

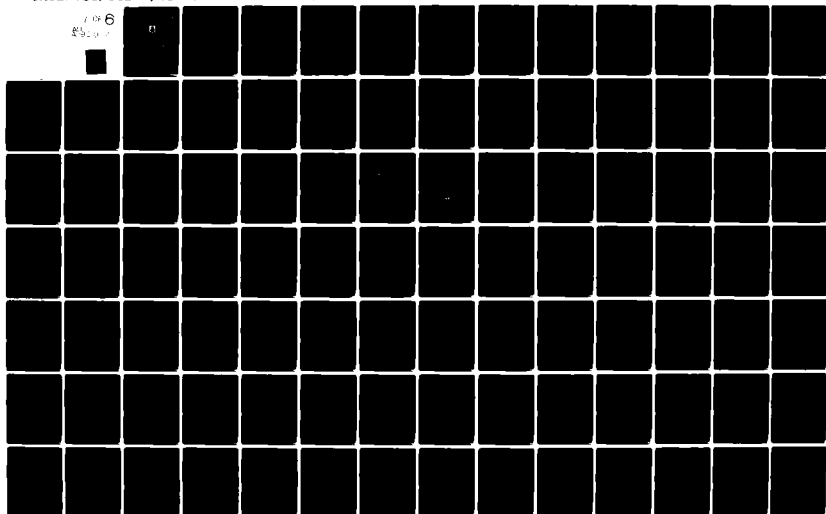
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EXPERIENCE OF SOVIET MEDICINE IN A GREAT PATRIOTIC WAR, 1941-19--ETC(U)
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EXPERIENCE OF SOVIET MEDICINE IN A GREAT
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increase in the years of the war of a number of crushed breaks (Table 301), in the dependence on the increasing ballistic properties of the wounding weapon.

An increase in the number of crushed breaks in comparison with a more considerable reduction in the number of fragmented ones was small, however, since the frequency of amputations with the crushed breaks almost 15 times was more than with of the fragmented, the value crushed breaks in an increase in the frequency of amputations in the years of war is doubtless.

Another important factor is an increase in the years of the war of a number of fragmentation injuries (on all segments, together undertaken, with 35.50/o during the first year of war to 44.70/o in last year), since with the fragmentation injuries amputations were conducted more than 3 times more frequently than with the bullet injuries.

Furthermore, in proportion to the acquisition of larger experiment/experience were established the real limits of the conservative treatment of bullet breaks, which were being examined initially too optimistically.

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Table 301. Frequency of shattered and fragmented breaks of the bones of extremities during the different years of war (in the percentages).

(1) Локализация перелома	(2) Виды перелома по годам войны							
	(3) первый		(4) второй		(5) третий		(6) четвертый	
	(7) при раздроблении	(8) оскольчатый	(7) при раздроблении	(8) оскольчатый	(7) при раздроблении	(8) оскольчатый	(7) при раздроблении	(8) оскольчатый
Плечо (9)	20,0	54,8	19,6	51,4	18,3	52,3	22,7	47,3
Предплечье (10)	13,3	58,2	15,9	56,1	15,5	55,5	13,7	57,5
Бедро (11)	13,9	49,9	14,3	49,5	15,6	42,3	14,8	40,7
Голень (12)	19,0	48,7	22,7	45,5	22,6	40,7	24,2	39,1

Key: (1). Localization of break. (2). Forms/species of break on years of war. (3). the first. (4) the second. (5). the third. (6). the fourth. (7). crushed. (8). fragmented. (9). Shoulder. (10). Forearm. (11). Thigh. (12). shin.

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Considerable interest presents a question about the immobilization of injured extremities without which surgical processing with the bullet break cannot be considered final. Immobilization is necessary not only for the fixation of scrap in the correct position, it was very essential preventive substance against the development of anaerobic infection. This conclusion/derivation was made already during war 1914-1918 (N. N. Burdenko et al.), but

then immobilization was applied rarely and its methods were extremely inadequate: short splints/pulp publications, carton also of any genus the improvised attachments.

From the examination Tables 302 follows the conclusion that the immobilization of lower extremities after the primary processing of bullet breaks was realized in the overwhelming majority of injured people, especially because some number of immobilization was not reflected in the histories of disease/sickness/illness/malady and therefore it entered into the graph of the "information about the immobilization it was not". It is necessary to think that these shortages of documentation occurred to the identical degree both for the lower and for the upper extremity.

Table 302. The information about the presence of the immobilization of extremities after the primary processing of the bullet breaks on weather of which subsequently it was necessary to amputate (in the percentages).

Локализация перелома (1)	Конечность иммобилизована (2)	Сведений об иммобилизации не было (3)	Всего (4)
Плечо (5)	47,0	53,0	100,0
Предплечье (6)	58,2	41,8	100,0
Бедро (7)	80,3	19,7	100,0
Голень (8)	78,6	21,4	100,0

Key: (1). Localization of break. (2). Extremity is immobilized. (3). Information about immobilization it was not. (4). In all. (5). Shoulder. (6). Forearm. (7). Thigh. (8). Shin.

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Table 303. Distribution of injured people with the bullet break of shoulder and thigh bone according to the form/species of immobilization after the primary surgical processing in the group of injured, that were subjected and not subjected to amputation (in the percentages).

(1) Локализация перелома	(2) Группа раненых	(3) Вид иммобилизации								(13) Всего	
		(5) шины							(12) глухая гипсовая повязка		(13) прочие виды им- мобилизации
		(6) Дитерихса	(7) Дитерихса с гипсовыми повязками	(8) Томаса	(9) Крамера	(10) картонные, фанерные	(11) гипсовые				
(14) Плечо	(15) Подвергшихся ампутации после первичной обра- ботки	—	—	—	65,9	2,4	2,4	2,4	26,9	100,0	
	Не подвергшихся ампутации . . .	—	—	—	62,2	2,7	5,8	2,8	26,5	100,0	
(17) Бедро	(15) Подвергшихся ампутации после первичной обра- ботки	72,0	1,2	1,2	6,1	—	1,2	3,0	15,3	100,0	
	Не подвергшихся ампутации . . .	59,3	2,6	4,2	19,1	—	2,1	3,0	18,7	100,0	

Key: (1). Localization of break. (2). Group of injured people. (3). Form/species of immobilization. (4). In all. (5). splint. (6). Diedrich. (7). Diedrich with gypsum annuli. (8). Thomas. (9). Cramer. (10). carton, plywood. (11). gypsum. (12). anechoic gypsum bandage. (13). other forms/species of immobilization. (14). Shoulder. (15). Subjected to amputation after primary processing. (16). Not subjected to amputation. (17). Thigh.

Therefore the considerable preponderance of the high indicators of the graph indicated in the relation to the breaks of the bones of shoulder and forearm makes it possible to consider that concerning the immobilization of upper extremity the matter was more badly.

On the methods of immobilization and to a certain degree about the character/nature of the breaks with which was applied the immobilization it is possible to compose representation according to given data of the deepened development of the histories of disease/sickness/illness/malady (Table 303).

On the basis table 303 it is possible to make the following conclusions:

1. As the basic means of immobilization with the break of femoral bone served the splints of Diedrich. The wide supply by them was great achievement and lowered the percentage of use/application for the immobilization of another material, usually improvised and extremely inadequate.

2. With breaks of shoulder bone, as a rule, were applied splints of Cramer, that one should recognize under conditions for primary

processing by completely advisable.

3. Anechoic gypsum bandage found insignificant use/application that it is also completely substantiated, since original attempts to convert with the aid of anechoic gypsum bandage bullet break into that closed, as a rule, led to risky complications and therefore they were very soon ended.

The impossibility to make a conclusion about the favorable effect of the more advanced methods of immobilization on further fate of extremity is explained by the fact that they, it is necessary to assume/set, they were applied during the heavier damages.

Readings to the amputations.

Question about the readings to the amputations apropos of bullet injuries one of the most debatable ones. A large number of the fatal results and a disastrous position of those remaining in the living ones after amputations in the preantiseptic period caused the doubt of the advisability of their wide application. Doubts these fortified themselves by the observations when injured people with those irrefutable, it would seem, by readings to the amputation, after avoiding it for some reason or other, remained in the living ones and retained extremity, sometimes with the satisfactory function.

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Against the wide application of amputations grew on the protest. Literature data, which derived the need for restricting readings to the amputations, met sympathetic response.

In 1756 Parisian royal surgical academy sentenced on the contest the premium to Zh. F. (J F Faure), who arrived at the conclusion that the immediate operations/processes (in the field) not at all must be conducted.

By several years later large impression produced dissertation I. U. Bil'gera (J. U. Bilguer) and General-surgeon of army Friedrich II. In this dissertation, and also in other his composition, written (1782) already in a somewhat directive for the prussian military surgeons form, I. U. Bil'ger rejected amputations apropos of military damages almost completely.

Caused by works I. U. Bil'gera controversy impelled the most prominent surgeons of that time Zh. R. Tenol (J R Tenon), S. Sharp (S Sharp), P. Pott (P. Pott), P. F. Persi (P. F. Percy) et al. to reexamine her installations, and also to refine and to argue readings to the amputations.

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Dogmatism of previous readings was shaken, and their proposed in 1812 K. P. Grefe (C. P. Graefe) separation into the absolute ones and the relative ones rapidly became conventional.

Subsequently large role played the statistical data about the results of amputations, given by Zh. F. Mal'genes (J F Malgaigne). Its results and conclusions/derivations (1848) irrefutably demonstrated insufficient validity and danger of the wide application of amputations.

In 1849-1851 and 1851-1853. Belgian medical academy twice proposed one and the same theme to the competition of the premium: "to show on basis of the contemporary methods of the treatment of substance for the avoidance of amputation".

At the first contest was awarded A. Massar's composition (A Massare) "Chirurgie conservatrice". At the second contest the medal and honorary response obtained Breslavl surgeon G. Paul (G Paul) for the fundamental work the "conservative surgery of members, or the presentation of substances and methods to avoidance and limitation of amputations, and also resections".

All these are only basic landmarks on the path of limiting the readings to the amputations in the preantiseptic period. Discussion and controversy continued uninterruptedly, from time to time abating and being peaked again. It is necessary to note that the transactions indicated for the practical management/manual gave little. Their authors greatly convincingly derived, that the amputations are applied too widely and that their results are sad. However, to propose any new, more advanced methods of treatment they not could.

Much greater it was made others. In 1788 F. Shopar (F Chopart) it proposed ramification stops with the retention/preservation/maintaining of heel and collision bones. The operation/process, proposed by F. Shopar, followed even the more advisable propositions: ramification according to Zh. Lisfrank (J Lisfranc, 1815) and amputation of shin according to D. Sayn (J Syne, 1842).

In 1854 published his osteoplastic method of amputation N. I. Pirogov. These interventions displaced with the appropriate injuries stops the amputation of shin in loco electionis, which was being considered earlier as the universal operation/process during the heavy damages stops.

A large step/pitch forward on the way of limiting the readings

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toward the amputations made B. Langenbek (B. Langenbeck) in the period of a Danish-Schluswig-Holstein war 1848-1851. With the fresh bullet injuries of large/coarse joints instead of the amputations, which were being counted in these injured people by those by absolutely shown, B. Langenbeck began to produce resections.

Vast merit in this region of military surgery belongs to N. I. Pirogov, who created the "saving treatment" of the heavy bullet damages of extremities, principal value in which had the proposed by N. I. Pirogov gypsum bandage. Its imposition, on N. I. Pirogov's persuasion, "must in the incomparably larger part of the cases replace production in the primary operations/processes (amputations and resections) by the dressing stations". This position of N. I. Pirogov preserved completely entire its significance and it up to now and proved to be correct not only for the amputations on the dressing stations, but also in the remaining stages of sanitary evacuation. The proposed by N. I. Pirogov gypsum bandage at all fronts of the Great Patriotic War was basic textbook with the bullet breaks; surgical work without the gypsum bandage in all stages of sanitary evacuation became unthinkable.

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Certain representation about the use/application of amputations

in the preantiseptic period can be composed according to following data. In Crimean War 1854-1856 on the French army were produced 4915 amputations and ramifications. Furthermore, in 119 injured people it is amputated on two extremities and in one - three] to Zh. G. Shenyu (J. G. Chenu)].

In the federative army of the North American United States in war 1862-1863 it was subjected to the truncation of 6867 extremities [L. Lefor (L. Le Fort)].

during Franco-Prussian war 1870-1871 in the French army it was produced 12073 amputations and ramifications (J G Chenu). Into this number did not enter the numerals of the truncations of hand, foot and fingers/pins.

On the official military medical report about the Russo-Turkish war 1877-1878 in a Russian-Danube army it was made, including the truncations of fingers/pins, 1298 ramifications and 1447 amputations.

The introduction to antiseptic, then asepsis and improvement in the general/common/total setting of army medical matter opened/discovered great possibilities for limiting the readings to the amputations. It seemed this question was close to the happy permission. However, first world war 1914-1918 showed the inaccuracy

of these optimistic propositions. The number of amputations in each of the battling armies proved to be exaggerated; precise numerals were unknown. The official reports give the possibility to come to light/detect/expose those only amputated which were evacuated (table 304).

Here did not enter amputated injured, dead in the army region, or subjected to partial truncations feet and hands.

On the statistics of French military ministry on 31 October 1919 it were fitted with prosthetics 33342 injured people after amputation, from whom 12175 had defects of upper extremities and 21167 - lower. This summary did not reflect the actual number of amputations, since by it were not taken into consideration dead persons after amputations, or those, whom for some reason or other could not be fitted with prosthetic. The partial amputations of hand and foot with the summary are not connected.

On the quantity of injured people which produced amputation in the Russian army for war 1914-1918, there is no full/total/complete information. According to P. I. Kurkin's data, a number of amputations composed 5.20/o of a total number of injured people.

This large number of amputations of N. N. Burdenko was explained

by a "deficiency/lack in the sharp pre-war general-surgical installations, weak acquaintance of doctors with the methods of treatment, with the rules of evacuation and with the prospects for stationary treatment".

Especially widely were conducted the unjustified amputations in the foremost stages, i.e., soon after injuries. For stopping this were required extreme measures. In the Russian army to surgeon-consultants it was necessary to attain the prohibition of amputations in the foremost stages almost by way of order (M. N. Akhutin).

Table 304. The number of injured which produced amputation on the different occasions, in the foreign armies in war 1914 [1918].

(1) Армия	(2) Ампутированная конеч- ность		(3) Всего
	(4) верхняя	(5) нижняя	
Английская . . . (6) . .	11 600	29 400	41 000
Германская . . . (7) . .	20 771	45 359	66 130
Американская . . . (8) . .	1 109	2 745	3 854

Key: (1). Army. (2). Amputated extremity. (3). In all. (4). upper. (5). lower. (6). English. (7). German. (8). American.

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In the French army "followed order about the withdrawal of amputation instrumentation from the surgical set of regimental dressing stations" (E. Yu. Osten-Saken).

The sad results of war 1914-1918 required the new review of readings to the amputations.

In the beginning of the Great Patriotic War the main administration of the evacuation hospitals of Narkomzrav USSR published the following instruction:

Readings to the primary amputations:

1. Full/total/complete or almost full/total/complete separation/section of extremity or part of it.
2. Gas gangrene of extremity with rapidly developing edema and numbness of peripheral division of extremity.
3. Gas gangrene when freezing of peripheral division of extremity is present,.
4. Numbness of extremity, caused by damage of vessels, by freezings and burns/scalds.
5. Open damage of bones and joints with large crushing soft tissues, with damage of nerve-vascular shafts.
6. Open damages of joints with dislocations and subluxations/semiluxations, with extensive breaks of epiphysial parts of bone with impossibility due to their vastness to produce resection.
7. Extensive damages of soft tissues: skin, fascia and muscles - with large defects of soft tissues, especially in region of thigh,

shin and shoulder, that eliminate possibility of healing and functional aptitude of extremity.

Readings to the secondary amputations:

1. Extensive festerings on the spot of the break of bones with the flows, with pockets, with the propagation of suppurative discharge between the muscles, the tendons and the vaginas, with the harassing temperature.

2. Suppurative inflammation of joints, which is accompanied by fragmented breaks of pineal systems with high temperature and with incipient depletion of patient.

3. Repeated hemorrhage from large vessels with simultaneous break of bones and in presence of septic state.

4. Necroses of extremities, connected with damages of nerve-vascular bundles.

5. Gas infection of extremity with extensive damages of soft tissues and breaks of bones, especially thigh.

6. Gangrene of extremity as a result of freezing and burn/scald

with progressive general/common/total intoxication, which threatens life of patient".

During the Great Patriotic War these readings underwent review. First of all caused doubt the distribution of them in connection with primary and secondary amputations. These terms are introduced by T. Ol'kok (Th Alcock), who into 1836 proposed the sharp classification of amputations, constructed depending on periods, beginning from the moment/torque of injury.

Primary ones were called the amputations, produced for the first 24 hours after damage prior to the beginning of "traumatic" wound fever; secondary were considered the amputations, undertaken at the termination of the wound fever when from the wound already abundantly was separated/liberated pus, i.e., on the average through 8-10 days after injury even later. Amputations in the period of wound fever were named intermediate.

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This simple classification was to the highest degree advisable, since the issue of amputations in the preantiseptic period, other conditions being equal, in essence depended on time factor. The greatest lethality by the general/common/total acknowledgement gave

intermediate amputations, smallest - primary. In this case it proved to be that the earlier produced the primary amputation, the greater the chances to the recovery.

T. Ol'kok's classification was preserved to the present, but its previous definition was lost. Term "intermediate amputations" ceased to be mentioned almost entirely; the boundary between the primary and secondary amputations became difficult to that determined. Convincing examples in this respect it is easy to reveal/detect at least in the given above instruction, after comparing points about the gas infection or the numbness as a result of the damage of vessels in the readings to the primary and secondary amputations. Together with these terms appeared new: the urgent, early, deferred and late amputations. The use/application of these all names in the different values and not always with the sufficient demarcation from each other introduced into the readings to the amputations considerable vagueness.

It grew/rose still more because the time factor, which lies at the basis of these all terms, lost its former value. The calculation/enumeration of hours and days, which elapsed from the moment/torque of injury, ceased almost completely to be taken into consideration. Principal value acquired not period, but the state of injured person and his damaged extremity. By these factors were

determined readings to the amputation. This point of view, persistently advanced by P. A. Kupriyanov and S. I. Banaytis, stopped during the Great Patriotic War of conventional.

Developing his view, P. A. Cyprian completely forewent the separation of amputations into the primary ones and the secondary ones and introduced the new concepts of primary and secondary readings.

"Primary readings are determined by clinical signs or direct anatomical decomposition, which indicate the obvious need for the immediate removal of extremity, namely: the breakaways, extensive crushing, being determining lack of vitality extremities, damages of large vessels.

By the secondary readings are understood the signs whose clinical manifestations indicate the gravest, threatening life irreversible complications of wound process, which develop sometimes after the considerable periods after the injury: the complications of aerobic, anaerobic infection, which accept septic course, erosion and generally secondary hemorrhages, osteomyelitis, gangrene, which attack as a result of secondary changes in the vessels, trophic changes and so forth, etc.

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The amputations, produced after the designation of demarcation line, just as re-amputation, produced from the vital readings, relate to the same group" (P. A. Cyprians).

Hence it follows that the primary readings are determined by the character/nature of injuries, also, in any dependence on the time, which passed from the moment/torque of injury, they will not cost. But they all are revealed/detected within the nearest after injuries period, what is for them characteristic feature.

For the secondary readings, defined as the complications of wound process, is characteristic the more prolonged period, which elapsed from the moment/torque of injury.

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However, this distinctly expressed character/nature of time is only by associated and in the majority coinciding sign. On surgeon's tactics it no effect exert must. Peculiar tribute to the past remain only the names: "primary" and "secondary" readings. applying them, it is difficult to renounce customary, connected with these terms representation about the periods.

Are led below from the proposed by N. N. Burdenko for the

military surgeons "indications about the amputations", the classification of amputations and the enumeration of readings to their use/application:

Are distinguished the amputations: primary, secondary, late and repeated (re-amputation).

Amputation is called primary, when it realize by way renderings to the first surgical aid, and it consists in the removal/distance of clearly nonvital extremity

Secondary should be called the amputation which make for the removal/distance the extremities as the focus of intoxication and infection in the presence of the overall phenomena, which threaten the life of entire organism.

Late amputation is called the operation/process which make during the firmly not healing fistulas, prolonged coursing of osteomyelitis, which threatens to cause the amyloid of parenchymatous organs/organs, the multiple ankylosis, which disturb functions the extremities or which make the extremity of useless.

Readings to the primary amputation:

a) the full/total/complete or almost full/total/complete separation/section of extremity with the injury;

b) injury with the damage of the main shafts of vessels and nerves, soft tissues and the extensive breaking up of bones;

c) the open damages of bones and joints with the dislocations and the subluxations/semiluxations, with large crushings of the soft tissues when due to their vastness is impossible proper setting of joints and bone scrap or resection and when there are simultaneously presently secondary disorders of blood circulation;

d) the extensive damages of soft tissues - skin, fascias and muscles - with their large defects under the condition of damaging the skin integuments for the large elongation/extent - are more than two thirds of periphery; the vastness of such damages eliminates the functional suitability of extremity even during the utilization of plastic operations/processes;

e) the extensive deep numbnesses of tissues, caused by burns/scalds and chemical damages when is damaged the blood circulation of considerable cut the extremities and the change of tissues border charring....

... secondary amputations.

As readings to the secondary amputation they serve:

a) the gas infection of extremity with extensive damage of soft tissues and the breaks of bones, the so-called "massive form";..

b) extensive acute festerings with the breaks of tubular bones with the disseminated phlegmon, with the damage/defeat of muscles, tendons, their vaginas., with the phenomena of intoxication, with the high temperature, with the unsuccessful conservative measures;

c) the suppurative inflammations of joints primary - with their direct injury and secondary, that developed as a result of the fragmentation breaks of pineal systems, with the phenomena of intoxication, high temperature and heavy general state of injured person (sepsis);

d) repeated hemorrhages from the large vessels with the complicated pyo- infected breaks, the developing sepsis and the depletion of injured person, with the failure of the transfusion of blood and conservative surgical interventions.

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Table 305. Distribution of injured people with the bullet break of the bones of extremities according to the readings to the amputation (in the percentages) .

1) Локализация перелома	2) Группа раненых, подвергшихся ампутации	3) отрыв, раздробление	4) ранение сосудов
Плечо (12)	При первичной обработке	77,0	8,3
	В другое время	3,3	8,3
Предплечье (16)	При первичной обработке	93,0	1,8
	В другое время	6,3	6,3
Бедро (17)	При первичной обработке	48,0	12,0
	В другое время	4,8	2,4
Голень (18)	При первичной обработке	80,8	2,8
	В другое время	7,2	1,6
(19) В среднем . . .		33,6	3,8

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III. Показания к ампутации						(14) Всего
(2) инфекционная гангрена	(8) анаэробная инфекция	(9) сепсис	(10) гнойный артрит	(11) остеомиелит	(12) сочетание указанных причин	
1,8 10,0	11,1 53,4	0,9 11,7	— 3,3	— 1,7	0,9 8,3	100,0 100,0
— 10,4	1,8 64,5	— 10,4	— —	— —	3,4 2,1	100,0 100,0
12,0 7,2	26,0 28,7	— 45,9	— 2,4	— 3,8	2,0 4,8	100,0 100,0
2,8 12,4	10,0 50,0	— 11,6	— 9,6	— 0,8	3,6 0,8	100,0 100,0
7,0	30,3	13,3	3,0	1,0	3,0	100,0

Key: (1). Localization of break. (2). Group of injured people, who were subjected to amputation. (3). Readings to amputation. (4). In all. (5). breakaway, crushing. (6). injury of vessels. (7). ischemic gangrene. (8). anaerobic infection. (9). sepsis. (10). suppurative arthritis. (11). osteomyelitis. (12). combination of reasons indicated. (13). Shoulder. (14). During primary processing. (15). In another time. (16). Forearm. (17). Thigh. (18). Shin. (19). On the average.

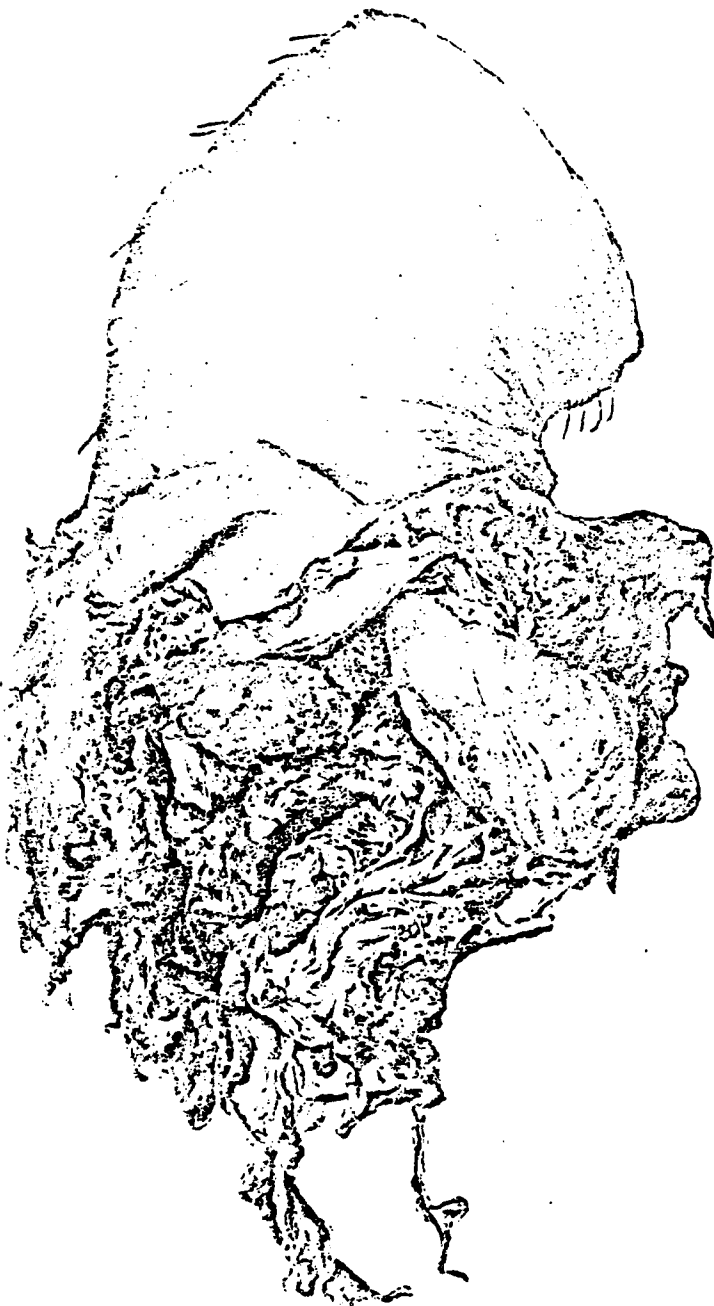


Fig. 124. Full/total/complete breakaway of extremity by explosion of projectile in limits of upper half shin. At the level of breakaway the extensive decomposition of all tissues with the loss of their structure and anatomical relationships/ratios.

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Fig. 125. X-ray photograph of shin, depicted in Fig. 124. Are visible the serrated outlines of the fracture of bones, bone scrap, displacement of the scraps of soft tissues and numerous dustlike fragments of projectile.

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e) numbness after the operation/process of the dressing of main arterial shafts with their injury, after operation/process apropos of fluctuating hematomas, arterial and arteriovenous aneurism;

f) the freezing of the fourth degree after necrectomy or rejection/separation of the become numb sections

... late amputations and re-amputation make in the back institutions of front and internal region".

Together with the classifications of N. N. Burdenko and P. A. Kupriyanov, during the Great Patriotic War and after it widely continued to be applied the terms "primary" and "secondary" amputations in the most varied understanding, many authors not indicating, what precisely amputations they designate by one or the other term. Therefore during the comparison of materials to avoid erroneous conclusions/derivations it is necessary entirely to forego the separation of amputations into the primary ones and the secondary ones and to examine them directly from the separate readings.

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The materials of the deepened development of the histories of disease/sickness/illness/malady give the following picture (Tables 305).

From Table 305 it follows that the great number of amputations was produced apropos of breakaway (Fig. 124-128) and crushing (Fig. 129-131). The overwhelming majority of amputations, from these readings, was produced during the primary processing, i.e., the lack of vitality of extremity was doubtless upon the first examination/inspection.

The percentage of the amputations of thigh apropos of breakaway and crushing proved to be smallest, and forearms - greatest. Shoulder and shin in this respect engaged intermediate place.

Such relationships/ratios were obtained because for breakaway or crushing of the less massive part of the extremity sufficient smaller mechanical violence. Therefore forearm underwent breakaways and crushing more frequently than thigh.



Fig. 126. Incomplete breakaway of right forearm with the supplementary injuries of hand and fingers/pins as a result of the explosion of mine. In the extensive wound are visible the ends of the torn tendons and scrap of bones. The neurovascular bundles are also torn.

1532

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Fig. 127. X-ray photograph of preparation, depicted in Fig. 126.

Breaking up of the extremital ends of the bones of forearm with the large bias of scrap, decomposition of radiocarpal joint and extensive gaps of soft tissues.

Page 485b.



Fig. 128. Incomplete breakaway of extremity in limits of upper third of shin, caused by explosion of hand grenade (X-ray photograph). The extremital part of the extremity is connected with that remaining only the bridge of soft tissues. In its thickness as in the entire

periphery of injury, numerous bone scrap and fine/small metallic fragments. Between the muscles are visible the interlayers of explosive gases.

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It is possible to indicate another reason: under the unfavorable conditions of combat circumstances certain number of injured people with the breakaway and crushing of thigh perished earlier than by them could be produced amputation. Injured people with the same damages to shin, shoulder and forearm, other conditions being equal, better maintained/withstood period until the rendering by them of surgical aid, that also was reflected in the percent ratio of the amputations, produced at different levels of upper and lower extremities apropos of breakaway and crushing.

Following in the frequency reading was anaerobic infection in all its forms (Fig. 132 and 133).

It is characteristic that almost the half the amputations of thigh from this reading was produced by way of primary surgical processing. The corresponding numerals of the amputations of shin and shoulder are much lower, and for the forearm they composed only 1.80/o.

1535

This relationship/ratio was, it is necessary to think, by the result of the late delivery/procurement of injured people with the break of femoral bone. Injured people with the break of the bones of shin, shoulder and especially forearm could be more easily and more rapidly were delivered to the place productions in the primary surgical processing and therefore they underwent by it within the earlier periods. Furthermore, as is known, anaerobic infection more frequently complicated the injury of thigh, finding in its massive soft tissues of the conditions, which most facilitate their development.

The third place among the readings to the amputation occupies sepsis (Fig. 134). With exception of scarce sharp/acute forms it was developed slower and it is later than anaerobic infection, and therefore almost all amputations apropos of sepsis were produced not during the primary processing, but in the subsequent time.

The injuries of thigh were complicated by sepsis much more frequently than the injury of shin or upper extremity, moreover during the damages of thigh sepsis flowed/occurred/lasted especially heavily. In this should be seen the reason for the preponderance of the amputations of thigh apropos of sepsis.

Amputations apropos of the damages of vessels will cost in numerical sense in the fourth place; they were conducted mainly as a result of the ischemic gangrene.

1536



Fig. 129. Crushing of elbow joint by the fragment of projectile with the extensive damage of soft tissues. Is visible the cavity of hematoma, which was being formed as a result of the gap of the artery of cubital bend. As direct occasion for the amputation served the numbness of hand.

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Fig. 130. crushing stops by explosion of antipersonnel mine (X-ray photograph). Extensive damage of bones, especially tarsus, and the gap of soft tissues. Bone scrap and many fine/small metallic fragments.

Page 486b.



Fig. 131. Bullet injury in limits of lower third of thigh (X-ray photograph). Crushed break of bone with the considerable bias of scrap. Breakaway of the upper part of stifle. Extensive gaps of soft

tissues; in the thickness their interlayers of the gas, introduced with the injury.

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The number of amputations apropos of suppurative arthritis and osteomyelitis was comparatively small; evidently, as direct reading to the truncation of extremity with these complications in the majority served the development of the sepsis on which were considered these injured people.

Extremely important ones is a question, in what measure during the Great Patriotic War it was possible to avoid the excessively wide application of amputations, characteristic for the past wars.

As completely indisputable ones should be recognized amputations apropos the breakaway of extremity. With the full/total/complete breakaway usually the peripheral part of the extremity is absent. With the incomplete breakaway the amputation in the essence was the primary surgical processing of extensive wound with the removal/distance of clearly nonvital sections. If with the injuries with the small zone of damage were cut all over the separate flakes of soft tissues, then upon the heaviest decomposition it was necessary to drive out entire nonvital part of the extremity.

More complex there was the establishment of readings to the amputation with crushings. The extremity, which was seeming nonvital with the first inspection of injured person, who weakened from the cold, the loss of the blood or who was in the state of shock, subsequently frequently proved to be viable. Specifically, in this respect were frequent the errors during war 1914-1918. Not less conditional ones were frequently other readings to the amputations.

Study of the materials of the Great Patriotic War does not give grounds for the conclusion about the unjustifiably wide application of amputations.

At the same time, one cannot fail to note that by some surgeons of reading to the amputation apropos of suppurative wound complications they were excessively limited or were established/installed too late.



Fig. 132. surgically processed fragmentation injury of elbow. Considerable loss of the substance of the pineal systems of femoral and tibia. Amputation is produced as a result of the gas infection, which developed in the tissues of shin.

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Excessive conservatism in the relation to suppurative wound complications was condemned by already N. I. Pirogov. "It is very important to know also, said he, that injured person dies sometimes from the depletion and the flows in the late periods after 2-3 and even 7 months after damage. In this case the break can seem joined. Sometimes really is formed the callus about the become numb ends, and the mobility of scrap disappears; but corn this - hollow as egg-like shell, and includes pus and sequestrations, while sometimes also bullet.... I observed 4 cases of this late death and was vexed to itself, that for long he was not solved for the late amputation". By the illustration of this excessive conservatism it can serve as Fig. 135.

More than possibility for limiting the amputations apropos of suppurative infection they were discovered after the appearance of new powerful combat means with it - first of all of penicillin. To give estimation to this substance in the digital expression on the basis of the used materials is impossible.

It is necessary to draw another conclusion of organizational order. T. Ol'kok's ancient classification eliminated itself and it does not reflect contemporary views on the amputation.

Hardly it is possible to recognize as successful ones and the attempts to introduce into the obsolete terms the new content.



Fig. 133. Fragmentation injury of foot by grinding of the part of the bones of tarsus. Surgical processing/treatment it was not. Amputation is produced apropos of gas infection.

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Since basic, being determining this classification sign of time fell, was created the great possibility of different understanding of the terms: "primary" and "secondary" amputations. Hence end difficulties during the comparison of different authors' materials and frequently even in the understanding of their data.

One should turn also from this classification and in the relation to readings. Under the headings of "primary" and "secondary" readings (according to P. A. Kupriyanov) are joined the pathological processes, too different for any general/common/total conclusions/derivations.

It is most expedient to examine amputations directly from the separate readings: grinding, anaerobic or suppurative infection, freezing, ischemic gangrene and so forth, etc. Inside each of the readings to preserve laying out on the time, calculating by its hours or by days.



Fig. 134. Fragmentation breaking up of the extremital end of the tibial bones with the damage of talocrural joint. Surgical processing/treatment it was not. Amputation is produced apropos of septic state.

Levels of amputations.

The truncation of extremity this characteristic intervention that any subjectivism in the account according to this sign can be considered excluded. It is possible also not to fear that the level of amputations and ramifications was determined by previous surgeons differently from at present. Therefore the statistical summaries of past wars on these questions can be considered much more suitable for the comparison, than on many others.

We give some historical data, borrowed from the works Zh. G. Shenyu (J G Chenu) and L. Lefora (L Le Fort) (Table 306).

According to these data it is possible to establish/install some laws, which came to light in the preantiseptic period of the surgery:

- 1) in comparison with the amputations of ramification were conducted rarely, moreover chiefly in the shoulder joint;
- 2) lower extremities they underwent truncations into $1\frac{1}{2}$ and are even 3 times more frequently than upper;
- 3) predominated amputations in the limits of the proximal segments of extremities; in the relation to thigh these are phenomenon is not always constant, in the relation to shoulder it is expressed very sharply.

For the characteristic of position during the war 1914-1918 is given the information from the detailed summary of the 3rd French army (according to V. Sheynis) (Table 307).

Table 306. Frequency of ramifications and amputations of extremities on the different occasions in different wars of the XIX century (in the percentages).

(1) Вид усечения конечности	(2) Название армии и войны				
	(3) Французская армия в крымской войне 1854- 1856 гг.	(4) Английская армия в крымской войне 1854- 1856 гг.	(5) Французская армия в ита- лианской кампании 1859 г.	(6) Федератив- ная армия США в войне 1862- 1866 гг.	(7) Французская армия в франко-прусс- кой войне 1870- 1871 гг.
(8) Верхняя конечность					
(9) Вычленение в плечевом суставе . . .	4,5	8,1	6,5	3,5	3,1
(10) Ампутация плеча	23,2	21,1	27,4	28,2	19,2
(11) Вычленение в локтевом суставе . . .	1,6	—	0,5	—	1,2
(12) Ампутация предплечья	6,7	12,6	5,3	8,7	3,3
(13) Вычленение в лучезапястном суставе .	1,3	—	—	—	0,9
(14) Всего вычлененный	7,4	8,1	7,0	3,5	5,2
(15) ампутаций	29,9	33,7	32,7	36,9	22,5
(16) Нижняя конечность					
(17) Вычленение в тазобедренном суставе .	0,4	1,5	0,6	0,3	0,2
(18) Ампутация бедра	33,9	34,2	29,2	23,3	35,9
(19) Вычленение в коленном суставе . . .	1,4	1,5	0,4	1,7	0,2
(20) Ампутация голени	25,6	21,0	30,1	34,3	35,0
(21) Вычленение в голеностопном суставе .	1,4	—	—	—	1,0
(22) Всего вычлененный	3,2	3,0	1,0	2,0	1,4
(23) ампутаций	59,5	55,2	59,3	57,6	70,9

Key: (1). Form/species of the truncation of extremity. (2). Name of army and war. (3). French army in Crimean War 1854-1856. (4). English army in Crimean War 1854-1856. (5). French army in Italian campaign of 1859. (6). federative army of USA in war 1862-1866. (7). French army in Franco-Prussian war 1870-1871. (8). Upper extremity. (9). manifestation in shoulder joint. (10). Amputation of shoulder. (11). Ramification in elbow joint. (12). Amputation of forearm. (13). Ramification in radiocarpal joint. (14). In all ramifications. (15).

amputations. (16). Lower extremity. (17). exarticulation in hip joint. (18). Amputation of thigh. (19). exarticulation in knee joint. (20). Amputation of shin. (21). exarticulation in talocrural joint.

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The fundamental principles, available in the preantiseptic times, were preserved completely. Especially this is noticeable, if we exclude truncations of foot, hands also of fingers/pins. There is no necessity to give supplementary statistical data there is no war 1914-1918, considerable disagreements in them in this respect.

The materials of the Great Patriotic War on the basis of the deepened development of the histories of disease/sickness/illness/malady are represented in Table 295, where with a number of amputations are connected also ramifications. They were conducted sufficiently rarely. Ramifications in the hip and knee joint composed 2.50/o of all truncations of lower extremity; ramifications in the shoulder and elbow joint - 4.50/o of all truncations of upper extremity.

According to P. A. Kupriyanov, at the front where it worked, ramification they composed 3.70/o of all truncations. M. I. Kuslik calculated a quantity of exarticulations into 1.70/o. Independent of

the fluctuations of the indicators of exarticulations at other fronts, they are insufficiently great in order to change the considerable preponderance of the amputations of lower extremities.

The reason for this position, steadily repeating in each war for a period of whole century, obviously, are the factors, which do not depend on the perfection of surgery and entire setting of military health matter. This, apparently, it depends on the fact that, in the first place, the lower extremity, as a result of its large volumetric measurements, more frequently underwent injuries than upper; in the second place, in the more massive soft tissues of lower extremity it is more frequently developed in the heavy forms anaerobic and suppurative infection. Furthermore, the functional value of the upper extremity, which suffered from the mechanical destruction of the tissues and subsequent infection, is considerably higher than lower one with the same changes. This familiar fact impelled and impels surgeons to maximally limit readings to the amputations of upper extremity.

Development in the latter/last decades of prosthetics both in the relation to the perfection of the constructions/designs of prostheses and expansion of the supply by them of those requiring acts in the same direction, since it makes it possible to substitute the lost lower extremity incomparably better than upper one.

By these all factors is explained the considerable preponderance of the amputations of lower extremities.

Table 307. Frequency of exarticulations and amputations of extremities on the different occasions in the 3rd French army during the war 1914-1918 (in the percentages).

(1) Верхняя конечность	(2) Нижняя конечность
(9) Вычленение в плечевом суставе . . 0,5 (5) Ампутация плеча 18,5 (7) Вычленение в локтевом суставе . . 0,3 (8) Ампутация предплечья 8,0 (11) Вычленение в лучезапястном суставе 4,6	(4) Вычленение в тазобедренном суставе 1,1 (6) Ампутация бедра 43,1 (3) Вычленение в коленном суставе . . 0,6 (10) Ампутация голени 19,8 (12) Вычленение в голеностопном суставе 3,4
(13) Всего вычлененный 5,4 (14) ампутаций 26,5	(13) Всего вычлененный 5,1 (14) ампутаций 62,9

Key: (1). Upper extremity. (2). Lower extremity. (3). Exarticulation in shoulder joint. (4). Exarticulation in hip joint. (5). Amputation of shoulder. (6). Amputation of thigh. (7). Exarticulation in elbow joint. (8). Exarticulation in knee joint. (9). Amputation of forearm. (10). Amputation of shin. (11). Exarticulation in radiocarpal joint. (12). Exarticulation in talocrural joint. (13). In all ramifications. (14). amputations.

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Is available to explanation the second special feature/peculiarity of statistical summaries - preponderance of amputations in the limits of the proximal segments of upper and lower extremity. For the amputation of thigh it was necessary to produce

not only apropos of the injuries of thigh itself, but frequently, also, after the damages to shin. The same should be said about shoulder and forearm. Thus, according to data of the deepened development of the histories of disease/sickness/illness/malady, of all amputations, produced apropos of the bullet breaks of the bones of forearm, only 49.00/o were made on the forearm, and remaining 51.00/o - on the shoulder; with the breaks of the bones of shin on the shin - 47.00/o, and on the thigh - 53.00/o.

There is large practical interest in the relationship/ratio of the levels of amputations and localization of the injuries of extremities. The selection of the level of amputation was since olden times defined by the formula: "To amputate is so low, as soon as possible" (N. I. Pirogov). This tactics logically escape/ensued from the observations that the produced below the amputation, the greater the chances in the injured person to whom was produced the amputation, to remain in the living ones.

After war 1914-1918 the level of amputations many surgeons began to determine depending on the technical capabilities of prosthetics. Wide acceptance received the so-called "amputation schemes", for the first time proposed by M. Tsur-Vert (M Zur-Verth) and altered subsequently by many authors [Ts. Pedzh (C Page), Kirk (Kirk), M. S. Yusevich, N. N. Priorov, Kaush (Kausch), B. I. Berliner et al.].

These schemes free surgeon from the need for determining in each separate injured person locus necessitatis of amputation, establishing instead of this locus electionis for each segment of upper and lower extremity, in connection with the technical capabilities of prosthetics.

Without submerging into the critical examination by each of these schemes, it is necessary to recognize that the sequence by them is completely expedient upon reamputations and some amputations "in the cold period", for example, with the freezing with the issue into the mummification when there is no danger for the life and it is possible to rely on primary adhesion.

However, for the amputations apropos of bullet injuries and their infectious complications "schemes" must be rejected. With the rendering to the urgent, mass and most diverse surgical aid frequently under the extremely unfavorable conditions of combat circumstances suffered grinding or by the breakaway of extremity, frequently with the multiple contaminated wounds it cannot be discussed about the parts of future prosthetics.

Considerations about prosthetics lose their decisive importance also upon the amputations apropos of injuries with the less extensive damages, but with the threatening life infection, in those finding in

the state of heavy toxicosis, that weakened from the loss of blood, stay on the cold, etc.

In these all states surgeon's basic problem is the retention/preservation/maintaining life of the injured at a cost of deprivation of its minimum part of the extremity. Retaining upon the amputation the largest possible remainder/residue of extremity, surgeon thereby creates more great possibilities for the subsequent reconstruction of stump for the purpose of prosthetics.

The level of amputations in war must be determined by localization and character/nature of damage, by general state of injured person, by presence or threat of wound infection and by conditions, under which is conducted intervention, but not by "schemes". Amputation on the "schemes" entails the unjustified truncation of extremities at the higher level than this is caused by real need.

These considerations, expressed in the beginning of war by the author, obtained confirmation from the side of surgeons' majority.

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For the first one-and-a-half year of the Great Patriotic War in those

hospitals where the surgeons adhered to the "amputation schemes", the number of produced amputations of thigh with the injuries of shin proved to be to 5.90/o more in comparison with those hospitals where these schemes they did not put to use.

The same was obtained on DMP of the same front. Surgeons, who followed schemes, amputated in the limits of thigh with the injuries of shin to 10.00/o more frequently than surgeons, who did not amputate on the schemes.

Difference is too great in order to leave it without the attention; it once more derives, that the use/application of the "amputation schemes" during the truncation of extremities apropos of bullet injuries must not have places. At the same conclusions arrived on the basis of the experiment/experience of the Great Patriotic War Ye. L. Berezov, N. D. Garin et al. These conclusions found their reflection, also, in the "Indications from the military field surgery" of main military medical administration, that it is necessary to consider as the important factor, which contributed to a decrease in the level of amputations.

According to the data of the deepened development of the histories of disease/sickness/illness/malady, from a number of amputations, produced during the primary processing apropos of the

break of the bones of shin, only 38.00/o were produced on the thigh, and from a number of amputations, produced with the break of the bones of shin from the secondary readings, amputation on the thigh composed 74.00/o; if we here add what do 36.00/o of injured people have the first group (in which amputation it is produced during the primary processing) was observed gas infection, also, in 44.00/o - the break of the bones of shin in upper third, and in the second group in 90.20/o - gas and septic infection, also, in 50.00/o - break of upper third of bones of shin, then it will become completely obvious that the amputations of the overlying segment because of one severity alone of injury were observed rarely.

On the basis of data of author's development, the relationship/ratio of the levels of amputation and localization of injuries (in the presence of break) is represented in the following form (Table 308).

According to the data of the deepened development of histories the diseases/sicknesses/illnesses/maladies, from a number of all amputations of thigh 45.00/o were made apropos of the break of the bones of shin, and from a number of amputations of shoulder 23.80/o - apropos of the break of the bones of forearm.

Table 308. The distribution of injured people which produced amputation apropos of the bullet break of the bones of extremities, on the localization of break (on the author's development, in the percentages) .

(1) Уровень ампутации	(2) Локализация перелома					(8) Всего
	(3) кисть	(4) лучеза- пястный сустав	(5) предпле- чье	(6) локтевой сустав	(7) плечо	
(9) Плечо (10)	—	—	31,9	2,1	66,0	100,0
Предплечье	2,0	9,8	86,3	—	1,9	100,0

(1) Уровень ампутации	(2) Локализация перелома					(8) Всего
	(11) стопа	(12) голеностопный сустав	(13) голень	(14) колен- ный сустав	(15) бедро	
(16) Бедро (17)	—	1,1	43,6	11,7	43,6	100,0
Голень (18)	3,5	18,2	75,5	1,6	1,2	100,0

Key: (1). Level of amputation. (2). Localization of break. (3). hand. (4). radiocarpal joint. (5). forearm. (6). elbow joint. (7). shoulder. (8). In all. (9). Shoulder. (10). Forearm. (11). foot. (12). talocrural joint. (13). shin. (14). knee joint. (15). thigh.

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There is certain interest the small number of amputations of shin and in forearms, produced apropos of injuries more proximal of the divisions of extremities. Almost all these interventions were undertaken apropos of the ischemic gangrene of the extremal

divisions of extremities as a result of the damage of blood vessels at the higher level. In the separate injured people by reading to the amputation of this type served trophic ulcers of foot as a result of the injury of sciatic nerve.

Anesthetization.

Basic installations on this question are given by main military medical administration in the "Indications on the military field surgery" in the section of "Indication about the amputations". The methods of anesthetization it was proposed to select depending on the special features/peculiarities of the general state of injured person. For the general/common/total anesthetization was recommended ethyl chloride in combination with ether/ester or only ether/ester. On the chloroform it was not mentioned entirely. This form of narcosis was generally considered permissible only in the presence or of special facts. Cerebrospinal anesthesia was excluded completely, since its use/application was frequently connected with the large drop in the blood pressure, risky for the heavily injured. Local anesthesia was acknowledged by especially desirable with the phenomena of shock and absolutely necessary with the pulmonary catarrhal symptoms.

This installation was preserved almost without the changes to

the end of the Great Patriotic War.

The actual distribution (in the percentages) of the forms/species of anesthetization upon the amputations (based on materials of author's development) was following: ether/ester - 53.20/o, ethyl chloride - 24.00/o, local - 14.40/o, is unknown what - 6.00/o, hexenal - 1.20/o, cerebrospinal - 0.80/o, chloroform - 0.20/o, other methods - 0.10/o, without anesthesia - 0.10/o.

The injured people in who after the beginning of amputation under the local anesthetization it was necessary to change to ethyl chloride, ether/ester or chloroform, they were noted in the graphs/counts of general/common/total anesthetization. The amputations, initiated under the anesthetization by ethyl chloride and which required subsequently of the use/application of ether/ester or chloroform, are also taken into consideration in these two graphs/counts.

From that indicated the evidently considerable preponderance of general/common/total anesthetization (78.60/o) above all forms/species of local (15.20/o). This of phenomenon is detected also in the materials of other authors (I. P. Ochkur, V. G. Weinstein, V. I. Popov, N. N. Priorov et al.) independent of the oscillations/vibrations of the given by them numerals. It should be

recognized completely substantiated.

The period of excitation in the beginning of anesthesia/narcosis under conditions of war, as a rule, occurred otherwise. Injured people with the heavy damages, tired by combat circumstances, weakened from the loss blood and pains or being in the state of toxicosis as a result of the already developing wound infection, inflowed into the state of anesthesia/narcosis extremely rapidly almost without the period of excitation or entirely without it.

The rapid onset of anesthesia/narcosis was even more facilitated by the preliminary introduction 1.5-2 ml 10/o of solution/opening of morphine. Most advisable proved to be the intravenous introduction of morphine on the operating table directly before beginning amputation. The injection of morphine under the skin gave much smaller effect, since as a result of weakening of heart activity, which was being observed frequently in heavily injured, absorption from subcutaneous cellular tissue in them was delayed.

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2-3 Minutes after the intravenous introduction of morphine painful reflexes faded also for full/total/complete anesthesia/narcosis was required the inhalation of insignificant quantities of narcotic

substance.

All this made it possible to spread readings to chloroethyl anesthesia which in the pure form/species with the large operations/processes in peacetime is applied rarely.

To a certain extent the wide application of a general/common/total anesthetization depended on most those operated, that desired "to fall asleep" during the operation/process, and the possibility to charge the conduct of anesthesia/narcosis to the specially trained nurse or feldsher.

Chloroform anesthesia, as a result of the connected with it complications and the dangers, propagation did not receive. Its use/application, as a rule, was that forced as a result of the special conditions of combat circumstances.

Hexenal and analogous substances of wide acceptance also did not find, although the general/common/total impression from this form of narcosis upon the amputations was according to the observations of the author very favorable. Hexenal was applied mainly in the back hospitals where was well mastered the use of it. There found frequent use/application cerebrospinal anesthesia. It they put to use, as a rule, upon the amputations apropos of the irreparable strains when

the general state of patient suggested no fears. The expansion of readings for the cerebrospinal anesthesia upon the amputations during the Great Patriotic War would be unsuitable.

Local anesthetization was conducted by means of the infiltration of tissues on the course of section/cut their by 0.5-10/o solution of novocaine either according to the method of "cross section", or using ^{VISHNEVSKIY'S} A. V. ~~Vishnevskiy's~~ method. During the truncation of upper extremities it was applied somewhat more frequent (17.00/o). This is completely understandable, since the less massive tissues of shoulder and forearm in comparison with the thigh and the shin created more favorable conditions for the infiltration by the anesthetizing solution.

The details of anesthetization technique in the histories of disease/sickness/illness/malady were mentioned rarely. The use/application of local anesthesia according to the type of "conductor" was encountered in separate injured people; the use/application of the so-called venous local anesthetization according to A. Beer (A Bier) or arterial (according to V. A. Oppelyu) could not meet for time. Local anesthetization by ice according to F. M. Ellen's method (F M Allen) into the second half the Great Patriotic War became widely known, but she was applied only by some authors in a few injured people.

Of available data it is possible to draw one additional conclusion: local anesthetization upon the amputations in the institutions of the deep rear was applied much more frequently than in other stages of the medical evacuation. This phenomenon is completely regular. Upon the amputations, produced through the considerable period after injury, the soft tissues of extremities, which are subject to truncation, are much less massive than immediately after injury or in the presence of sharp/acute wound infection, and therefore are more available for the local infiltration anesthetization. Furthermore, in the back hospitals barely was observed anaerobic infection, one of the basic contraindications to the local anesthesia. Finally, in the back hospitals where extensively was used local anesthetization, injured people they had the capability to observe its advantages and therefore willingly they rejected overall anesthesia/narcosis.

One should indicate one very essential part of general/common/total anesthetization by which, unfortunately, it was not given the proper attention: injection into the large/coarse nerves, for example, sciatic and femoral, the solution of novocaine before their dissection or at least after dissection.

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This small measure decreases the danger of shock during operation/process itself and subsequent painful phenomena. On this completely correctly resembled V. I. Popov.

As far as amputations are concerned without any anesthesia (0.10/o), then they were conducted in separate injured people in the absence of sensitivity at the level of amputation as a result of multiple failure of the nerve trunks or removal of the almost completely torn part of the extremity by means of the dissection of the separate tendons on which it hung.

Amputations technique.

The methods of amputations it is virtually expedient to distribute in connection with four bases: circular, guillotine, flap and osteoplastic, although this distribution cannot be considered as the completely correct. Guillotine method according to the character/nature of the dissection of soft tissues is circular, and upon the osteoplastic amputations is conducted the formation of rags. Nevertheless the peculiar special features/peculiarities of these two methods require their examinations individually.

In the following presentation the lines of basic methods indicated are examined together with their modifications. In the graph of circular method, besides the amputations, produced two- and three-moment (according to N. I. Pirogov) section of soft tissues with the supplementary lateral sections of stump and without them, are referred also the amputations with the formation of lady's mantle. To guillotine ones are related the amputations with the one-time dissection of all soft tissues in one plane, it is unimportant, were made or not supplementary sections/cuts.

Flap were considered all amputations, with which it was formed from the soft tissues graft/flap or rags, independent of a quantity, form and their arrangement, and also of the character/nature of the tissues, which entered the composition of graft/flap. Into the same group entered the amputations, produced by means of the sections/cuts, they were known by the name en raquette, en croupier and par transfixion.

Regarding the methods of amputations in 1942 were given the following indications:

"One should realize amputations according to the circular method. Circular method has three variants: one-time, two-moment and three-moment. One-time (Gilton amputation) is recommended in the

exceptional cases".

In 1944 these recommendations were refined as follows:

"Usually primary amputation is done using the circular method, sometimes they resort to the oblique section/cut with the formation of graft/flap....

... In the cases, which allow/assume typical amputation, latter they produce on the two-moment method (on the forearm and the shin) and the three-moment (on the shoulder and the thigh)

... Circular method is recommended to make with the longitudinal splittings/fissions or with the formation of rags (muscular or skin-aponeurotic)....

... 1. Secondary amputation technique in essence the same as primary, but has some modifications

... 4. In cases when is done amputation in the healthy/sound tissues, is applied two- and three-moment method - circular and circular with the splittings/fissions. Sometimes the sections/cuts of skin and processing stump make, according to tissue changes, it is atypical.

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5. With gas gangrene amputation should be realized especially simply and it is rapid in a circular two-moment manner ... ".

In addition to these basic instructions of main army medical administration about the procedure of amputations during the Great Patriotic War were voiced many surgeons.

P. A. Cyprian, analyzing the amputations, produced in all stages of sanitary evacuation of one of the fronts for the first one-and-a-half year of war, counted surgeons' persistence in the use/application of circular section of the soft tissues of that deserving attention and from his side widely propagandized the supplementary lateral splits of stump. This procedure, in the opinion of P. A. Kupriyanov, retains all advantages of flap method and it is at the same time free from deficiencies/lacks in the latter: the expenditure of excess time for the formation of rags and need for the truncation of extremity at the higher level.

N. N. Yelanskiy on the basis of the experiment/experience of the front in composition of which o he worked, recommended in 1943

circular methods, considering that "... the flap and osteoplastic methods of amputation in war were not applied due to the danger in infection in the cult".

P. G. Kornev preferred upon the amputations of thigh to put to use "... the simplest circular method, after making only a small lady's mantle, and upon the amputation of shin to form front/leading graft/flap".

Together with these very authoritative recommendations of circular methods, occurred persistent statements in favor of flap amputations. Their advisability underscored E. Yu. Osten-Saken: "Norm must become flap methods. Cuts out itself a skin- fascial graft/flap without the muscles from this place and such form, that it would be possible to utilize the preserved integuments".

The same point of view developed V. G. Weinstein and P. A. Kopylov. A. O. Berzin arrived at the conclusion that the experiment/experience which it analyzed, it showed the legitimacy of the flap method of amputation in the army region under conditions of stable defense.

There is no necessity to increase the enumeration of the authors, who gave decisive preference both to flap and circular

methods. The given statements it is sufficient for the illustration of the fact that a question about the most advisable procedure of amputations continued persistently to be discussed during the entire Great Patriotic War.

The reasons for this disagreement on this far not new question are explained by the peculiarity of the conditions for development of amputation technology.

The majority of contemporary surgical operations/processes was created for the short comparatively time interval after Lister (Lister) and these operations/processes technique in entire its diversity was developed in a strict conformity with the asepsis and the teaching about the wound infection.

Completely another position occupy amputations. They were conducted already in the earliest times and preserved on themselves the traces of the installations of the surgery of different epochs. These past installations introduce into a question about the amputations the series/number of difficulties, especially during the war when the number of amputations extremely grows/rises, and their execution becomes doctors' responsibility majority of whom earlier to the amputations had no relation.

Upon the amputations in the wartime basic problem consists in survival of the injured by value removal least possible part of the victim of extremity.

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Main danger for the life is the infection, which already developed in the lethal area or which unavoidably threatens with its development in the nearest time. By propagation and virulence infections must be defined both level and method of amputation. In this consists the difficulty of selection.

Of all methods must be chosen such, which in each injured person most corresponds to contemporary concept about wound infection and measures of fight with it.

Most ideal surgical intervention in the fight with the infection is the full/total/complete removal/distance of infectious focus tightly. So they act with appendectomy, removal/distance of the festering appendages of uterus, total resection of joints according to N. M. Volkovich and many other operations/processes.

In application to the truncation of extremity this method gives the possibility within the shortest period to solve the problem of

treatment and to obtain the stump, which satisfies the requirements of prosthetics.

However, under conditions the wars of this type of amputation must not be conducted. Good results can be obtained only by the value of the truncation of extremity at the higher level than this would prove to be necessary out of war time. On the errors of this type prevented M. N. Akhutin on the basis of the experiment/experience of combat operations in lake Khasan.

If we forego upon the amputations the thought to withdraw by whole entire focus of infection and to sew wound, then surgeon's problem becomes the execution of amputation so that, after removing all nonvital tissues, to create optimum conditions for dealing with the infection, i.e., first of all to ensure the examination/inspection of wound surface in the post-operation period and the flow/discharge of wound discharge.

With heavy grinding or breakaways of the extremity when the introduced in the tissue infection yet not have time to develop, as achievement of the target of it was sufficient cutting the bridges of the soft tissues on which hung the nonvital part of the extremity, and to bandage vessels. In separate injured people it came, furthermore, to snip away or to saw off the end of the bone, if it

stood from the soft tissues.

This intervention in the essence is not present amputation and is the surgical processing of extensive wound with the removal/distance of clearly nonvital tissues.

During the already developing infection is necessary to drive out extremity more proximal than the zone of damage in the limits of tissues, macroscopically healthy/sound, moreover during extra-heavy infection is shown the one-time circular amputation of guillotine method. It was the basic method of amputation of up to quite latter/last years of theXVII century when for the first time appeared primitive flap and two-moment circular methods. With the full/total/complete absence of knowledge about the essence of wound infection and the unavoidable complication of it of each amputation wound this method was to a high degree advisable.

At present as latter/last substance in the fight with the violently progressive infection guillotine amputation is recognized by the best. Generating with this method wound surface is minimum in comparison with all others methods and it is completely available to inspection in the post-operation period. Guillotine amputation is universal, since there can be done at any level of upper and lower extremity. Its technology is led to the maximum simplification.

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These advantages of guillotine amputation are so great that it will preserve its value until are found for dealing with the wound, and first of all with the anaerobic, the infection more powerful substances than those which exist now.

However, there are deficiencies/lacks in this method.

The surgical principle of leaving the wound of that opened, if it is infected, and as far as possible to rather close it, when infection is eliminated, it can be realized upon the guillotine amputation only in its first part. The wound surface, which is generated as a result of guillotine amputation, is gradually decreased by cicatrization from the periphery. Cicatrization flows/occurs/lasts slowly and hardly ever it is finished with the full/total/complete healing of wound, especially after amputation in upper third of shin and thigh. The remaining at the end of the stump granulating surface it is necessary to remove by means of reamputation. The slowly smoothed infiltration of fresh stump and danger to cause new outbreak infections force even under the favorable conditions to deposit reamputation, especially lower

extremities, in many injured people not less than for 2 months.

Larger partly this period in the different reasons (need for further evacuation, the unwillingness of the injured person to whom it is produced amputation, to undergo repeated operation/process, the presence of other injuries, etc.) is increased. With the unavoidable numerous dressings the extensive granulating surface at the end of the stump it is difficult escape from the infection. Hence the formation of the inflammatory ulcers of flows, the development of erysipelas, osteomyelitis and streptoderma, that impede the operational reconstruction of stump.

Thus, the original advantage of guillotine method in the fight with the infection subsequently is converted into the full/total/complete contrast. This it forced to relate to the guillotine method extremely to with restraint and apply it only in injured people with the heavy anaerobic infection.

In comparison with the guillotine the circular and flap method of amputation have essential advantages. On passage of the sharp/acute period of infection wound surface easily can be covered with skin. By this was considerably shortened the duration of healing and was decreased the danger in secondary infection in all its manifestations. Subsequently an operational improvement in the stump

in connection with by the requirements of prosthetics proved to be necessary not in all injured people, moreover frequently it was possible to be restricted instead of reamputation to less extensive interventions.

Together with these advantages, circular and flap method have explicit deficiencies/lacks. Wound surface is more extensive, its examination/inspection in the post-operation period hinders by the hanging from the edges skin; the conditions for the flow/discharge of wound discharge are less favorable; the post-operation conduct of injured people with the amputation requires larger attention and experiment/experience; execution technique is more complex.

Intermediate between the guillotine and circular amputation is circular method with the lateral splits to the bone. The addition of lateral splits facilitates examination/inspection of wound in the post-operation period and provides the best from the current of discharge. Furthermore, this method, other conditions being equal, makes it possible to produce amputation more extremitally than with the circular method, since lateral splits give the possibility to manage the infection of higher than the level of amputation.

By the special features/peculiarities of circular claw-ended method indicated was determined the region of its use/application. It is shown in injured people with the less heavy infection, than for the guillotine method, but the heavier than for the circular method.

Lateral splits can be compared with the supplementary sections/cuts, produced, for example, with the phlegmons. If it is possible to be restricted only to one section/cut without the supplementary ones, then there is no their necessity and to make. More detailed indications both for the sections/cuts with the phlegmons and for the lateral splits of stump cannot be established/installed. In each injured person this question must be solved by surgeon's experience. If we there are the bases fear infection not in the muscles, but only in subcutaneous cellular tissue, then supplementary sections/cuts should be produced more superficially, only to the muscular fascia. The arrangement of sections/cuts, their length and quantity will be depending on the special features/peculiarities of injury and complications different.

Speaking about the circular amputation, we have in mind methods with the two-moment and three-moment (according to N. I. Pirogov) dissection of soft tissues. These methods are shown, when the boundary of the viable tissues of extremity goes cross to its axis. Method with the lady's mantle is better not to apply. The lady's

mantle, which consists only of the skin and the fatty cellulose, possesses, as a result of the poor blood supply, a small resistivity of infection. If the danger in infection is small and, therefore, it is possible to rely on healing without the complications, then method with the lady's mantle also should not be applied, especially on the lower extremity. Cellulose of lady's mantle is soldered with the wound surface, in consequence of which the skin of the end of the stump is deprived of useful with the carrying of prosthesis displacement.

For the circular amputation of thigh, it is unimportant with the lateral sections or without them, is very advisable repeatedly recommended technical procedure, namely: dissection by the first section/cut only of skin and subcutaneous cellular tissue; by the second - aponeurosis on the edge of the shortened skin; then gradually the dissection of musculature, also, at the latter/last moment of sciatic nerve. With this procedure is decreased the danger of shock, since nerve intersects one time.

However, for the maximum utilization of advantages of flap methods one should forego the thought to find among them any, best. Each of them, independent of a quantity of rags (one- or two-graft), their form (lanceolate, rhombic, elliptical, rectangular) or character/nature of section/cut (en croupiere or en raquette),

undertaken out of the special features/peculiarities of injury, it requires the free election of healthy/sound skin. For the majority of combat traumata the use/application of any of these methods as universal is possible only under the condition of the transference of the level of amputation higher than this is unconditionally necessary. In other words, into the victim to the cleanliness of method will be brought the length of stump.

A quantity of rags, arrangement and their form must be determined by localization and character/nature of mechanical damage and by propagation of infection. Thus, when suppurative infection is expressed still weakly, and skin is damaged only on the lateral surfaces of extremity, is shown amputation with the front/leading and posterior graft/flap. If, as this occurs with the perforating injuries in the sagittal plane, skin integuments are destroyed only on the front/leading and posterior surface, should be used healthy/sound skin of medial and lateral surface and formed two lateral grafts/flaps. During the damage of skin from three sides it sometimes proves to be sufficiently healthy/sound skin on the surviving side in order to produce amputation from one by graft/flap.

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The same considerations it was necessary to be guided, also,

during the expressed infection.

Speaking about rags, everywhere have in mind skin- fascial rags, which encompass, besides skin and subcutaneous cellular tissue, another fascia or aponeurosis, i.e., all layers of tissues to the muscles.

It is necessary in a quite consistent manner to conduct upon the amputations the principle of the maximum utilization of skin integuments, which survived from the trauma and the infection. This gives the possibility to preserve longer stump and to accelerate the healing of wound surface. Thereby is decreased the danger of the onset of infectious complications and are simplified subsequent surgical interventions for the correction of stump.

Are especially valuable the flap methods upon the amputation of thigh, with which wound surface is most extensive. Its subsequent cicatrization with a deficiency/lack in the skin flows/occurs/lasts is much more prolonged and more frequent connected with the infectious complications, than after the amputation of shin and upper extremity.

Accepted in the operational surgery calculations of the length of rags, depending on the diameter of the amputated extremity and

contractibility of skin at its one or the other level, upon the amputations under military field conditions have very relative value. If it is possible, in addition to basic graft/flap should be preserved also the separate prominences of skin on the periphery. These prominences, not provided for by the classical technique of amputation and not deserving even names of rags, with the large use can supplement the basic graft/flap, which does not cover entire wound surface.

Of the variants of the flap method of considerable attention deserves N. I. Kukin's proposition, very close to V. I. Gusynin's earlier proposition. N. I. Kukin utilized for the subsequent occlusion of the wound surface of stump the section of the undamaged/uninjured skin, more extremital than the level of amputation, forming from the skin the tubular graft/flap, which remains one its end in the compound with the stump. After the abatement of inflammatory phenomena tubular graft/flap by section/cut along the line of weld was again converted into the flat and was fastened by sutures on the wound surface.

Flap methods technique must be applied taking into account the special features/peculiarities of injury. It requires larger clinical experiment/experience in the estimation of the state of different tissues and character/nature of infection. Too optimistic an

estimation entails the necrosis of graft/flap, and in some injured people it can contribute to further propagation of infection and is imperiled life.

The use/application of different methods of amputations, according to the data of the deepened development of the histories of disease/sickness/illness/malady, is represented in Table 309.

Widest use obtained circular method. The number of guillotine amputations is relatively small. Nevertheless it is possible to think that into some conditions they were conducted unjustifiably frequently, whereas in others their quantity was insignificant. For example, on one of the fronts where there were exclusively severe conditions, for the first one-and-a-half year of war in all stages of the medical evacuation of the guillotine amputations of upper extremity are produced only 5.40/o, thigh - 7.50/o and shins - 7.10/o (P.A. Cyprians).

Too rare a use/application found graft method. Entire diversity of its variants remained far not used and was propagandized completely insufficiently.

Where these recommendations were more persistent, the use/application of a flap method rapidly found followers and sharply it was increased. In this respect is very characteristic the position, which was established in the hospitals of the same front in the first three years of the Great Patriotic War (Table 310).

This sharp shift/shear toward the expansion of readings to the flap method due to the circular in one and the same hospitals testifies about the great possibilities, not used into the first one-and-a-half year of war. Deciding in this respect it was wide discussion and review of the questions, connected with the amputations, conducted in Leningrad on the basis of the results of the first period wars. There are all foundations for assuming that and at other fronts the flap method could find more wide application.

Table 309. Distribution of the amputated with the bullet breaks bones of extremities according to the applied method of amputation (in the percentages).

(1) Локализация перелома	(2) Способ ампутации				(7) Всего
	(3) круговой	(4) гильоти- нный	(5) лоскут- ный	(6) костно- пласти- ческий	
(8) Плечо	80,0	12,0	8,0	—	100,0
(9) Предплечье	100,0	—	—	—	100,0
(10) Бедро	76,5	16,1	7,4	—	100,0
(11) Голень	81,0	10,6	4,2	4,2	100,0
(12) В среднем	79,9	12,8	6,1	1,2	100,0

Key: (1). Localization of break. (2). Method of amputation. (3). circular. (4). guillotine. (5). flap. (6). osteoplastic. (7). In all. (8). Shoulder. (9). Forearm. (10). Thigh. (11). Shin. (12). On the average.

Table 310. The distribution of the amputation (independent of readings to them) using the methods of their production in the hospitals of Leningrad in the first three years of the Great Patriotic War (in the percentages).

(2) Уровень ампутации	(3) Период войны	(1) Способ ампутации				
		(4) по типу способа Н. И. Пи- рогова	(5) круговой с расше- вом	(6) лоскут- ный	(7) гильо- тинный	(8) прочие
(9) Верхняя ко- нечность	(10) Первые полтора года войны (П. А. Куприянов) . . .	75,5	7,5	8,6	4,6	3,8
(12) Бедро	11 Последующие полтора года войны (Ф. А. Копылов)	29,7	21,5	36,1	10,5	2,2
	10 Первые полтора года войны (П. А. Куприянов) . . .	74,8	9,1	8,0	5,4	2,7
(13) Голень	11 Последующие полтора года войны (Ф. А. Копылов)	29,7	18,6	39,9	9,6	2,2
	10 Первые полтора года войны (П. А. Куприянов) . . .	51,8	13,0	12,2	14,1	8,9
	11 Последующие полтора года войны (Ф. А. Копылов)	15,1	11,0	60,9	9,2	3,8

Key: (1). Method of amputation. (2). Level of amputation. (3). Period of war. (4). according to type of N. I. Pirogov's method. (5). claw-ended circular. (6). flap. (7). guillotine. (8). other. (9). Upper extremity. (10). The first one-and-a-half year of war (p. a. Cyprians). (11). Following one-and-a-half year of war (F. A. Kopylov). (12). Thigh. (13). Shin.

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For the osteoplastic amputations the readings were encountered very rarely, since for the successful result of such amputations is necessary primary adhesion. However, any possibility for the subsequent osteoplastic reconstruction of stump should be utilized.

In amputation technology very essential is a question about the use/application of an elastic bandage or tourniquet for preventing the hemorrhage during operation/process itself. Considerably facilitating the work of surgeon and reducing to the minimum the blood loss, the elastic overhauling of extremity nevertheless must be applied possibly rarely. It is absolutely contraindicated with the anaerobic infection and some forms of suppurative infection, for example, with the lymphangitis, thrombophlebitides or flows the level of propagation of which to the operation/process not always can be established/installed, and some others.

However, in the absence of these contraindications it is necessary to consider other negative consequences of the use/application of an elastic tourniquet. Besides the familiar

subsequent hemorrhage from the the fine/small vessels, was revealed one additional essential complication.

As a result of the disconnection of the blood circulation of extremity as a result of the imposition of elastic tourniquet in its tissues are formed histamine-like substances - proteinogenic amines. After the removal/taking of tourniquet they enter bloodstream, causing the development of the phenomena of shock.

Tourniquet usually was laid at the root of extremity. Thus, the more extremal the level of amputation, the the large part of the extremity with the undamaged/uninjured vessels it proves to be turned-off from the total current of blood circulation. Consequently, the more it is formed histamine-like substances - proteinogenic amines which enter blood after the removal/taking of tourniquet - and the more strong the danger of shock.

These considerations, especially underscored by P. A. Kupriyanov, impel to operate, as far as possible without putting to use tourniquet.

Based on materials of the deepened development of the histories of disease/sickness/illness/malady, the tourniquet was applied with the amputations of captivity in 20.00/o, forearms - in 55.00/o,

thighs - in 23.50/o and upon the amputations of shin - in 61.80/o, and on the average in 33.50/o of injured people.

It is necessary to consider that in some part of the injured people the amputation was produced with the tourniquet which was superimposed earlier for the cessation of hemorrhage with the rendering of first aid. The considerable number of amputations, produced apropos of breakaway and grinding of extremity, suggests that this phenomenon was observed fairly often.

The given materials about the use/application of a tourniquet only in 33.50/o of injured people attest to the fact that army medical command's recommendation to restrict the elastic overhauling of extremities during their truncation was properly perceived.

Final state of blood flow after amputations was reached by means of bandaging of vessels by the silk which guaranteed from the repeated hemorrhages more reliable than catgut; however subsequently after the use/application of silk frequently appeared alloyed fistulas. Their treatment with a deep arrangement of suppurated ligatures and their large quantity in many injured people was accompanied by repeated surgical interventions, which lengthened the periods of the hospitalization of those amputated.

To avoid these complications it is desirable, together with the silk, to introduce into the wide use the slowly resolved catgut.

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On the basis of author's development of histories of disease/sickness/illness/malady it is possible to conclude that treatment of bone (or bones) upon the amputations was realized by two methods: 1) in the overwhelming majority surgeons were limited to cross cutting through of bone into the level with preliminarily split of periosteum; 2) more rarely performed processing on E. Bunge i.e., drove out periosteum and bone marrow for the elongation/extent of several millimeters from the end it overdrank. Method this is based on the assumption that because of this processing is prevented the development of osteophytes.

The first means of processing must be considered shown during the wound infection, and also with the suspicion to its presence. In other words, method E. Bunge connected with the supplementary traumatization and the danger of the infection of bone marrow, and also with deterioration in the nourishment of the end of the bone it overdrank, it can find use in essence with reamputation. Upon its amputations should be considered it shown only in those very a few injured people in who amputation wound can be at the termination of

operation/process sew.

Processing large/coarse nerve trunks was reduced to their intersection at the higher level than remaining soft tissues. Was reached this via the drawing back of soft tissues or by stretching of the stump of nerve from their thickness. The first of these two variants is more correct.

Upon the guillotine amputations, and also when the end of the split nerve was not visible in the wound, it remained without any processing.

The more complex methods of processing nerve did not find the frequent use/application (in one hundredths of a percent of all amputations).

The completely unavoidable upon the amputations intersection of large/coarse nerve trunks amplifies all fears, connected with the shock. They, as is known become are especially great, if it is necessary to produce amputation in the limits of thigh to injured person, recently brought out from the state of shock.

Therefore very advisable ones should be counted some changes in the technicalities of N. I. Pirogov's three-moment cone-circle

method, persistently recommended by P. A. Kupriyanov. It proposes upon the amputations of thigh to produce the circular section of muscles, going around sciatic nerve, and to intersect it if and only if the latter/last surviving layer of muscles is cut to the bone. As a result the nerve trunk instead of two intersects only one time, if we do not consider its finishing treatment.

In what measure this very advisable recommendation was perceived, on the basis of data of the deepened development of the histories of disease/sickness/illness/malady, cannot be judged.

To the wound after the termination of amputation, as a rule, no sutures it was laid with exception of the single cases. This tactics should be recognized unconditionally correct.

Some prospects in the relation to the possibility of the imposition of the primary or primary-deferred suture after the amputations (not apropos of gas gangrene and sepsis) with the bullet injuries gives use/application of penicillin locally and intramuscularly during and after operation/process.

Lethality.

The truncations of extremities apropos of bullet injuries always

entailed considerable lethality.

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In Crimean War 1854 - 1856 of afterward "large" amputations and ramifications of upper and lower extremities in the French army died 72.80/o all of those operated [Zh. G. Shenyu (J. G. Chenu)], while in English - 40.20/o [L. Lefor (L. Le Fort)].

Lethality after amputations in injured soldiers and officers of French army into the Italian campaign of 1859 constituted 63.90/o. In the federative army of the USA in the war 1862-1863, according to the report of chief surgeon M. Barnes (M. Barnes), from the injured people, who were subjected to amputations and ramifications, died 33.90/o.

This clearly expressed improvement proceeding in the truncations sharply it was destroyed during the Franco-Prussian war 1870-1871, when, according to the data Zh. G. Shenyu, lethality of the amputated French injured people it achieved 81.20/o.

On the issues of truncations for the war 1914-1918 not no precise information there are. N. M. Burdenko, analyzing the published materials, established/installed the following numerals of the lethality of those subjected to amputation (table 311).

The results of that deepened of development of histories of disease/sickness/illness/malady, and also the numerals, revealed at different fronts, with a certainty derive, which in the Great Patriotic War in comparison with the war 1914-1918 was possible to sharply lower lethality of injured people after amputation. This success is particularly significant because it will achieve together with the limitation of readings to the amputations.

At the same time were repeated the facts, characteristic for all previous wars: 1) after the amputations of lower extremities the lethality was much higher than after the amputations of upper ones, and 2) lethality grew/rose with respect to raising the level of amputations.

On the reasons for the fatal results after amputations it is possible to judge according to the data, given in Table 312.

Basic conclusion/derivation from table 312 following: by the main reason of death of the injured people, who were subjected to amputation, there were anaerobic and general/common/total suppurative infection. Consequently in order, to any considerably improve the issues of amputations, it was necessary to guide all efforts/forces

against these complications.

The second very essential conclusion can be drawn, after comparing tables 312 s Table 305. From the comparison of them it is evident that almost 40.00/o of all amputations were produced apropos of breakaway and grinding, i.e., the heavy decomposition of the tissues of extremities. It would seem that in accordance with this of one of the basic reasons for death must be the blood loss.

The in actuality this reason for death occurred relatively rarely. This testifies about the great successes, achieved in the Great Patriotic War in the fight with the blood losses.

Table 311. The lethality of injured people after amputations on the different reasons in the war 1914-1918 in the different armies (according to N. N. Burdenko) (in the percentages).

(1) Армия	(2) Фронтовые госпитали	(3) Табачеты дивизии
(4) Английская	33,0	33,0
(5) Германская	(7) 69,0	12,0
(6) Русская	Сведений нет	23,0

Key: (1). Army. (2). Front hospitals. (3). Sick-bay of division. (4). English. (5). German. (6). Russian. (7). There is no information.

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It is characteristic that the lethality from the shock among injured people whose amputation is produced by way of primary surgical processing, achieved high numeral (30.40/o). This phenomenon must be placed in the dependence on the integrated effect/action of wound and operating trauma. Upon the later amputations when wound shock no longer occurred, lethality for this reason was many times lower.

Inverse relationship/ratio showed the numerals of lethality from the sepsis. This is understandable: almost all injured people with the sepsis underwent amputations not during the primary processing, but much later. On the same reason this relationship/ratio, although

expressed is less sharply, it was repeated in the lethality from the anaerobic infection.

Osteomyelitis as the reason for death did not figure completely, although greatly frequently it complicated bullet breaks, since lethality in the presence of osteomyelitis was taken into consideration in the graph/count "Sepsis" and "Combinations".

Lethality from other reasons was small and was the consequence of different intercurrent diseases or rare wound complications: metastatical abscesses, tetanus and so forth, etc. Certain part of the injured people, who were subjected to amputation, perished with bombardments and bombardments of hospitals.

STATE OF STUMPS.

General information.

For a long time the issues of the amputations of wartime were examined from one point of view it remained in the living ones or it died the injured person to whom was produced the amputation. Subsequently, in connection with the development of prosthetics arose supplementary evaluation criteria: the suitability of stump to prosthetics. Discussion deals in this case not with prosthetics generally, but about the most ideal orthopaedic supply, to a maximally possible degree which replaces the lost extremity.

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EXPERIENCE OF SOVIET MEDICINE IN A GREAT PATRIOTIC WAR, 1941-19--ETC(U)
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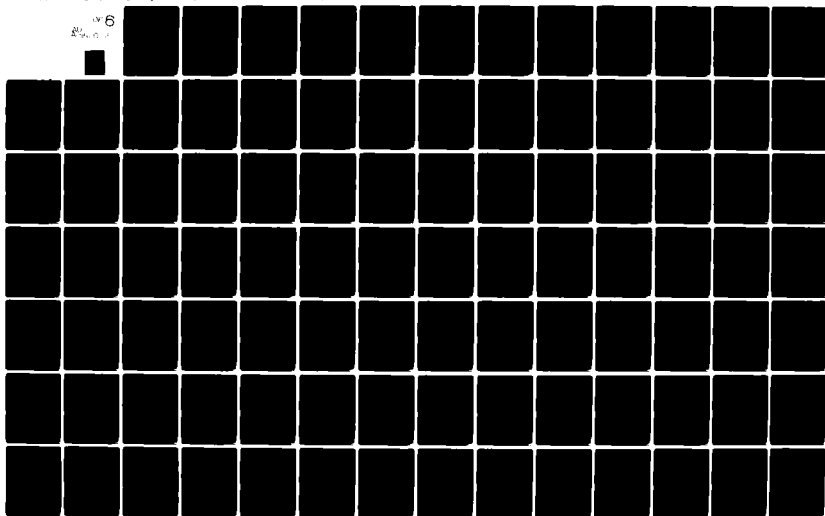


Table 312. Reasons for lethal outcome after amputation in injured people with the bullet break of the bones of extremities (in the percentages).

(1) Время ампутации и локализация перелома	(2) Причины смерти								(11) Всего
	(3) значитель- ные анатоми- ческие раз- рушения	(4) шок	(5) кровооче- ние	(6) анаэробная инфекция	(7) сепсис	(8) пневмония	(9) прочие	(10) сочетание не- рассчитанных причин	
(12) Раненые, подвергшиеся ампутации:									
(13) При первичной обработ- ке	5,2	30,4	8,9	33,3	8,9	1,5	5,2	6,6	100,0
(14) В другое время	—	2,3	3,1	56,7	30,3	0,3	3,4	3,9	100,0
(15) Плечо	2,2	6,5	4,4	50,0	17,4	2,2	10,9	6,4	100,0
(16) Предплечье	4,8	9,5	4,8	57,0	14,3	—	4,8	4,8	100,0
(17) Бедро	1,1	5,3	4,9	45,5	34,9	—	2,6	5,7	100,0
(18) Голень	1,1	16,6	4,3	57,2	13,4	1,1	3,7	2,6	100,0
(19) В среднем	1,3	9,6	4,6	50,9	24,6	0,5	3,9	4,6	100,0

Key: (1). Time of amputation and localization of break. (2). Reasons for death. (3). considerable anatomical decomposition. (4). shock. (5). hemorrhage. (6). anaerobic infection. (7). sepsis. (8). pneumonia. (9). other. (10). combination of enumerated reasons. (11). In all. (12). Injured people, who were subjected to amputation. (13). During primary processing. (14). In another time. (15). shoulder (16). to forearm. (17). Thigh. (18). Shin. (19). On the average.

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With of this type to the estimation of the amputations, done in the period of the war 1914-1918, after which were for the first time

realized mass prosthetics, it turned out that a considerable quantity of stump did not satisfy the requirements of rational prosthetics. Digital relationships/ratios, on the calculation/enumeration of different authors, were obtained following (table 313).

Not smaller disagreements were obtained also in the foreign authors: Tuffe (Tuffier) established that 69.10/o of stump were completely suitable for prosthetics, whereas, according to M. Janssen (M. Janssen), of such stumps it proved to be only 17.00/o.

Even more different numerals were obtained during the evaluation of the results of amputations, produced in the Great Patriotic War. N. N. Burdenko considered that a quantity of unsuitable for prosthetics stumps reached 92.00/o, whereas, according to M. I. Kuslik's data, then there were only 20.0-25.00/o.

The reason for these disagreements is clear; different authors' data characterize the state of stump in the specific stage of sanitary evacuation or even in the individual institutions of one or the other stage, but not the general/common/total results of amputations during the war.

Thus, for instance, G. A. Albrecht and T. M. Stepanov arrived at the completely identical conclusions on the basis of the development

of the materials of the institution, specially intended for reducing the ability to work of those amputated. Into this institution entered those amputated mainly according to the sign of the impossibility of the supply with prostheses. Therefore the percentage of the stumps, suitable for prosthetics, in these authors was obtained minimum.

Ye. F. Klopfer inspected those amputated, "scattered throughout different therapeutic institutions and shelters of Petrograd", without any preliminary selection, and therefore the percentage of the so-called faulty stumps, according to the data of E. F. Klopfer, proved to be several times less.

By the same factor are explained disagreements in the estimation of the state of stump in the period of the Great Patriotic War. For example, M. I. Kuslik's numerals are comprised on the basis of the materials of hospitals of one of REP, where entered in essence the injured people of Leningrad Front.

Table 313. Estimation of the suitability of stump for prosthetics of injured people after amputation according to the different reasons in the period of war 1914-1918 (on the different authors, in percents).

(1) Автор	(2) Год сообщения	(3) Культи. пригодные для протезирования	(4) Культи. не-пригодные для протезирования
(5) Е. Ф. Клопфер	1916	70,0	30,0
(5) Е. Ф. Клопфер	1917	55,3	44,7
(6) А. Л. Поленов	1917	31,8	68,2
(7) Г. А. Альбрехт	1925	14,5	85,5
(8) Г. Н. Лукьянов	1926	15,4	84,6
(9) Т. М. Степанов	1926	14,5	85,5
(10) А. А. Успенский	1929	16,6	83,4

Key: (1). Author (2). Year of communication/report. (3). Stumps, suitable for prosthetics. (4). Stumps, unsuitable for prosthetics. (5). Ye. F. Klopfer. (6). A. L. Polenov. (7). G. A. Albrecht. (8). G. N. Lukyanov. (9). T. M. Stepanov. (10). A. A. Uspenskiy.

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As a result of the difficult conditions of evacuation from blocked Leningrad were exported those amputated chiefly with the healed or close to the healing stumps. However, the observations of N. N. Burdenko done in the specialized hospitals of the deep rear, in which were concentrated the amputated with the "faulty" stumps according to the sign needs for their operational reconstruction. Those amputated with the stumps, which allowed/assumed orthopaedic supply, were furnished with prosthesis in the preceding/previous stages of

sanitary evacuation and the hospitals of the deep rear they did not reach.

Aptitude of stump for prosthetics.

The data of the deepened development of the histories of disease/sickness/illness/malady about the suitability of stump for prosthetics with the extraction of those amputated from the hospitals are represented in Table 314.

Consequently, at the termination of treatment in the hospitals in the overwhelming majority of injured people by which was conducted amputation (84.80/o), with the extraction the stumps were acknowledged suitable to prosthetics. For obtaining such results in 37.90/o of those amputated it was necessary to produce supplementary surgical intervention on the stumps for the purpose of the elimination of their "flaws", which impeded prosthetics, moreover the stumps of lower extremity were operated from 3 to 8 times more frequently than by upper.

This relationship/ratio is understandable, because the use of the prostheses of lower extremity impede even the insignificant defects of stump. The requirements, presented in this respect to the stumps of upper extremities, were considerable below, since after the

amputation of shoulder and forearm supply was conducted almost exclusively by the so-called cosmetic prostheses to put to use which possible and with the defective stumps. Therefore the operational reconstruction of the stump of upper extremities was conducted in the majority of injured people only with the sharply pronounced defects.

Stumps after amputation during the primary surgical processing were subjected to correction operationally considerably more frequently than after the amputations, produced in another time, as this it is possible to see in Table 315.

From table 315 it is evident that after amputations during the primary surgical processing of stump it was necessary to subject to operational reconstruction for the purpose of prosthetics considerably more frequently than after amputation in another time. These numerals are not unexpected.

Table 314. Distribution of injured people which produced amputation apropos of the bullet break of the bones of extremities, on the suitability of stump for prosthetics with the extraction from the hospital (in the percentages).

(1) Локализация перелома	(2) Качество культи	(3) Годные для протезирования			(7) Негод- ные для протези- рования	(8) Всего
		(4) без после- дующих операций	(5) после опера- тивной ре- конструкции	(6) итого		
(9) Плечо		66,8	14,6	81,4	18,6	100,0
(10) Предплечье		73,7	5,6	79,3	20,7	100,0
(11) Бедро		38,7	42,8	81,5	18,5	100,0
(12) Голень		35,4	53,5	88,9	11,1	100,0
(13) В среднем		46,9	37,9	84,8	15,2	100,0

Key: (1). Localization of break. (2). Quality of stump. (3). Suitable for prosthetics. (4). without subsequent operations/processes. (5). after operational reconstruction. (6). altogether. (7). Unfit for prosthetics. (8). In all. (9). Shoulder. (10). Forearm. (11). Thigh. (12). Shin. (13). On the average.

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Amputations during the primary processing were conducted apropos of heaviest injuries or their complications and frequently in the complex circumstances. Everything was subordinated to basic problem - survival of the injured person: the concern about subsequent prosthetics was moved aside therefore to the second plan/layout.

The statistical evidence about suitability and inadequacy of stump for prosthetics, assembled in the therapeutic institutions, even if in them is realized prosthetics of those amputated without any preliminary selection, can be only approximate. A more precise estimation of the state of stump can be given on the basis of the results of the distant observations. Frequently only through several months after amputation are revealed/detected morbid neuromas, are activated/promoted the concealed/latent inflammatory foci, are formed ulcerations/pittings and strains Rubtsov, are detected the impeding function osteophytes; the stumps, acknowledged with the extraction of injured people with the amputation from the hospital by completely suitable ones for prosthetics, it is necessary to subject to operational reconstruction for eliminating the coming to light flaws. On the contrary, stumps, initially far not corresponded to requirements prosthetics, subsequently sometimes prove to be completely for it suitable. Therefore for the judgment about the quality of stump are necessary observations not with the extraction of injured people from the hospitals, but later. Such observations are. In 1947-1948 in the Leningrad institute of prosthetics was produced the examination/inspection of 1000 injured after amputation extremities apropos of the bullet injuries during the Great Patriotic War, undertaken without any preliminary selection, i.e., here entered injured people, who did not have bullet break. L. S. Kofman it inspected the stumps of the lower of extremities, S. F. Godunov -

upper (Table 316). Upon the examination/inspection of the injured into those removed after amputation apropos bullet breaks periods the painless stump of the thigh were observed into 58.20/o, shin - into 56.50/o, shoulder - into 61.60/o and forearm - into 67.00/o. These full-valued stumps are the result of both conservative treatment and surgical interventions, produced after amputation, that it is possible to see from the data, given in Table 316.

Is visible the distinct difference in numerical ratio of both groups of the full-valued stumps of upper and lower extremities: the majority of the full-valued stumps of shoulder and forearm is obtained without any supplementary operations/processes, whereas the stumps of thigh and shin for purposes of prosthetics it was necessary in a considerable quantity to operate. This will agree with that presented on page 508.

Table 315. Frequency of the operational correction of stump after the amputations apropos of bullet break, produced during the primary surgical processing and in another time (in the percentages).

(1) Группа ампутированных	(2) Уровень ампутации	(3) Плечо	(4) Предплечье	(5) Бедро	(6) Голень
(7) Раненые, подвергшиеся ампутации:					
(8) при первичной обработке		17,4	8,9	58,8	65,7
(9) в другое время		9,6	0,1	38,3	51,3

Key: (1). Group of those amputated. (2). Level of amputation. (3). Shoulder. (4). Forearm. (5). Bucket. (6). Shin. (7). Injured people, who were subjected to amputation. (8). during primary processing. (9). in another time.

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It is necessary to add that 14.80/o of total number of inspected stumps of thigh and 8.20/o of stump of shin although possessed some defects, they proved to be completely suitable for prosthetics.

Thus, according to the data L. S. Kofman, 2-6 years after the amputation of the suitable for prosthetics stumps of thigh it was discovered by 73.00/o and shin 64.70/o.

Reasons for the inadequacy of stump.

By the basic reason for the fault of stump in the period of 1914-1918 was accepted (G. A. Albrecht, N. A. Bogoraz, S. L. Tregubov, A. L. Polenov, N. I. Napalkov, et al) insufficient acquaintance with technology of amputations and prosthetics. Such statements occurred to Great Patriotic War (A. P. Kotov, I. Ya. Sternberg, N. N. Prirov). With them cannot be agreed. The reasons for the inadequacy of stump can be come to light/detected/exposed, after examining individually their flaws, which impede prosthetics, also the conditions by force of which is formed each of the flaws, namely:

1. The insufficient length of stump, in consequence of which it badly/poorly is held or is not held at all in the shell of prosthesis. Of this type faulty stumps are obtained even afterward "economical" amputation itself with the retention/preservation/maintaining of the maximum part of the extremity. If the boundary of viable tissue is arranged/located highly, stump is unavoidably short.

2. Cicatrical flaws. in essence they are the result of guillotine amputation or supplementary sections/cuts, produced apropos of wound infection. In this respect it is necessary to maximally restrict the use/application of a guillotine method,

putting to use it only during the doubtless readings. However, to forego it is completely possible will be only after the appearance of new more powerful substances against the wound infection. The same should be said also about scars after supplementary sections/cuts. To avoid Rubtsovs flaws as a result of other injuries of extremity, arranged/located it is higher than the level of truncation, obviously, does not be managed at all.

3. Different genus inflammatory processes of stump: osteomyelitis, foci of all around fine/small, sometimes multiple foreign bodies in deep scars, etc.

Table 316. Frequency of full-valued stumps for prosthetics 2-6 years after the amputations, occurring apropos of the bullet break and other injuries (based on materials of S. P. Godunov and L. S. Kofman, in the percentages) .

(1) Группа раненых с полноценной культи	(2) Уровень ампутации				В сред. (7) нем
	(3) плечо	(4) предплечье	(5) бедро	(6) голень	
(8) Без дополнительных операций	49,6	50,4	23,4	11,3	23,5
(9) После дополнительных операций на культих	12,0	16,6	34,8	45,2	31,5
(10) Всего . . .	61,6	67,0	58,2	56,5	55,0

Key: (1). Group of injured people with the full-valued stump. (2). Level of amputation. (3). shoulder. (4). forearm. (5). thigh. (6). shin. (7). On the average. (8). Without supplementary operations/processes. (9). After supplementary operations/processes on stumps. (10). In all.

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For prevention of these complications, which require sometimes prolonged conservative treatment and repeated operations/processes, is necessary also not so much an improvement amputating os surgical technique, is as more effective substances for dealing with the suppurative infection.

4. Pathological state of skeleton of stump. From the flaws of this genus on the inaccuracies of technology depend protrusion of the end of the sawn bone, contracture of joints and partially the osteophytes. All other pathological states of the osteoarticular apparatus of the stump: ankylosis, flail joints, pseudoarthroses and late strains, for example, fibula valga, so strongly impeding prosthetics, they are connected with other reasons.

5. Disorders, which depend on disorders of nervous system: sensitive (it is more frequent) motor and trophic (less frequent), motor and trophic (less frequent). For a long time the postamputation pains (phantom perceptions, which irradiate neuralgias, causalgia, etc.) it was accepted to place in the dependence on the neuromas, and these latter - from deficiencies/lacks in the amputation technology, in particular, from processing of the nerve ends of the crossed nerve trunks.

The neuroma theory of post-amputation pains at present cannot be acknowledged correct. Their best prophylaxis it is the aseptic healing of wound, but not the technical details of processing the nerve trunks. Of all numerous methods thus far none has the proved advantages before the usual intersection of nerve shaving sharp/acute foot on 1-2 cm more proximal than the level of the dissection of musculature.

As far as disorders are concerned motor and trophic, then they completely depend on the supplementary injuries of the nerve trunks.

Thus, the flaws of the stump of wartime only in their small part can be set in connection/communication with the technical defects of amputation and a small acquaintance of surgeons with prosthetics. In essence they proceed as a result of the inadequacy of the methods of fight with the anaerobic and suppurative infection, and also from localization and special features/peculiarities of injuries. Therefore amputation during the heavy wounds or the threatening life wound infection and attachment of stump to prosthetics thus far must be considered as two parts of the therapeutic plan/layout realized each individually. During the first stage surgeon's problem is survival of injured person and removal on the possibility of the minimum part of the extremity.

Subsequently by means of supplementary intervention is conducted the reconstruction of stump for the purpose of prosthetics. The the large part of the extremity it is retained after amputation, the wider the possibility of reconstruction and the better the results of prosthetics after reconstruction.

Striving to solve both problems in the majority of wounded one-time entails the removal of extremity at the higher level than this is necessary, i.e., in the final analysis deterioration in the results of subsequent prosthetics.

On the basis of this point of view, the estimation of a large quantity of "faulty" stumps by the previous authors as the result of the defects of amputation technology and unfamiliarity with prosthetics, should be recognized the incorrect.

Any considerable improvement in this direction can be achieved/reached only by perfecting the combat means with the wound infection.

Preparation for prosthetics.

Preparation for provision of prothesis was composed from surgical interventions and conservative measures.

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On quantity and character/nature of surgical interventions, produced on the stumps, gives representation Table 317.

As it is shown in beginning of chapter, repeated are named such amputations which were conducted from the vital readings when the

already produced amputation of extremity at the lower level did not reach target. Repeated amputations in their readings, urgency of execution, methods and issues sharply differ from reamputation and therefore they must be examined separately.

As reading to the repeated amputations almost always served anaerobic infection. By this is explained their quantitative distribution. Repeated amputations after the break of the bones of forearm, according to the data of the deepened development of the histories of disease/sickness/illness/malady, it did not prove to be at all. Reason consists in the fact that the anaerobic infection rarely complicated the bullet breaks of the bones of forearm, and if it appeared, then single amputation was completely sufficient substance for its stopping.

Otherwise should be explained the insignificant number of repeated amputations of the thigh whose anaerobic infection flowed/occurred/lasted it especially heavily and required the most radical methods of treatment. The state of the affected by it injured people, in whom was already produced the amputation, it was frequently such, that the repeated amputation of thigh no longer could aid and therefore it was not conducted. The anaerobic infection of the stump of shoulder left more great possibilities for the repeated amputations, and also for the connected with their number

ramifications in the shoulder joint. These latter were transferred more easily than ramification in the hip joint, and therefore they were conducted more frequent than.

The following graph of table "Dressing of vessels" characterizes a quantity of post-amputation repeated and secondary hemorrhages apropos of which were produced the dressings. The dressing of vessels and repeated amputations were conducted from the vital readings and to the preparation of stumps to prosthetics of straight/direct relation did not have.

Table 317. Operations/processes, produced on the stumps of extremities after the bullet breaks (in the percentages).

(1) Тип культи	Операция (2)	(3)	(4)	(5)	(6)	(7)	(8)
		Повторная ампутация	Перевязка сосудов	Реканпуляция	По поводу воспалительных осложнений	Остаточные реконструктивные вмешательства в целях протезирования	Всего
(9) Культи плеча после перелома плеча		5,0	6,0	28,0	44,0	17,0	100,0
(10) Культи плеча после перелома костей предплечья		—	15,0	30,0	50,0	5,0	100,0
(11) Культи предплечья после перелома костей предплечья		—	3,3	50,0	26,7	20,0	100,0
(12) Культи бедра после перелома бедра		0,7	4,3	53,7	27,5	13,8	100,0
(13) Культи бедра после перелома костей голени		1,0	3,2	68,9	16,1	9,8	100,0
(14) Культи голени после перелома костей голени		3,0	1,1	76,0	7,6	12,3	100,0

Key: (1). Form/species of stump. (2). Operation/process. (3). Repeated amputation. (4). Dressing of vessels. (5). Reamputation. (6). Apropos of inflammatory complications. (7). Remaining reconstructive interventions for the purpose of prosthetics. (8). In all. (9). Stump of shoulder after break of shoulder. (10). Stump of shoulder after break of bones of forearm. (11). Stump of forearm after break of bones of forearm. (12). Stump of thigh after break of thigh. (13). Stump of thigh after break of bones of shin. (14). Stump of shin after break of bones of shin.

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The basic means of reconstructive operations/processes were

reamputation. From the data of table 316 it is evident that the stumps of the lower extremities were reamputated more frequently than upper ones, moreover in proportion to the approximation/approach of the level of amputation to a body the percentage of reamputations was decreased. So it was because to the cult of the upper extremities of requirements in the relation to prosthetics it was less, and possibilities for reamptuation the greater, the longer the stump.

Some authors give the higher percentage of reamputation. For example, according to the data of Sh. Kh. Baybekovoy, reamputations they composed 91.20/o of all operational intervention on the stumps. According to Ye. L. Berezov's data, of 1020 operations/processes for the purpose of prosthetics it was counted 982 reamptutaion. In the opinion of I. P. Ochkur, removal/distance of ligatures, sequestrations and other conservative interventions rarely are of use and therefore "one should speak not so much about the readings to reamputation about the contraindications to it".

From this point of view it cannot be agreed. Reamputation it must be used if and only if in another manner to remove obstructions for rational prosthetics it is impossible. In all others those amputated are shown less radical interventions.

On the need for restricting readings to reamputation even in the

60's of past century Yu. K. Shimanovskiy wrote: "... only when cannot be found materials for the transplantation, permissibly to think about the product of new amputation, above preceding/previous". On the basis of data, obtained during the Great Patriotic War, in the same direction were voiced L. P. Gektin, A. N. Vitkovskaya et al. B. N. Tsyarkin noted a sharp reduction in the quantity of reamputation, produced by it in 1944-1945 in comparison with 1942-1943, and was placed this in direct connection/communication with the acquisition of larger experiment/experience.

The prolonged healing of the postamputation wound of stump advanced a question about early reamputation. Term "early reamputation" was understood differently. D. M. Labok considered it early reamputation, produced in the course of the first month after injury; M. V. Kolokol'tsev - is not later than 45 days; A. S. Markov - in the course of 3 months; V. S. Chekryzova - in the period by no means fully "healed wound with the presence of suppurative discharge".

Observations of the authors indicated, and also many others (P. A. Cyprian, A. P. Yevstropov, M. Mosidze, Ye. L. Barezov, A. P. Gausman et al.) they showed that reamputation in the presence of unhealed wounds, ulcers and suppurative fistulas in the majority of injured people were finished with primary adhesion. However, hence in

any way it is not possible to draw the conclusion that early reamputation must be used as frequently as possible. ^P Very of posing of the question about early and latter reamputations is incorrect. These terms and furthermore they are understood differently, include the relapse of the ancient separation of amputation into the primary ones, the intermediate ones and the secondary ones. reamptutation, as all generally operations/processes, must be conducted from the specific readings. The period, which elapsed from the day of injury or asputation, no value must have.

Tendency to reamputate in the presence of wound at the end of the stump entails an artificial increase in the quantity of reamputations, because some part of such stumps on the healing of wounds will not need reamputations. Furthermore, surgeon's tendency toward the primary adhesion forces him to plan the level of reamputation higher than after the healing of wound, i.e., to excessively shorten cult.

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^Q And one more: by the general/common/total acknowledgement, reamputation it must be latter/last operation/process on the cult.

In actuality the results of reamputations left to desire the

best. N. D. Garin of 2677 reamputations had 26 unsuccessful, required repeated operations/processes. Ye. L. Berezov of 260 reamputations according to Beer observed 9 times to sequestration of bone transplant. L. K. Nemesh^yeva came to light/detected/exposed those amputated, each of which in different stages of evacuation underwent 5-6 reamputations. About repeated reamputations communicated V. D. Chaklin and A. N. Vitkovskaya on the basis of the examination/inspection of such injured people, who entered into the central and Leningrad institutes of prosthetics. B. N. Tsyarkin observed sepsis from by fatal result, that developed after reamputations of thigh per Kirshner, and ^{Sh}Yu. Kh. Baybekova - gas infection, also ending lethally.

Such results of reamputations impel not to their earliest possible execution, but to the determination of the reasons for failures and to specifications of readings. Unsuccessful issues depended mainly on post-operation festerings and errors in the operational technology (A. N. Vitkovskaya).

Conditions for reamputations are optimum, if stump is completely free from the infection. In the presence the infections in one or the other form (streptoderma, the festered ulcers, infected foreign bodies, osteomyelitis, inflammatory infiltrates, etc.) the zone of its propagation are frequent it was determined incorrectly, and

section/cut or cut was conducted in the inflamed tissues. The part of the festering would depend on the transfer of infection from the driven out end of the stump into the operating wound into time of reamputation itself or on the suppurative infection of organism, although stump itself was free from its visible manifestations. Here are involved the festering wounds and fistulas any localization, and also the residual phenomena of transferred sepsis. In some injured people to the development of festering contributed hematomas, which were being formed after reamputation as a result of hypovitaminosis C, which flowed/occurred/lasted without the explicit symptoms and therefore not taken in the attention.

From the inaccuracies of operational technology the most particular reasons for failures were the errors in calculation of rags, abandonment to nonsmoothed of the end of the crest of the tibia, the excessive removal/distance (more than on 0.3 cm) of periosteum and bone marrow during the processing overdrank per Bunge insufficient fixation of transplant with osteoplastic interventions. The inadequacy of reamputation technique into the first half the Great Patriotic War was emphasized by N. N. Burdenko.

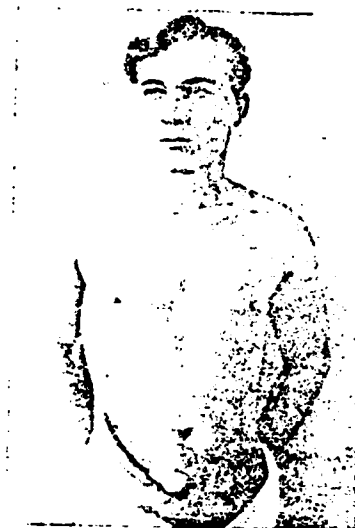


Fig. 136. First moment/torque of plastic surgery - formation of filatov petiole from the skin of stomach (based on materials of Prof. N. N. Yelanskiy).

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By the supplementary reason for the unsuccessful issues of reamputations were the inaccuracies, allowed in the post-operation period: the absence of the immobilization of stump gypsum splint, the caused formation of contractures, and the too early beginning of the use of prosthesis, in consequence of which were obtained the strains of the nonreinforced scar, which were being easily converted into the firm ulcers.

The indicator of the graph of "Operation/process apropos of inflammatory complications" (Table 317) was formed their interventions of two kinds. Their part is produced apropos of phlegmons, suppurative flows, thrombophlebitis and other sharp/acute processes, which developed in the tissues of stump after amputation, and for the reconstruction of the stump of direct relation did not have. As reading for the remaining operations/processes, taken into consideration in this graph, served suppurative foci around the fine/small fragments, alloyed fistulas, terminal osteomyelitis and other inflammatory complications, which impeded prosthetics.

Latter/last graph Table 317 switches on diverse interventions, produced completely for the purpose of prosthetics. It is possible to divide them into two groups: operation/process on the soft tissues and on the skeleton of stump. To a number of the firsts belonged diverse skin plastic surgery, carving of excess soft tissues, intervention on the nerve trunks and tenotomy for eliminating the contractures. Another group composed interventions on the fibular bone, removal/distance of osteophytes and rare interventions in the form of arthrodeses, osteotomies and elongations of stump. There has also a communication/report about arthroplasty of knee joint in the presence of the stump of shin one injured person (M. I. Kuslik).

With the long not healing wound of stump, in particular after

the high amputation of thigh using the guillotine method when reamputation it is undesirable or impossible entirely, the best method is the plastic occlusion of the defect of skin by filatov graft/flap on the pedicle. In this case it is necessary to take skin from the stomach with a sufficient quantity of fatty cellulose from those considerations, that skin of stump must be well mobile/motile and resistant to pressure and friction of prosthesis (Fig. 136, 137 and 138) .



Fig. 137.

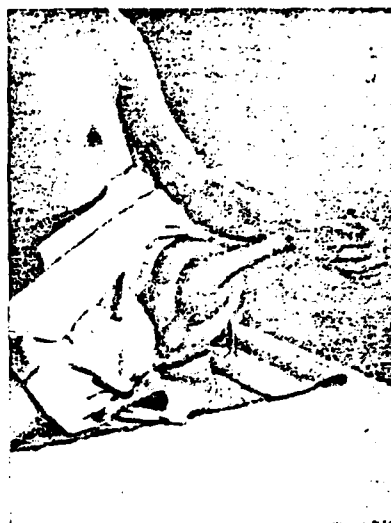


Fig. 138.

Fig. 137. Second moment of plastic surgery - transfer of pedicle of hula to hand (based on materials of Prof. N. N. Yelanskiy).

Fig. 138. Third moment/torque of plastic surgery - occlusion of defect of stump of thigh after amputation of thigh by guillotine method apropos of gas gangrene (based on materials of Prof. N. N. Yelanskiy).

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Conservative measures.

From the flaws of stump conservative treatment underwent most frequently its wounds. Arranged/located, with a little exception, at the end of the stump, in the center section of the scar, they were unique variety/subspecies of the long not healed wounds whose treatment during the Great Patriotic War became one of the special problems of surgery.

As a result of the unfavorable conditions the innervations and the blood supply of wound and ulcer at the end of the stump frequently more firmly did not heal than with another localization. In this case they frequently recurred, since scar at the end of the stump easily underwent strains during the first attempts at the use of prosthesis, whereas with another arrangement of scar at this mechanical stimulation did not test/experience.

In the treatment of these flaws of stump found use all diverse substances and methods, which were being used with the long not healed wounds generally, but the success by condition indicated strength was considerably more badly. In the overwhelming majority of such injured people the matter was finished with surgical intervention. Nevertheless the conservative methods of treatment must not be rejected. Without giving frequently full/total/complete success, they, as a rule, contributed to the liquidation of the different genus of the complications of wounds and to the decrease of

their sizes, than were created more favorable conditions for the primary adhesion after the carving of wound together with its surrounded scar.

Another disorder apropos of which extensively was used conservative, mainly physical therapy, the treatment, were the post amputation pains in entire their diversity. This is the special region of the pathology of those amputated, the examination by which, however, already exceeds the limits of present chapter.

In the absence of the flaws of stump after the healing of amputation wound or afterward eliminations by one or ~~another~~ method was conducted the complex of the conservative measures whose target consisted in the formation of stump, the consumption/production/generation of its durability to the prosthesis and in the instruction of that amputated in the use of it.

After amputation in the tissues of stump are developed the processes, united under the general/common/total name of atrophy. As its external manifestation serves the weight loss of stump. In the near ones several weeks after amputation weight loss occur sufficiently rapidly, then decelerates, given to its natural course, is finished toward the end of the annual period. From this time the volume of stump in adult becomes constant, what is the necessary

condition of the correct fitting of prostheses.

With the earlier supply with prosthesis the shell its, which covers stump, through several time becomes excessively wide, and prosthesis falls down from the stump. If shell is prepared from the solid material: tree/wood, nitrolacquer or metal, prosthesis proves to be completely unfit and must be substituted new. If shell is leather, then at first helps the retention of prosthesis tighter the tightening of the belts or lacing, with which the shell is fastened to the cult. However, this entails the displacement of the metallic splints of prosthesis toward the front, which is possible only to the known limit. With the more intimate contraction of shell, depending on the continuous weight loss of stump, the mechanics of prosthesis is disturbed/detuned, and it becomes unfit.

Everything said refers to the stumps of lower extremities.

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Atrophic changes in the stump of upper extremities are expressed more weakly and more rapidly they are finished, since their soft tissues are less massive. Furthermore, by the prostheses of upper extremities, especially cosmetic ones, possible the more or is less satisfactory to put to use, also, with certain nonconformity in the

fitting.

The weight loss of stump in the process of its formation depends also on the gradual disappearance of edema, which appears after amputation as a result of the caused by it disturbances/breakdowns of blood circulation.

The use of prosthesis initially strongly interferes with the insufficient durability of skin of stump. Being located after injury and subsequent amputation sometimes during the prolonged period in the contact only with gauze and cotton, under conditions of photic and oxygen starvation, and frequently irritated by wound discharge, skin of stump badly/poorly transfers the pressure of the shell of prosthesis. Appears excess sweating, appear worn-out conditions, festering, sometimes is developed furunculosis, and the initiated use of prosthesis is necessary to cease.

Almost unavoidable difficulties appear even when stump is completely formed and durable, with the beginning of walking on the prosthesis from the inability to put to use it. The carrying prosthesis must manufacture completely new skills and fasten them before the automatic reproduction. Only after this prosthesis can be considered mastered, and prosthetics completed.

Basic means for achievement of these all targets are the so-called therapeutic, or sick-bay, prosthesis. Introduced into the use before the war 1914-1918, it is the simple attachment for the walking, which consists of the wooden bamboo or metallic strut, motionlessly fastened with the shell from the gypsum bandages, formed/shaped directly on the cult. Therapeutic prosthesis is easily prepared in the medical dressing room with medical personnel's forces and it is equally well applicable the afterward one-sided and bilateral amputation of thigh or shin at any level.

Therapeutic prosthesis can be used 15-18 days after the healing of wound. From this time the carriage and crutches stop for that amputated by unnecessary ones. Under the effect of the use of therapeutic prosthesis the formation of stump, the consumption/production/generation of its durability and instruction in walking are accomplished simultaneously during the shortest time. The weight loss of stump occurs so rapidly that through 10-14 days the shell of therapeutic prosthesis proves to be excessively wide and it it is necessary to replace with new.

During the Great Patriotic War therapeutic prostheses completely deservedly found widest application (A. N. Vitkovskaya, D. M. Labok, N. N. Priorov, Ya. A. Rants, B. N. Tsyarkin, I. Ye. Kazakevich, I. Ya. Sternberg and many others).

Some authors, speaking about the therapeutic prostheses, called their "temporary/time", that should be recognized the incorrect. Temporary/time prosthesis (in the foreign literature "training", "intermediate" or "transient" prosthesis) is intended for the supply in the period between use by the therapeutic and permanent prosthesis when atrophy of stump still is continued, but its rapid weight loss already ended. In the foreign literature therapeutic and temporary/time prostheses frequently are united by the name of "auxiliary ones".

Temporary/time prosthesis possesses the same design features as constant (presence of foot and knee hinge joint), but is more simple and cheap.

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As the supplementary, everywhere applied substances for the formation of stump served its tight bandaging, suction massage and physical therapy procedures. Was used extensively also the therapeutic exercise, which contributed to the reduction of the general state of those amputated.

Considerable achievement was the concentration of those amputated in the hospitals, specially fitted out for the reconstruction of stump and prosthetics. In these institutions were reached considerably best results, than in general/common/total type hospitals (A. N. Vitkovskaya).

Duration of hospitalization.

The duration of the hospitalization of injured people during the war is a very important question. Under conditions of peacetime S. A. Zarubin determined average period from obtaining of trauma to the healing of amputation wound 133 days. On D. M. Labok's data, after

amputation apropos of street trauma for treatment and prosthetics it was required on the average of 8 months.

The materials, assembled by the author against those those amputated (independent of the character/nature of trauma) after war with the White Finns, treatment and prosthetics of whom it was conducted in Leningrad, made it possible to determine duration hospitalizations sufficiently accurately (Table 318).

Furthermore, after the termination of prosthetics it was required even on the average of 8 days for the instruction for the use of prosthesis, the formulation searches, etc., in consequence of which the duration of hospitalization respectively was increased.

For those amputated during the Great Patriotic War which were inspected in the hospitals of the deep rear (Omsk), N. N. Burdenko it determined the following periods of the stay in the therapeutic institutions (Table 319).

On the average the injured people after the amputation of shoulder were treated 5.5 months, forearms - 3.5 months, thighs - 6.5 months and shins - 6.3 months. According to A. P. Gausman's data, the injured people, by whom it is produced re-amputation conducted in the hospitals on the average of 6.5 months; without re-amputation - 8.5

months, switching on the periods, necessary for prosthetics A. Ya. Sheftel' he indicated that the periods of the stay of those amputated during the hospital treatment during the Great Patriotic War were from 150 to 210 days.

Table 318. Average duration of the hospitalization of those amputated during the war with the White Finns.

(1) Уровень ампутации	(2) Длительность госпитализации (в днях)	
	(3) общая продолжительность	(4) в том числе для протезирования
(5) Плечо	125	22
(6) Предплечье	126	24
(7) Бедро	172	24
(8) Голень	163	24
(9) Две конечности и более	190	29
(10) В среднем . . .	152	(11) Сведений нет

Key: (1). Level of amputation. (2). Duration of hospitalization (in days). (3). general/common/total duration. (4). among other things for prosthetics. (5). Shoulder. (6). Forearm. (7). Thigh. (8). Shin. (9). Two extremities and more. (10). On the average. (11). There is no information.

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All given above numerals concern those only remaining in living those amputated and are assembled independent of occasions, on which were produced the amputations.

Based on materials of the deepened development of the histories of disease/sickness/illness/malady, it is possible to present the following information about the duration of hospitalization (Table

320).

Table 320 characterizes the average duration of the stay in the therapeutic institutions, which produced amputation in the presence of bullet break. Dead persons after amputation in Table 320 are not included, regardless of the day on which they died.

The duration of hospitalization could be abbreviated/reduced. Necessary for this purpose measures can be taken in several directions.

1. Selection of method of amputation. Other conditions being equal, the amputation wound heals the faster, the better provided occlusion with its skin integuments. Least favorable is in this respect guillotine method; therefore the use/application of it is admissible only during the unconditional readings.

Table 319. Duration of the hospital treatment of those amputated during Great Patriotic War (1942), based on materials of the hospitals of the deep rear, in the absolute numerals (N. N. Burdenko) .

(1) Уровень ампутации	(2) Срок (в месяцах)				(3) 7 и более	(4) Общее количество раненых
	2	3-4	5-6			
(5) Плечо	—	2	5	2	9	
(6) Предплечье	—	2	—	—	2	
(7) Бедро	2	16	66	141	225	
(8) Голень	—	20	86	108	214	

(1). Level of amputation. (2). Period (in months). (3). and more.
 (4). Total quantity of injured people. (5). Shoulder. (6). Forearm.
 (7). Thigh. (8). Shin.

Table 320. Average duration of the hospital treatment of the amputated with the bullet breaks bones of extremities.

(1) Уровень ампутации	(2) Время ампутации после ранения (в месяцах)	
	при первичной обработке (3)	в другое время (4)
(5) Плечо	3,9	4,2
(6) Предплечье	3,4	3,6
(7) Бедро	7,2	7,7
(8) Голень	6,5	6,7

(1). Level of amputation. (2). Time of amputation after injury (in

months). (3). During primary processing. (4). in another time. (5). Shoulder. (6). Forearm. (7). Thigh. (8). Shin.

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2. Subsequent treatment. It must not be passive expectant, but must encompass measures, actively contributing to healing wounds. Among them high value has a stretching of skin, realized by different methods. On the basis of the experiment/experience of North Western Front the stretching persistently was recommended N. N. Yelanskiy and D. I. Chechel'nitskiy, which applied after amputation the stretching of skin of stump by the bands of adhesive mat/patch with the aid of wire rods, fixed/recorded by gypsum bandage.

Such bandages for the stretching of the soft tissues of stump were laid in the army and front sorting evacuation hospitals all by that amputated, directed into the rear.

Here is involved the timely use/application of reconstructive interventions. The defects of skin after amputations using guillotine method on the short stumps must be occluded plastically with the aid of Filatov arm.

3. Use/application of antibiotics. During the Great Patriotic

War from the fear of the subsequent complications of infection the soft tissues of stump after amputations did not sew themselves and wound was treated in an open manner, which led subsequently to the formation of the faulty stump, which requires re-amputation any other reconstructive operations/processes.

In the presence of antibiotics has the capability more widely to resort to the imposition of the primary or primary-deferred suture after amputation, which must considerably shorten the periods of the treatment of injured people after the amputation of extremities.

With sewing of stump by the primary or primary-deferred suture it is necessary to leave on the side drainages for the suction of the saved/accumulated wound secret/secretion and periodic irrigation of wound by the solutions of antibiotics.

As great achievement should be noted the wide and general/universal use/application of physiotherapy, therapeutic exercise and gypsum therapeutic prostheses, which considerably shortened the time of the preparation of stump for prosthetics.

4. Prosthetics. Another experiment/experience of war with the White Finns showed that with the timely safeguard of those amputated with prosthesis it was possible to shorten the period of

hospitalization. In the Great Patriotic War this experiment/experience was used far not everywhere, which led sometimes to the elongation of the periods of hospitalization. Organizational and technical measures for accelerating the production of prostheses are left here without the examination.

In the digital indicators, given in the present chapter, significantly was reflected the exception/elimination of amputations apropos of freezings. They possess the characteristic features: their level does not heave above crus and forearm, the danger of flying issue, as a rule, is insignificant, the periods of hospitalization are shorter, since in many those frozen wound after amputation can be sew.

The amputations from the remaining readings (burns/scalds, injury only of soft tissues, etc.), which also proved to be out of the examination, could not substantially influence the digital indicators as a result of the small number of such amputations.

Chapter XI.

CLINICAL ISSUES IN INJURED PEOPLE WITH THE BULLET BREAK OF THE BONES
OF EXTREMITIES.

Clinical issues in injured people with the bullet break of shoulder
bone ¹.

FOOTNOTE ¹. See also that 15 of present "work", pg. 246, 247, 259,
270, 274. ENDFOOTNOTE.

Lieutenant Colonel of medical service K. P. Ivan'kovich.

Issues in previous wars.

Statistical evidence in the relation to the issues of the bullet
breaks of shoulder in the previous wars are mainly on the lethality
and the amputations. However, the information about the functional
suitability of the preserved extremity is encountered only from the
time of the first world war.

In view of the very high lethality with the bullet breaks in the
previous wars frequently they resorted to the amputations, attempting

by this to lower lethality. However, in proportion to an improvement in the methods of treatment, without resorting amputation, it was possible to preserve the life of injured people. In the Russian army to this was turned the attention already in the beginning of the XIX century. Thus, in the "military field medicine" (1836) Akin Charukovskiy reported: "in Turkish war (1828-1829) some doctors with the breaking up of bones to much of part deducted hands and feet under the same conditions for the damages during which others bandaged the wounds of extremities ... thus far finally main on the army medical inspector did not solve this object/subject to the side of the latter".

The most specific information about the lethality during the saving treatment and after amputation is given in N. I. Pirogov (Tabl. 321).

Table 321. Number of dead persons and number of amputations with the bullet breaks of shoulder in the previous wars of the XIX and XX century (in the percentages).

(1) Автор	(2) Война	(3) Годы	(4) Летальность	(5) Ампутации
(6) Н. И. Пирогов	(7) Голштинская	1848	(8) При сберегательном лечении — 25,0	(9) Не указано
(13) Военно-медицинский отчет по Дунайской армии	(10) Крымская (11) Итальянская (12) Русско-турецкая	1854 1859 1877—1878	(14) После ампутации — 30,0—50,0 (15) Для верхней конечности — 15,5	" "
(16) В. Б. Гюббенет	(17) Русско-японская	1904—1905	(18) Для верхней конечности — 4,7	" "
(19) Мюллер (по В. А. Опцелю)	(20) Первая мировая война (русская армия)	1914—1918	6,0	11,0
(21) И. В. Тихомиров	(21) То же	1914—1918	3,6	5,0
(22) В. В. Трофимов	" "	1914—1918	3,6	1,8
(23) К. Франц	(22) Первая мировая война (французская армия)	1914—1918	4,6	15,6
(24) В. Г. Вайнштейн	(23) Война с белофиннами	1939—1940	(25) Летальных исходов не было	1,1
(24) В. М. Белогородский	(24) То же	1939—1940	(26) Летальных исходов не было	1,5

Key: (1). Author. (2). War. (3). Years. (4). Lethality. (5). Amputations. (6). N. I. Pirogov. (7). Holstein. (8). During saving treatment - 25.0. (9). it is not shown. (10). Crimean. (11). After amputation - 30.0-50.0. (12). Italian. (13). Military medical report

on Danube army. (14). Russo-Turkish. (15). For upper extremity - 15.5. (16). V. B. Gyubbenet. (17). Russo-Japanese. (18). For upper extremity - 4.7. (19). Mueller/Mullar (according to V. A. Oppelyu). (20). First world war (Russian army). (21). I. V. Tikhomirov. (22). ditto. (23). V. V. Trofimov. (24). K. Franz. (25). First world war (French army). (26). V. G. Weinstein. (27). War with White Finns. (28). Flying issues it was not. (29). V. M. Belogorodskiy.

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Although the given in Table 321 information has relative value, since many of them are based on the personal scarce observations nevertheless they indicate a gradual reduction in lethality and number of amputations.

The statistical data about the functional suitability of extremity after the bullet break of shoulder n are full/total/complete, contradictory and based on a small number of observations (A. L. Lepekhin, I. A. Tikhomirov, V. V. Trofimov, G. I. Uglitskiy, G. M. Zyazin, A. I. El'yashev, V. G. Weinstein, V. M. Belogorodskiy, L. Ye. Rukhman et al.).

Most defined concretely data for the first world war on the French army are brought by K. Franz (C Franz): the considerable

disturbances/breakdowns of the function of shoulder - 42.00/o,
insignificant disturbances/breakdowns - 37.80/o, it died and are
amputated - 20.2%.

Issues in a Great Patriotic War.

Clinical issues in injured people with the bullet break of shoulder just as with the break of bones they are remaining the segments of extremities, depended on the form/species of break, character/nature of the injury, presence of the associated injuries, general state of injured person and from entire complex of the therapeutic measures, which were being conducted in injured people from the moment/torque of injury to the extraction their UZ of hospital. Therapeutic measures in turn, depended on overall operational and medical circumstances, and also to a considerable extent from character/nature and severity of damage. Thus, with the breaks with the insignificant damage of soft tissues and bone substance was conducted more conservative treatment, and sometimes also full/total/complete abstention from the surgical processing.

Upon the more massive decomposition of soft tissues and bone they were applied first more, then less complex surgical interventions, in the dependence on the character/nature of injury and developing complications.

Therefore final clinical issues cannot be estimated in connection with any separate factor, and it is necessary to take into consideration entire totality of phenomena in the region of wound, in entire organism and in connection with different environmental factors, which acted on wound and injured person in the process of treatment.

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Page 523. Table 322. Distribution of injured people with the bullet break of shoulder according to the clinical issues in connection with the form/species of break (in the percentages).

(1) Вид перелома	(2) Клинический исход	(3)	(4)	(5)	(6)	(7)
		Хороший	Деформация	Поврежденные нервы	Контра-тура	Ампутация
(5) Дырчатый		45,1	—	14,3	28,6	3,3
(16) Поперечный		8,6	0,6	18,6	45,7	4,9
(17) Продольный		32,0	—	4,0	40,0	—
(18) Косой		23,5	1,2	15,7	44,3	2,7
(19) Раздробленный		4,1	—	6,1	18,2	4,7
(20) Крупнооскольчатый		13,3	0,4	16,6	41,5	4,1
(21) Мелкооскольчатый		9,2	—	14,8	40,0	4,3
(22) Краевой		38,7	—	16,3	34,2	2,7
(23) Вколоченный		20,0	—	8,0	52,0	8,0
(24) В среднем по установленным видам перелома		15,6	0,4	14,2	36,5	3,9
(25) Вид перелома не установлен		18,5	0,2	16,5	32,6	3,1
(26) В среднем		16,1	0,4	14,6	35,8	3,7

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Точный су- став (5)	(4) Кульба	(3) Остеомиз- лит	(1) Комбиза- ция	(2) Прочие	(13) Итого	(14) Умерло
—	—	4,3	2,2	2,2	100,0	—
4,9	1,2	5,6	6,8	3,1	100,0	—
4,0	—	4,0	4,0	12,0	100,0	—
0,8	0,6	6,1	3,5	1,6	100,0	—
12,8	38,2	8,3	6,8	0,8	100,0	5,3
3,7	0,6	10,9	7,2	1,7	100,0	0,6
8,3	0,8	11,3	8,7	2,6	100,0	
—	0,6	2,4	2,1	3,0	100,0	0,3
—	—	4,0	4,0	4,0	100,0	—
5,0	7,9	8,6	6,0	1,9	100,0	1,4
1,2	14,4	5,5	4,3	3,7	100,0	3,9
4,3	9,1	8,0	5,8	2,2	100,0	2,3

Key: (1). Form/species of break. (2). Clinical issue. (3). Good ¹.

FOOTNOTE ¹. Good in anatomical and functional sense. ENDFOOTNOTE.

(4). Strain. (5). Damage of nerves. (6). Contracture. (7). Ankylosis.
(8). False joint. (9). Stump. (10). Osteomyelitis. (11). Combination
².

FOOTNOTE ². In the graph "combination" are referred those injured
people in who it was difficult to secrete any basic issue.

ENDFOOTNOTE.

(12). Other ³.

FOOTNOTE ³. Other - where is introduced the issue, which was poor not
because of the break, but on the associated injuries or the diseases.
ENDFOOTNOTE.

(13). Altogether. (14). It died. (15). Perforated. (16). Cross. (17).
Longitudinal. (18). By scythe. (19). Crushed. (20). Large-splintered.
(21). Small-splintered. (22). Edge/boundary. (23). Packed in. (24).
On the average according to established/installed forms/species of
break. (25). Form/species of break is not established/installed.

(26). On the average.

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Form/species of break issues.

For the analysis of the clinical issues of the injuries of shoulder it is necessary to stop at the radiation/emission of a question about how the severity of injury and break it influenced clinical issues. The severity of injury is determined by the form/species of break and the character of injury. The form/species of break was one of the main factors of the influenced by initial injuries; therefore at it it is necessary to stop, first of all.

Before analyzing data of Table 322, it is necessary to note that the indicators of issues are relative, since with the extraction from the hospital injured people could have and they in actuality more frequently had not one any clinical issue, but the combination of the issues from which some was considered basic. The frequency of the combination of separate pathological states with the extraction of injured people with the bullet break of shoulder is well illustrated by data, given in Table 323.

Thus, in injured people, referred in the group a "good issue",

in the small percentage was observed strain, residual phenomena of the damage of nerves, contractures and osteomyelitis in the stage of liquidations which did not disturb the function of extremity.

With other basic clinical issues such associated issues were observed in the considerably larger percentage.

Clinical outcomes were found strictly depending on the form/species of break. According to the greatest number of best indicators of clinical issues the forms/species of the break it is possible to arrange as follows in the descending order: the incomplete breaks (edge/boundary and perforated), linear breaks (longitudinal, by scythe and cross), fragmented and crushed.

A number of good anatomical and functional issues in the various forms of break was different. Thus, with the large-splintered breaks which composed 44.50/o of all bullet breaks of shoulder, was observed a good issue in 13.30/o of injured people, with the crushed breaks, which composed 20.00/o of all breaks, in 4.10/o, and with the small-splintered breaks, which composed 6.10/o of breaks, in 9.20/o injured people.

The enumerated forms/species of the fragmented breaks of shoulder composed 70.60/o of a total quantity, which determines their great practical value.

Table 323. Frequency of the combination of the associated issues with the basic issues in injured people with the bullet break of shoulder (in the percentages).

(1) Основной исход	(2) Сопутствующий исход	(3) Деформа- ция	(4) Поврежде- ние нервов	(5) Контракту- ра	(6) Анкилоз	(7) Ложный сустав	(8) Остеоми- елит
(9) Хороший		1,2	0,3	2,4	—	—	0,3
(10) Деформация		—	—	25,0	—	—	—
(11) Повреждение нервов		12,5	—	49,7	0,6	—	9,3
(12) Контрактура		19,5	9,2	—	0,2	0,1	8,4
(13) Анкилоз		31,7	14,4	28,7	—	0,6	27,5
(14) Ложный сустав		30,3	13,8	50,0	2,7	—	22,3
(15) Остеомиелит		24,7	13,4	68,0	3,5	0,9	—
(16) Комбинация		39,8	46,1	78,7	14,0	9,3	64,0
(17) Прочие		11,3	3,1	20,6	—	—	2,1

Key: (1). Basic issue. (2). Associated issue. (3). Strain. (4). damaged nerves. (5). Contracture. (6). Ankylosis. (7). False joint. (8). Osteomyelitis. (9). Good. (10). Strain. (11). Damage of nerves. (12). Contracture. (13). Ankylosis. (14). False joint. (15). Osteomyelitis. (16). Combination. (17). Other.

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Anatomical changes with these forms/species of break have many general/common/total lines and they are, first of all, characterized by the presence of the considerable decomposition of bone, by the formation of bone scrap, by gaps, contusions and stratification of muscular tissue.

The severity of the damage of soft tissues with the forms/species of break indicated in essence was determined by a quantity and value of bone fragments and by that kinetic energy which was communicated by it by the wounding projectile.

Worst in the relation to clinical issues were the crushed breaks of shoulder bone. Good clinical results were obtained with this form/species of break in the smallest number of injured people (4.13/o). Anatomical decomposition with these breaks reached such degree, that in 38.20/o of injured people in the issue was noted the stump.

With this form/species of break are noted the most severe complications in the first stages of evacuation. The shock which with the bullet breaks of shoulder was encountered not at all frequently, with the crushed form/species of break was observed 5 times more frequently than with the large-splintered breaks, but gas gangrene - almost is 6 times more frequent. Osteomyelitis as clinical issue composed only 8.30/o, then false joints achieved 12.80/o. All this makes it necessary to consider the crushed breaks of shoulder as the heaviest means of damage.

The limitation of motions and ankylosis almost equally frequently were observed among the issues of fragmented breaks. Thus, with the large-splintered breaks of the limitation of motions were noted in 41.50/o and ankylosis - in 4.10/o; with the small-splintered ones: the limitation of motions - in 40.00/o, and ankylosis - in 4.30/o of injured people.

Among the clinical issues of fragmented breaks osteomyelitis was encountered frequently. In the group of large-splintered breaks it composed 10.90/o and small-splintered - 11.30/o i.e. the almost coinciding quantity, then the formation of false joints with the small-splinter breaks was observed more than 2 times more frequently (8.30/o) large-splintered ones (3.70/o).

This finds its explanation in the fact that upon the massive decomposition of bone marrow and in the presence of the fine/small bone fragments, which lost connection/communication with the periosteum, were created the favorable conditions for the development of infection. Periosteal diaphysis in the region of damage partially lost its capability for regeneration. This retarded the processes of the coalescence of bone (Ya. M. Bruskin, P. G. Kornev, N. N. Petrov et al.).

Thus, the fragmented breaks of shoulder bone were heavy damages

both with respect to the pathoanatomical changes and according to the character/nature of clinical issues.

Other forms/species of the breaks of shoulder were encountered comparatively rarely: edge/boundary break - in 8.7o/o, cross - in 4.2o/o, perforated - in 2.4o/o of injured people.

The enumerated forms/species of breaks more than in the half all injured people were the consequence of fragmentation injury, moreover blind-end injuries were encountered more frequent than through ones.

On the localization edge/boundary and perforated breaks in essence were in epi-metaphasal sections of shoulder, while the cross breaks in essence occupied diaphysic region.

Good anatomical and functional results with these means of damage fluctuated in the considerable limits: with the perforated break - 45.1o/o, edge/boundary - 38.7o/o and cross - 8.6o/o.

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From these data it follows that the worst results were obtained with the cross form/species of break. In this respect they approached the heaviest crushed and small-splintered breaks.

Attention is drawn to the frequent damage of nerves. It comprised in the issues: with the perforated break - 14.3o/o, with the cross - 18.6o/o and end - 16.3o/o.

With the cross breaks more frequently than with other forms/species, was observed in the issues the damage of nerves, which is explained by the intimate topographic-anatomic relationships/ratios of radial nerve and diaphysis of shoulder bone; in this case the pressure on the nerve of the displaced massive fragments of bone with the cross break was more stable than with other forms/species of breaks.

The limitation of motions as the final issue of the bullet breaks of shoulder was expressed with the perforated break into 28.6o/o, with the edge/boundary - in 34.2^oo, with the cross - into 45.7o/o and with the packed in break - into 52.0o/o.

In the frequency of the observed ankylosis cross break occupied the second place after packed in break (4.9-8.0o/o), also, approached the fragmented forms/species of breaks. Ankylosis are noted into 3.3o/o of perforated breaks and into 2.7o/o of edge/boundary ones. Osteomyelitis with these forms/species of the breaks of shoulder was

observed more rarely than with the multi-fragmented breaks: with the perforated break - into 4.30/o, with cross - into 5.60/o and with the edge/boundary - into 2.40/o. However, here most frequently it was noted with the cross break; but if we consider that the false joints which not at all were encountered among the perforated and edge/boundary breaks, with the cross composed 4.90/o, but amputation 1.20/o, then it is possible to draw the conclusion that this form/species of break was the heavy damage of shoulder, in the clinical issues which were approaching fragmented breaks. With the longitudinal, the oblique and packed in breaks a good anatomical and functional result was observed respectively in 32.00/o, 23.50/o and 20.00/o of injured people.

Table 324. Distribution of injured people with the bullet break of shoulder according to the clinical issues in connection with the character/nature of injury (in the percentages).

(1) Характер ранения	(2) Клинический исход	(3) Деформация			
		Хороший	Деформация	Поврежде- ние нерва	Контрак- тура
(15) Слепое		21,2	0,2	10,5	40,3
(16) Сквозное		15,8	0,4	16,7	37,0
(17) Касательное		18,8	—	10,6	36,5
(18) Размоложение		—	—	1,3	1,3
В среднем		16,1	0,4	14,6	35,8

(7) Анкилоз	(8) Ложный су- став	(9) Культи	(10) Остеомиелит	(11) Комбинация	(12) Прочие	(13) Итого	(14) Умерло
4,3	3,0	2,5	9,1	6,0	2,9	100,0	2,8
3,9	4,8	5,1	8,2	6,0	2,1	100,0	1,8
3,5	4,7	7,1	10,6	4,7	3,5	100,0	1,2
—	0,9	95,2	—	0,9	0,4	100,0	8,3
3,7	4,3	9,1	8,0	5,8	2,2	100,0	2,3

Key: (1). Character/nature of injury. (2). Clinical issue. (3). Good. (4). Strain. (5). Damage of nerves. (6). Contracture. (7). Ankylosis. (8). False joint. (9). Stump. (10). Osteomyelitis. (11). Combination. (12). Other. (13). Altogether. (14). It died. (15). Blind. (16). Through. (17). Tangent. (18). crushing.

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With rammed in break the contracture composed 52.0.o/o and ankylosis - 8.0o/o, what is the highest indicator in comparison with other forms/species of the bullet breaks of shoulder. This, as it was noted above, is found explanation in the fact that the packed in break, being arranged/located in the meta-epiphysial region, was located in immediate proximity to the joint.

Osteomyelitis as issue was noted with the longitudinal break in 4.0o/o of injured people, with the oblique - in 6.1o/o and with that packed in - in 4.0o/o, and false joint was observed with the longitudinal break in 4.0o/o and the oblique - in 0.8o/o of injured people.

Character/nature of injury and clinical issues.

The dependence of the clinical issues of the bullet breaks of shoulder on the character/nature of injury is represented in Table 324.

From the represented in Table 324 data it is evident that there is no special difference between the clinical issues in the dependence on the character/nature of injury, if we secrete from the

comparison crushing and breakaways, with which, naturally, there were especially poor results.

If we take, for example, indicators on good issues and false joints, then the best results were observed with blind injuries, worse - with the tangents and even more worse - with the perforating injuries.

This sequence of the best indicators on the issues on the whole will agree with the characteristic of these groups of injuries according to the form/species of break (Table 325).

Consequently, on the severity of the break in the decreasing order injuries were arranged/located as follows: through, blind, tangents, and along the greatest number of best indicators of clinical issues - somewhat otherwise: through, tangents and blind, i.e., in spite of a larger number of heavy breaks, with the blind-end injuries clinical issues were better than with the tangents, with which heavy breaks it was observed much less.

This is explained by the fact that the tangential injuries, which generate the break of bone, were accompanied by decomposition by the decomposition of soft tissues on large extent, which usually seizes the half the periphery of shoulder.

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Table 325. Distribution of injured people with the bullet break of shoulder according to the form/species of break in connection with the character/nature of injury (in the percentages).

(1) Характер ранения	(2) Вид перелома	(3) Директная раная	(4) Оскольча- тый	(5) Раздроблен- ный	(6) Поперечная, продольная, косая	(7) Итого
(8) Слепое		19,7	46,4	11,7	22,2	100,0
(9) Сквозное		8,9	57,2	16,4	17,5	100,0
(10) Касательное		38,9	20,8	9,7	30,6	100,0
(11) Размозжение		—	1,8	97,3	0,9	100,0

Key: (1). Character/nature. (2). Form/species of break. (3). Perforated edge/boundary. (4). Fragmented. (5). Crushed. (6). Cross longitudinal by scythe. (7). Altogether. (8). Blind. (9). Through. (10). Tangent. (11). Crushing.

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Clinical outcomes depending on the character/nature of injury were different. Good functional and anatomical results are obtained most frequently in the group of the blind bullet breaks of the shoulder where they composed 21.20/o of all issues in the recovered injured people, whereas in group of perforating injuries they reached only 15.80/o and tangents - 18.80/o.

Explanation this should be searched for in the fact that with the perforating bullet injuries of the shoulder 73.60/o breaks they related to the rank of the heaviest forms of the crushed and fragmented breaks, while with the blind-end injuries in their fraction/portion was only 58.1.0/o of all breaks.

Contractures and ankylosis with the extraction of the hospital were encountered with the blind-end injuries more frequently than with the through ones and the tangents (Table 324).

Increase of a quantity of contractures with the blind-end injuries of shoulder, which were being accompanied by the break of bone, depended on the fact that these injuries in the overwhelming majority were fragmentation (77.60/o).

The structure of wound canal with the blind-end fragmentation injuries was characterized by its irregular form even larger crushing of tissue by the wounding projectile; the absence of outflow outside contributed to the propagation of the issuing from blood on the interfascial to slits, stratification of muscles and to accumulation of the blood in the closed spaces (V. V. Gorinevskaya, P. G. Kornev, A. N. Maksimenkov), which created favorable conditions for the development of infection, which led to the delay of the consolidation of break and to excess formation of scar tissue (I. L. Krupko).

The damage of nerves as to basis of outcome almost equally frequently was observed in the group of the blind bullet breaks of shoulder (10.50/o) and tangents (10.60/o) and was increased with through breaks (16.70/o), which in all probability depended on the damage of nerves by the bone fragments whose effect/action with the through fragmented breaks should be considered as the effect/action of the secondary wounding projectiles.

Osteomyelitis as outcome it was encountered with the blind-end injuries of shoulder bone in 9.10/o, with the through ones - in 8.20/o of injured people. In the rank of tangential injuries osteomyelitis as issue was observed in 10.60/o of injured people. The false joints of the afterward perforating and tangential injuries of shoulder respectively composed 4.8 and 4.70/o and blind-end injuries - 3.00/o.

Table 326. Distribution of injured people with the bullet break of shoulder according to the clinical issues in connection with the means of injury (in the percentages).

(1) Вид ранения	(2) Клинический исход	(3) Хороша	(4) Деформация	(5) Поврежде- ние нервов	(6) Контрак- тура
(15) Пулевое		18,4	0,3	16,0	38,7
(16) Осколочное		13,1	0,4	12,3	31,9

(7) Анкилоз	(8) Ложный су- став	(9) Культи	(10) Остеомие- лит	(11) Комбинация	(12) Прочие	(13) Итого	(14) Умерло
3,4	4,2	3,7	8,0	5,2	2,1	100,0	1,2
4,2	4,6	16,4	8,0	6,8	2,3	100,0	3,8

Key: (1). Means of injury. (2). Clinical issue. (3). Good. (4). Strain. (5). Damage of nerves. (6). Contracture. (7). Ankylosis. (8). False joint. (9). Stump. (10). Osteomyelitis. (11). Combination. (12). Other. (13). Altogether. (14). It died. (15). Bullet. (16). Fragmentation.

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An increase in the false joints with the through injuries of shoulder bone is explained by the considerable decomposition of bone

tissue, by the removal/distance of bone fragments during the surgical processing and by the presence of favorable soil for the development of infection in the focus of damage.

Thus, it should be noted that heaviest both according to the character/nature of damages and on the clinical issues were the perforating injuries of shoulder, eliminating the crushed wounds, which were being frequently accompanied by the breakaway of extremity.

Not without reason a quantity of injured people with the amputation, discharged from hospital with the perforating injuries, was 2 times more than with the blind ones (5.1-2.50/o).

To the following on the severity it is necessary to relate the tangential injuries in number of which osteomyelitis composed 10.6% and amputations they achieved 7.10/o.

As it is possible to judge from entire aforesaid, the form/species of break and pathoanatomical changes in the tissues in a decisive manner affected clinical issues.

Means of injury and clinical issues.

The clinical issues of the breaks of shoulder, caused by bullet, were considerably better than the issues of the breaks of shoulder, caused by fragments both in the relation to of lethality and number of amputations and in the relation to of ankylosis, pseudoarthroses and good results (Table 326).

This is explained by a large number of crushed breaks among the fragmentation injuries (Table 327).

Since with this was simultaneously less than fragmented and more than incomplete breaks, then it is necessary to recognize that by themselves fragmentation injuries differed in terms of the complexity of wound canal by the preponderance of blind-end fragmentation injuries in comparison with the blind bullet ones (4 1/2 times) and of the larger bacterial contamination of the fragments of projectiles and mines in comparison with the bullets (see Vol. 15 of present "work").

Primary surgical processing and clinical issues.

Outcomes in injured people with the break of shoulder after the different character/nature of primary it is surgical treatments are visible from the data, given in Table 328.

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The best indicators on the clinical issues were in injured people, who were subjected to dissection and carving with the removal/distance of foreign bodies.

Table 327. Distribution of injured people with the bullet break of shoulder according to the form/species of break in connection with the means of injury (in the percentages).

(1) Вид ранения и его удельный вес	(2) Вид перелома	(3) Дырча- тый и краевой	(4) Осколь- чатый	(5) Раздроб- ленный	(6) Поперечный, продольный, косой	(7) Всего
(1) Пулевое (56,7)		9,3	57,6	15,6	17,5	100,0
(2) Осколочное (43,3)		13,4	42,6	25,9	18,1	100,0

Key: (1). Means of injury and its specific gravity/weight. (2). Form/species of break. (3). Perforated and edge/boundary. (4). Fragmented. (5). Crushed. (6). Cross, longitudinal, by scythe. (7). In all. (8). Bullet. (9). Fragmentation.

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In comparison with other groups of injured people there was here more than good outcomes and it is less than outcomes with osteomyelitis, ankylosis and amputation.

It is known that blind injuries were accompanied by the smaller trauma of tissues, including of bone, than through (Table 325), and if in this case during the primary processing was removed foreign body, then were provided good clinical issues.

The poorest indicators on the clinical issues were observed in injured people, who were subjected, besides dissection and carving of wound, also to the removal/distance of bone fragments.

Completely valid can be remark that the removal/distance of bone fragments was conducted with the the fragmented and crushed breaks. i.e. with the heaviest breaks, in view of which issues in injured people with these breaks were more badly in comparison with those transferred simpler processing.

Therefore is very important examination of data, in which would be reflected connection/communication of clinical issues with the character/nature of processing the separate forms/species of break or group of uniform breaks (Table 329).

Thus, with the perforated and edge/boundary breaks the best indicators of issues in the decreasing order were obtained:

a) with the abstention from the primary processing - on good issues, contractures and combinations of poor issues;

b) after dissection and carving - on the ankylosis to

osteomyelitis and to contractures:

c) after dissection - on good issues, ankylosis, combinations of issues (besides stump):

d) at the latter place there were the injured people, in whom were applied other elements of processing.

Table 328. Distribution of injured people with the bullet break of shoulder, that were subjected of different genus to primary surgical processing, according to the clinical issues (in the percentages)

(1) Характер первичной хирургической обработки	(2) Клинический исход	(3)	(4)	(5)	(6)
		Хороший	Деформа- ция	Поврежде- ние нервов	Контр- актура
(15) Рассечение		17,0	0,1	16,4	40,3
(16) Рассечение и иссечение		15,6	1,0	16,4	39,6
(17) Рассечение и иссечение с удалением инород- ных тел		23,6	0,6	11,2	41,6
(18) Рассечение и иссечение с удалением костных осколков		8,0	0,5	16,5	36,3
(19) Обработки не было		22,7	0,4	14,9	35,6

(7) Анkilоз	(8) Ложный с- став	(9) Культи	(10) Остеомиелит	(11) Комбинация	(12) Прочие	(13) Итого	(14) Умерло
4,1	2,1	2,4	9,1	6,3	2,2	100,0	1,8
4,2	3,7	3,9	8,9	4,7	2,0	100,0	2,9
2,8	2,8	1,7	5,6	7,3	2,8	100,0	0,6
4,6	10,9	5,0	9,8	7,2	1,2	100,0	1,4
3,7	3,6	2,6	7,9	5,6	3,0	100,0	2,5

Key: (1). Character/nature of primary surgical processing. (2). Clinical issue. (3). Good. (4). Strain. (5). Damage of nerves. (6). Contracture. (7). Ankylosis. (8). False fixture. (9). Stump. (10). Osteomyelitis. (11). Combination. (12). Other. (13). Altogether. (14). It died. (15). Dissection. (16). Dissection and carving. (17). Dissection and carving with removal/distance of foreign bodies. (18). Dissection and carving with removal/distance of bone fragments. (19). Processings it was not.

Page 531. Table 329. Distribution of injured people with the bullet break of shoulder according to the clinical issues in connection with the form/species of break and the character/nature of the primary surgical treatment (in the percentages).

(1) Вид перелома	(2) Характер первичной хирургической обработки
(14) Дирчатый и краевой	(15) Рассечение
	(16) Рассечение и иссечение
	(17) Рассечение и иссечение с другими элементами обработки
(19) Оскольчатый	(18) Обработки не было
	(15) Рассечение
	(16) Рассечение и иссечение
	(17) Рассечение и иссечение с другими элементами обработки
(20) Раздробленный	(18) Обработки не было
	(15) Рассечение
	(16) Рассечение и иссечение
	(17) Рассечение и иссечение с другими элементами обработки
(21) Поперечный, продольный и косой	(18) Обработки не было
	(15) Рассечение
	(16) Рассечение и иссечение
	(17) Рассечение и иссечение с другими элементами обработки
	(18) Обработки не было

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(3) Клинический исход									
(4) хороша	(5) контр- актура	(6) вынужд.	(7) локный сустав	(8) пульс	(9) остеомиелит	(10) комбинированный	(11) прочие	(12) итого	(13) умерло
37,8	41,2	2,1	—	—	2,8	2,1	14,0	100,0	0,7
35,4	22,8	—	—	—	2,1	6,3	33,4	100,0	—
31,0	31,0	2,4	—	—	2,4	2,4	30,8	100,0	—
30,0	22,5	2,1	—	—	2,7	0,7	22,0	100,0	—
13,0	42,0	4,4	2,3	0,5	11,7	7,2	18,9	100,0	0,3
9,3	41,4	4,9	4,9	0,6	15,4	3,7	19,8	100,0	0,6
18,1	39,7	2,6	6,9	—	6,9	12,9	12,9	100,0	1,7
17,7	40,5	4,0	3,3	0,5	9,1	7,0	17,9	100,0	1,1
7,9	31,7	8,7	9,6	9,6	11,9	11,9	8,7	100,0	3,8
4,8	30,8	7,1	14,2	14,3	9,6	9,6	9,6	100,0	4,5
6,3	18,7	4,2	18,7	22,9	8,3	14,6	6,3	100,0	11,1
6,0	24,1	5,4	16,8	15,5	13,4	8,1	10,7	100,0	8,0
20,0	43,2	3,1	1,2	0,8	6,3	3,9	21,5	100,0	—
17,8	50,0	2,4	1,2	—	4,8	4,8	19,0	100,0	—
17,9	53,5	1,8	1,8	—	7,1	3,6	14,3	100,0	—
26,9	42,9	2,9	1,9	—	5,4	4,4	15,6	100,0	—

Key: (1). Form/species of break. (2). Character/nature of primary surgical treatment. (3). Clinical issue. (4). Good. (5). Contracture. (6). Ankylosis. (7). False joint. (8). Stump. (9). Osteomyelitis. (10). Combination. (11). Other. (12). Altogether. (13). it died. (14). Perforated and edge/boundary. (15). Dissection. (16). Dissection and carving. (17). Dissection and carving with other elements of processing ¹.

FOOTNOTE ¹. In a number of other elements of processing according to all forms/species of breaks they entered: the dressing of vessels - 5.40/o, the removal/distance of foreign bodies - 18.00/o, the removal/distance of bone fragments - 67.40/o, processing the fragments of bone - 3.00/o and the combination of the enumerated elements/cells - 6.20/o. ENDFOOTNOTE.

(18). Processings it was not. (19). Fragmented. (20). Crushed. (21). Cross, longitudinal and by scythe.

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With the fragmented breaks it is possible to note this sequence in the decreasing order according to the best results:

a) the group of injured people with the use/application of other elements of processing on all issues, except false joint and lethality;

b) abstention from the processing - on all issues. except lethality;

c) one dissection or in the combination with the carving gave the least number of best indicators.

With the crushed breaks it is possible to note the following distribution in the decreasing order according to the greatest number of good indicators depending on the character/nature of processing:

a) dissection - according to good issues, lethality, false joints and number of amputees;

b) the group of injured people with other elements of processing - according to many indicators. At the latter/last place proved to be abstention from the processing and the dissection with the carving.

With the oblique cross and longitudinal breaks descending sequence according to the best indicators was several different: here in the first place it is possible to place abstention from the

processing in the second place - dissection, on the third - "complex processing with other elements/cells".

9) At the latter/last place proved to be the dissection with the carving.

From what has been said the value of the primary surgical processing turned out to be sufficiently in relief: incomplete breaks flowed/occurred/lasted better, if they or in no way were treated or underwent simplest processing and worst of all, if was performed processing with other elements/cells.

With more compound fractures (oblique, cross and longitudinal) already begins cross ones and longitudinal ones) already it begins to be revealed/detected the value of the use/application of other elements/cells, at which following the abstention from the processing and by simple dissection were obtained the best results, than during the dissection with the carving. With the fragmented breaks of even more came to light the advisability of applying other elements/cells and the deficiency of the simple processings, during which the results were even worse than with the abstention from the processing.

Table 330. Distribution of injured people with the bullet break of shoulder according to the clinical issues in connection with the presence of the associated injuries (in the percentages).

(1) Группа раненых	(2) Клинический исход	(3) Хороши	(4) Деформации	(5) Поврежде- ние нервов	(6) Контра- ктура
(15) Без сопутствующих ранений		17,6	0,4	14,8	36,5
(16) С сопутствующими ранениями		13,5	0,2	14,3	34,6

(7) Анкилоз	(8) Ложный су- став	(9) Культи	(10) Остеомиелит	(11) Комбинация	(12) Прочие	(13) Итого	(14) Умерло
3,7	4,2	7,2	8,3	5,4	1,9	100,0	1,3
3,8	4,4	12,5	7,4	6,5	2,8	100,0	4,1

Key: (1). Group of injured people. (2). Clinical issue. (3). Good. (4). Strain. (5). Damage of nerves. (6). Contracture. (7). Ankylosis. (8). False joint. (9). Stump. (10). Osteomyelitis. (11). Combination. (12). Other. (13). Altogether. (14). It died. (15). Without associated injuries. (16). With associated injuries.

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The crushed breaks almost equally flowed/occurred/lasted well afterward simple and complex (with other elements/cells) processings

and it is bad/poor- in the absence of treatment.

Especially it should be noted that the best indicators on clinical outcomes with all breaks, except those crushed, are noted in the absence processings.

Associated injuries and clinical outcomes.

The effect of accompanying injuries on the clinical outcomes of the bullet breaks of shoulder is represented in Table 330.

The presence of other injuries, besides the bullet break of shoulder, to a considerable degree made clinical issues worse. If the associated injuries it was not, then with the smaller lethality 3 times and a smaller number of amputations almost 2 times was noted a larger quantity of good results, and it is also less than ankylosis and pseudoarthroses.

Is explained this not only by the presence of the associated injuries whose 30,0% composed the breaks of other bones and the penetrating injuries in the cavity, but also by the composition of injured people in these groups according to the form/species of basic break (Table 331).

As can be seen from given in Table 331 data, the composition of injured people by the form/species of break in the presence of accompanying injuries was heavier, than without the associated injuries.

In 9.30/o of injured people the cracks, which are generated with the bullet breaks of shoulder bone, penetrated the joint, which frequently led to the supplementary complications. In the clinical issues this was expressed by an increase in the number of contractures to 47.4 % and the ankylosis to 18.80/o in comparison with the issues in all injured people with the break of shoulder bone - 35.80/o (contracture) and 3.70/o (ankylosis).

Simultaneously with this lethality and number of those discharged with the stump among the injured people with the penetrating into the joint break were two times less than among all injured people with the break of shoulder bone, that it is possible to partly explain by the smaller severity of breaks in the injured people of the first group (more than edge/boundary ones and it is less than fragmented ones). Consequently, complication of the bullet breaks of shoulder bone of arthritis flowed/occurred/lasted sufficiently favorably, and relative to rarely it was necessary to resort to the amputation.

Table 331. Distribution of injured people with the bullet break of shoulder according to the form/species of break in connection with the presence of the associated injuries (in the percentages).

(1) Группа раненых	(2) Вид перелома	(3) Дырча- тый и краевой	(4) Осколь- чатый	(5) Раздроб- ленный	(6) Поперечный, продольный, косой	(7) Итого
(8) Без сопутствующих ранений . .		11,4	53,8	17,7	17,1	100,0
(9) С сопутствующими ранениями . .		10,7	47,7	22,0	19,6	100,0

Key: (1). Group of injured people. (2). Form/species of break. (3). Perforated and edge/boundary. (4). Fragmented. (5). Crushed. (6). Cross, longitudinal, by scythe. (7). Altogether. (8). Without associated injuries. (9). With associated injuries.

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Essential difference in the majority of clinical issues with the breaks, which penetrate into the shoulder and elbow joint, noted could not be. With the breaks, which penetrate into the shoulder joint, were observed greater lethality and smaller number of those discharged with the stump, than with the breaks, which penetrate into the elbow joint, that it does not require special explanations.

Clinical issues on the years of war.

If we trace clinical issues on the years of war, then it is possible to note a reduction in the lethality, and also the decrease of a number of injured people with osteomyelitis, ankylosis, consequences of the damages of nerves and combination of issues (Table 332).

Decrease in the issues of osteomyelitis from 9.6 to 5.60/o and reduction in the lethality, it is doubtless, must be set in connection/communication with an increase in the surgical activity in

all stages, with an improvement in the quality of the surgical processing, during which turned considerable attention to processing of bone wound and removal/distance of bone fragments, since the severity of break on the years of war was changed little, as is evident from table 333.

The decrease of lethality, number of issues into osteomyelitis and ankylosis partially should be related due to an increase in the number of amputations in connection with surgeons' increased activity during the war.

A small increase in the number of false joints also can be explained by the grown/risen radicalism of operational aid. As far as decrease is concerned of a number of good issues and increase of the number of contractures in last year of war, this can be explained by the earlier extraction of injured people from the hospitals in connection with the termination of war.

Simultaneously with this it is necessary to consider those unfavorable factors (table 334) which grew on in the years of the war: an increase in the quantity of fragmentation injuries, an increase of a number of breaks with the associated injuries.

In connection with an increase in the number of fragmentation

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injuries was increased also the frequency of breaks with the foreign bodies with 33.3 (1941) to 36.0o/o (1945).

Table 332. Distribution of injured people with the bullet break of shoulder according to the clinical issues during the different years of war (in the percentages).

Год войны (1)	Клинический исход (2)	Хороший (3)	Деформации (4)	Повреждение нервов (5)	Контрактура (6)	Анкилоз (7)
Первый (15)	...	15,3	0,5	11,1	38,5	5,2
Второй (16)	...	18,8	0,3	16,3	31,6	4,1
Третий (17)	...	17,6	0,3	15,5	35,0	3,3
Четвертый (18)	...	12,2	0,3	14,8	38,8	2,9

Ложный сустав (8)	Культи (9)	Остеомиелит (10)	Комбинация (11)	Прочие (12)	Итого (13)	Умерло (14)
4,4	5,7	9,6	6,6	3,1	100,0	2,5
3,5	8,6	9,0	6,0	1,8	100,0	3,0
3,8	9,0	8,0	5,3	2,2	100,0	2,1
5,5	12,5	5,6	5,5	1,9	100,0	1,8

Key: (1). Year of war. (2). Clinical issue. (3). Good. (4). Strain. (5). Damage of nerves. (6). Contracture. (7). Ankylosis. (8). False joint. (9). Stump. (10). Osteomyelitis. (11). Combination. (12). Other. (13). Altogether. (14). It died. (15). The first. (16). The second. (17). The third. (18). The fourth.

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Here should be also noted the difference in the clinical issues,

which was being observed in those obtained injury in the different periods of year. It is known that a change in the climatic conditions for a period of year exerted influence not only directly on injured people themselves, but it affected also the content, care and their nourishment.

It is known, for example, that the food in summer months was in more diverse and richer vitamins than in other periods of year. In connection with this clinical issues in those obtained injury in the different season were dissimilar.

The study of this question occurred in such a way that all injured people were broken into 4 groups on the time of the injury: injured people in the spring months (February, March, April), injured people in the summer months (May, June, July), injured people into the autumnal months (August, September, October) and the injured people in the winter months (November, December, January).

Clinical issues were estimated taking into account the distribution in these groups of injured people according to the form/species of break (table 336).

The given materials (table 335) give to right conclude that the best clinical issues, which were being observed in those obtained

injury in summer months, are explained precisely by season, because the composition of injured people by the form/species of the break in these months was heavier than in other periods of year.

In the injured people in the winter months was more than the light breaks and it is less than crushed and nevertheless issues were more badly than in injured people in summer months.

Table 333. Distribution of injured people with the bullet break of shoulder according to the form/species of the break during the different years of war (in the percentages).

Год войны (1)	Вид перелома (2)	Дырчатый и краевой (3)	Оскольчатый (4)	Раздробленный (5)	Поперечный, продольный, косой (6)	Итого (7)
Первый (8)		7,0	54,8	20,0	18,2	100,0
Второй (9)		10,3	51,4	19,6	18,7	100,0
Третий (10)		12,5	52,3	18,3	16,9	100,0
Четвертый (11)		12,3	47,3	22,7	17,7	100,0

Key: (1). Year of war. (2). Form/species of break. (3). Perforated and edge/boundary. (4). Fragmented. (5). Crushed. (6). Cross, longitudinal, by scythe. (7). Altogether. (8). The first. (9). The second. (10). The third. (11). The fourth.

Table 334. Frequency of fragmentation injuries and associated injuries with the bullet breaks of shoulder during the different years of war (in the percentages).

Группа раненых (1)	Год войны (2)	Первый (3)	Второй (4)	Третий (5)	Четвертый (6)
С осколочными ранениями (7)		41,7	42,4	43,4	44,9
С сопутствующими ранениями (8)		35,4	35,6	37,0	37,5

Key: (1). Group of injured people. (2). Year of war. (3). The first.

(4). The second. (5). The third. (6). The fourth. (7). With fragmentation injuries. (8). With associated injuries.

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The poorest results of treatment were in injured people in the spring months when still remained the difficulties of winter period, and food in the relation to vitamins was most lean.

Issues in different age groups.

To establish/install a strict dependence of clinical issues on the age of injured people with the bullet breaks of shoulder did not manage (table 337).

If we reject/throw from the comparison of a number of those amputated and the dead persons who are located in the inversely proportional relationship/ratio between themselves, then it is possible to note that the best indicators on the clinical issues were in the most young ones (of up to 29 years).

Table 335. Distribution of injured people with the bullet break of shoulder according to the clinical issues in connection with the time of injury (in the percentages).

Время ранения (1)	Клинический исход (2)									
	(3) хорошая	(4) повреждение нервов	(5) контр-анг. ра	(6) анкилоз, ложный сустав или комбинация	(7) культя	(8) остео-миелит	(9) деформация, прочее	(10) итого	(11) умерло	
Февраль — апрель (12)	13,7	14,4	35,8	15,3	9,0	9,3	2,5	100,0	2,5	
Май — июль (13)	19,4	12,2	33,8	14,9	12,0	5,3	2,4	100,0	1,8	
Август — октябрь (14)	16,2	16,0	35,1	12,6	9,8	8,1	2,2	100,0	2,4	
Ноябрь — январь (15)	16,3	14,0	37,2	14,5	7,3	8,0	2,7	100,0	2,3	

Key: (1). Time of injury. (2). Clinical issue. (3). good. (4). damage of nerves. (5). contracture. (6). ankylosis, false joint of combination. (7). stump. (8). osteomyelitis. (9). strain, other. (10). altogether. (11). died. (12). February-April. (13). May-July. (14). August-October. (15). November-January.

Table 336. Distribution of injured people with the bullet break of shoulder according to the form/species of break in connection with the time of injury (in the percentages).

Время ранения (1)	Вид перелома (2)				
	дырчатый и разовой	оскольчатый	раздроб-ленный	прочие	всего
Февраль — апрель (12)	10,3	51,3	20,8	17,6	100,0
Май — июль (13)	10,7	48,8	22,7	17,8	100,0
Август — октябрь (14)	10,8	51,4	19,6	18,2	100,0
Ноябрь — январь (15)	11,9	53,0	18,3	16,8	100,0

Key: (1). Time of injury. (2). Form/species of break. (3). perforated and edge/boundary. (4). fragmented. (5). crushed. (6). other. (7). in all. (8). February-April. (9). May-July. (10). August-October. (11). November-January.

Table 337. Clinical issues in injured people with the bullet break of shoulder in the different age groups (in the percentages).

(1) Группа раненых по возрасту	(2) Клинический исход											
	(3) хороша	(4) поврежде- ние нервов	(5) контрак- тура	(6) анкилоз	(7) ложный сустав	(8) культи	(9) остео- миелит	(10) комбина- ция	(11) прочие	(12) итого	(13) умерло	
До 29 лет (14)	21,4	15,9	32,4	3,0	3,0	8,8	8,0	5,0	2,5	100,0	2,0	
30—39 лет (15)	13,8	13,9	38,6	3,8	5,0	9,4	7,4	6,2	2,4	100,0	1,5	
40 лет и более (16)	11,0	11,0	41,0	6,1	6,7	8,3	8,2	6,6	1,1	100,0	2,5	

Key: (1). Group of injured people on the age. (2). Clinical issue. (3). good. (4). damage of nerves. (5). Contracture. (6). ankylosis. (7). false joint. (8). stump. (9). osteomyelitis. (10). combination. (11). other. (12). altogether. (13). it died. (14). Of up to years. (15). years. (16). years and more.

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They have most of all of good issues and least of all contractures, ankylosis, false joints and combinations of poor issues; however, all these best issues it is not possible to explain only by age, since in younger proved to be a smaller number of heaviest (crushed) breaks:

of up to 29 years - 14.00/o, from 30 of up to 39 years - 18.40/o it is older than 40 years 17.90/o.

Periods of the formation of the callus.

The consolidation of the bullet breaks of shoulder on the average began in 2.3 months (according to the data of the deepened development), and the frequency of the onset of consolidation on the periods was represented in Table 338.

Thus, later than the average period (2.3 months) consolidation began almost in 1/3 injured people (31.20/o), it is earlier than the average period - it is somewhat more than in 2/3 (68.80/o). This testifies about a relatively small number of late consolidation - about 1/3 all injured people.

The period of the consolidation of the break of shoulder was found in the dependence on the form/species of the break: so, according to the data of the author's development, produced by S. G. Yartsev, toward the end of the second month after injury the callus was observed in the half all injured people with the oblique, cross and slantwise-cross break, in 25.80/o of injured people with the large-splintered break and in 11.50/o - with the small-splintered break. Toward the end of the 4th month after injury the callus was

noted in 61.10/o of injured people with the oblique, cross and slantwise-cross break, in 42.70/o - with the large-splintered break and in 30.00/o - with the small-splintered break.

During the comparison with the breaks of other bones it is possible to note that on the average period of the formation of the callus the breaks of shoulder occupied the middle place between the breaks of the bones of shin and forearm and considerably they differed from breaks thigh (table 339).

This can be partly explained by the fact that the shoulder bone throughout its mass occupies the middle place between the bones of shin and forearm.

In the presence of osteomyelitis the formation of corn on the shoulder was detained by 0.7 months.

Multiple failure of nerves lengthened the consolidation of the breaks of shoulder very insignificantly (for 0.1 months).

Table 338. Distribution of injured people with the bullet break of shoulder bone according to the periods of the formation of the callus (in the percentages).

Срок образо- вания костной мозоли (в ме- сяцах) (1)	1,5	1,6-2	2,1-2,5	2,6-3	
Процент ране- ных (3)	19,4	27,3	22,1	13,6	
3,1-3,5	3,6-4	4,1-4,5	4,6-5	5,1-6	6,1 и более (2)
5,6	5,3	1,8	2,3	1,4	1,2

Key: (1). Period of the formation of the callus (in the months). (2). and more. (3). Percentage of injured people.

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Duration of hospital treatment.

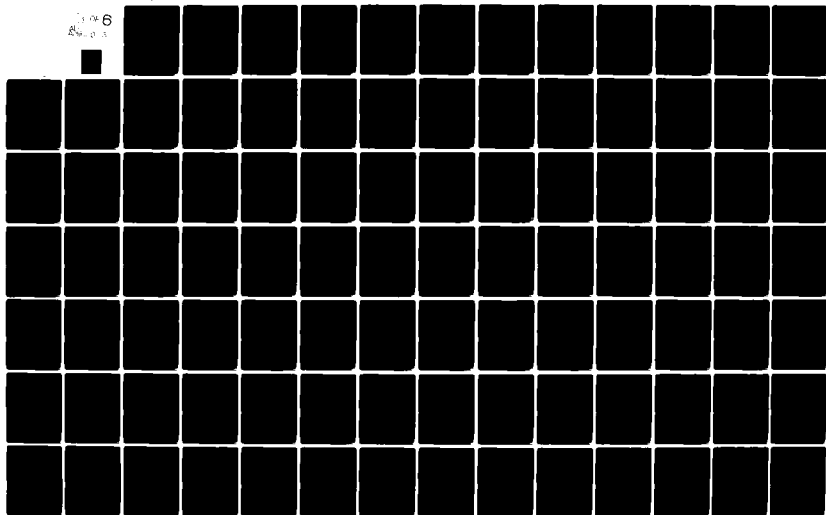
According to the data of the deepened development of the histories of disease/sickness/illness/malady, the average period of hospital treatment with the bullet breaks of shoulder was equal to 4.5 months.

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EXPERIENCE OF SOVIET MEDICINE IN A GREAT PATRIOTIC WAR, 1941-19--ETC(U)
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In this respect the breaks of shoulder approached more breaks of the bones of forearm, than the bones of shin, in contrast to the data about the consolidation where the breaks of shoulder occupied the middle place between the breaks of the bones of forearm and shin (table 339).

Consequently, the extraction of injured people after the consolidation of the break of shoulder was conducted within the shorter periods than after the consolidation of break of the bones of shin. This is explained mainly by the best conditions of the blood supply of shoulder, arranged/located more proximal than shin. In connection with this the reduction processes on the shoulder occurred more rapidly than on the shin, which is evident at least from the fact that the operations/processes for occluding the wound of soft tissues with the breaks of shoulder were conducted more rarely (1.10/o) than with the breaks of the bones of shin (1.50/o).

The groups of injured people with the bullet break of shoulder in the duration of treatment in the hospital are represented in Table 340. Greatest group (24.20/o) composed those injured people who were treated from three to four months.

Consequently, somewhat more than the half injured people (55.00/o) was discharged earlier than the average period (4.5

months). This determines the delay of hospitalization in a considerable number of injured people (45.0o/o).

The form/species of break was one of the basic factors, which condition the issue of injury, including in the relation to the duration of hospitalization.

Table 339. Average period of the consolidation of the bullet breaks of the bones of extremities and the average duration of hospital treatment apropos of the same breaks (in the months).

По анизация перелома (2)	Плечо (3)	Предплечье (4)	Бедро (5)	Голень (6)
Средний срок (1)				
Консолидации (7)	2,3	1,9	3,2	2,7
Госпитализации (8)	4,5	3,6	6,1	5,6

Key: (1). Average period. (2). Localization of break. (3). Shoulder. (4). Forearm. (5). Thigh. (6). Shin. (7). Consolidations. (8). Hospitalizations.

Table 340. Distribution of the recovered injured people with the bullet break of shoulder according to the duration of hospital treatment (in the percentages).

Длительность лечения (в днях) (1)	До 60	61-80	81-120	121-150	151-180	181-210	211-240	241-270	271-300	(2) 301 и более
Процент выздоро- вевших раненых (3)	4,0	16,2	24,2	21,6	14,6	8,8	4,4	3,1	1,4	1,7

Key: (1). Duration of treatment (in the days). (2). and more. (3). Percentage of recovered injured people.

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The duration of hospital treatment was located in accordance with the severity of break; most lasting it was with the heaviest breaks. According to the data of the deepened development, they finished treatment not later than the average period (4.5 months) with edge/boundary break 77.80/o of injured people, with the perforated - 72.50/o, with the oblique - 67.70/o, with the cross and the longitudinal - 65.50/o, with that crushed - 63.70/o and with the fragmented - 61.20/o. The available nonconformity in the relation to the crushed and fragmented breaks is explained by the fact that with the crushed breaks is produced considerably more amputations, than with the fragmented ones.

Age greatly little affected the duration of treatment, as is evident from the stated below comparison of the average duration of hospital treatment with the specific gravity/weight of the heavy breaks in the different age groups (table 341).

As is known from the preceded chapters, in injured people with the break of shoulder and by the damage of nerves the delay of hospitalization was equal to on the average 10 to days, in those

transferred gas infection - 6 to days, and with the complication of osteomyelitis the period of hospitalization was increased by more than 1 1/2 months.

Lethality.

Lethality with the bullet breaks of shoulder bone occupied the third place: it was 6 1/2 times less than the lethality with the breaks of femoral bone 2 times less than the lethality with the breaks of the bones of shin. This difference in the lethality with the breaks of different bones is explained by the predominantly dissimilar frequency of the complication of breaks of gas infection.

The reasons for death with the bullet breaks of shoulder were following: gas infection - 36.7o/o, the diseases of internal organs/controls - 19.3o/o, sepsis - 17.4o/o, shock - 10.1o/o, combinations from the reasons pointed out above - 8.2o/o, hemorrhage - 6.4o/o and pneumonia - 1.9o/o.

Thus, most of all of the fatal results was observed with the gas infection and the sepsis, what is characteristic for the breaks of the bones of all segments of extremities. Difference from other segments was a considerable quantity of deaths from the "disease of internal organs/controls" as the consequence of the associated injuries mainly of thoracic cavity.

Table 341. Average duration of hospital treatment and frequency of the crushed and fragmented bullet breaks of shoulder in the different age groups.

Возраст раненых (1)	Средняя длительность госпитального лечения (2) (в месяцах)	Частота оскольчатых и раздробленных переломов (3) (в процентах)
До 29 лет (4) . . .	4,7	71,2
30-39 " . . .	4,5	72,7
40 лет и старше (5)	4,6	72,9

Key: (1). Age of injured people. (2). Average duration of hospital treatment (in months). (3). Frequency of bullet and crushed breaks (in percentages). (4). Of up to years. (5). years it is older.

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Development in the wound of infection, and also onset of other complications were found in the dependence on the series/number of conditions. Thus, is very dissimilar was dissimilar lethality with the different in the severity breaks (perforated, cross, longitudinal, by scythe, small-splintered and packed in) in no way it was observed the fatal results, with the crushed break the lethality was 4 times more than average/mean lethality with the breaks of shoulder.

The bullet breaks of shoulder bone to a considerable degree were burdened by the associated combined injuries, since shoulder bone through its anatomical arrangement almost always is found against the background of other parts of the body: breast, stomach, head. Therefore its breaks were accompanied by the penetrating injury of different cavities considerably more frequently than the breaks of other long tubular bones: 3 times more frequent than the breaks of thigh and 6 times of more frequent than the breaks of the bones of forearms and shin. It is hence completely logical that the lethality in the group with the associated injuries was more than 3 times higher than in the group without the associated injuries.

Form/species and character/nature of injury also affected lethality. Here already to the larger degree is revealed/detected the value of infection; so, with the fragmentation bullet breaks of shoulder bone the fatal results are noted 3 times more frequently than with the bullet ones, although according to a number of crushed breaks the fragmentation injuries 1 1/2 times only exceeded bullet injuries.

With the blind-end injuries the lethality was 1 1/2 times higher than with the perforating injuries, and 2 times, than with the

tangents, although among the perforating injuries there was more both the crushed and fragmented breaks, than among the blind ones.

Consequently, high lethality with the blind-end injuries is explained mainly by the larger infection of wound.

Lethality in the injured people of different age differed very little.

Lethality on the years of war is represented in the following form (after accepting the lethality of the fourth year of war for unity): the first year - 1.4, the second year - 1.7, the third year - 1.1, the fourth year - 1.0. In view of the fact that the severity of injuries each year of war gradually was increased, the decrease of lethality must be explained by an improvement in the rendering to medical aid and the methods of the treatment of injured people, including by expansion of readings to the amputation.

Clinical issues in injured people with the bullet break of the bones of forearm the docent Lt. col. of medical service I. M. Ayzan.

Issues in the previous wars.

The study of a question about the issues of the bullet breaks of

the bones of forearm in injured people in the Great Patriotic War acquires vast value because: first, this group was considerable percentage (64.0) among the injured people with the breaks of shoulder and injured people from the break of the bones of forearm, together undertaken; in the second place, forearm in functional sense it is the very important part of the extremity in view of complex anatomical-physiological relationships/ratios and, thirdly, comparatively high percentage of unfavorable results with the breaks indicated it obtains satisfaction this problem of extremely urgent.

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To examine the clinical issues of the bullet breaks of the bones of forearm in the historical aspect is almost impossible, since the breaks of the bones of forearm as independent unity in the reports to the first world war did not occur. On them there are only single indications. Thus, N. I. Pirogov writes in the "beginnings of general/common/total military field surgery", that with the saving method of treatment the mortality oscillated in limits of 20.0-25.0o/o for both bones of forearm and 11.0-13.0o/o for one bone of forearm.

Upon the early amputations apropos of the bullet breaks of the bones of forearm the mortality oscillated in the limits from 6.0 (at

Englishmen) to 50.00/o and more (in Frenchmen).

Foreign authors' reports for the first world war do not give representation about actual state of affairs in this category of injured people since nowhere it is indicated a quantity of good anatomical and functional issues, or complications, which impedes their utilization for the comparison with the data of the subsequent wars and the Great Patriotic War.

Table 342 depicts the information about the issues of the bullet breaks of the bones of forearm in the foreign armies (S. I. Banaytis).

In the Russian army directly in the field of battle the lethality composed 0.70/o (S. R. Mirotvortsev).

Table 342. Issues in injured people with the bullet break of the bones of forearm in the first world war on the reports of foreign armies (in the percentages).

Отчет (1)	Исход (2)	Годные и военной службе (3)	Работо- способ- ные (4)	Неработо- способные (5)	Итого (6)	Ампута- ции (7)	Леталь- ность (8)
По немецкой армии (9)		34,4	35,9	29,7	100,0	10,0	4,8
По французской армии (10)		63,4		36,6	100,0	7,9	1,9
По американской армии (11)						4,8	3,1

Key: (1). Report. (2). Issue. (3). Fit for military service. (4). Operational. (5). Inefficient. (6). Altogether. (7). Amputation. (8). Lethality. (9). On German army. (10). On French army. (11). On American army.

Table 343. Direct issues in injured people with the bullet break of the bones of forearm in the subsequent wars after the first world war (in the percentages).

Автор (1)	Война (2)	(3) Итоги						
		(4) выживало	(5) уволено в от-уск в направ-лено в дом-ных	(6) эвакуиро-вано	(7) счито с учета	(8) ампутиро-вано	(9) умерло	(10) ис-ход не-известен
(11) М. Н. Ахутин	Военные действия							
(12) М. Н. Ахутин	(12) на Халхин-Голе	7,7	73,5	12,2	3,1	—	—	3,5
	Бои у озера Ха-сан (14)	—	—	—	11,0	—	—	—
П. А. Куприя-нов (15)	Война с белофин-нами 1939/40 г.	2,3	—	—	—	—	—	—
(17) С. Е. Кашкаров	То же (18)	—	—	—	—	4,0	0,15	—
(19) Г. Я. Эпштейн	" " " " " "	25,3	—	—	11,7	—	—	63,0
(20) Г. М. Зязин	" " " " " "	6,5	75,5	—	11,1	—	—	6,9

Key: (1). Author. (2). War. (3). Issues. (4). it recovered. (5). is discharged to tempering and is directed into rest home. (6). evacuated. (7). taken/removed from account. (8). amputated. (9). died. (10). termination is unknown. (11). M. N. Akhutin. (12). Military effects/actions in Khalkhin-Gol. (13). M. N. Akhutin. (14). Combat in Khasan lake. (15). P. A. Cyprian. (16). War with White Finns 1939/40. (17). S. Ye. Kashkarov. (18). the same. (19). G. Ya. Epstein. (20). G. M. Zyazin.

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The information about the issues of the bullet breaks of the bones of forearm in the subsequent wars after the first world war (table 343) are also interrupted/fragmentary and carry faster military-expert character/nature, than functional-anatomical one;

therefore they are also barely suitable for the comparison with the issues in the Great Patriotic War.

Issues in a Great Patriotic War.

The analysis of issues in injured people with the bullet break of the bones of forearm, according to the data of the deep development of the histories of disease/sickness/illness/malady, it showed the known dependence of the obtained results from the series/number of moments/torques. Here had a value not only commonly known factors as, for example, character/nature and localization of damage, age of injured person, method of treatment, etc., but also such moments/torques as tactical situation, period of war.

Clinical issues in connection with some factors (absence of complications, penetrating into the joint breaks, etc.) are presented in volume 15, pg. 315, 320, 323, etc.

Great value in the clinical issues had the character/nature of break, since the heavy decomposition of bone not only by themselves could lead to the poor issues, but they contributed to the onset of all possible complications.

Forms/species of break and issues.

During the deepened development of the histories of disease/sickness/illness/malady especially clearly was revealed/detected the difference in the issues in injured people depending on the form/species of break (table 344).

Before beginning the analysis of the dependence of issues on the form/species of break, one must take into account that table 344 shows the basic issues: however almost each basic issue accompanied still others, less important, not affected one or another basic issue in wounded, including good. If from several issues it was difficult to secrete basis, then the data about such injured people were placed into the heading "combination".

As frequently and with what basic clinical issues were combined other issues, it is shown in Table 345.

Table 345. Frequency of the combination of the associated issues with some basic by issues in injured people with the bullet break of the bones of forearm (in the percentages).

Основной исход (1)	Сопутствующий исход (2)	Дефор- мации (3)	Повреж- дение нервов (4)	Контрак- тура (5)	Анкилоз (6)	Ложный сустав (7)	Остео- миелит (8)
Хороший	(9)	3.2	0.2	1.9	—	—	0.1
Повреждение нервов	(10)	15.0	—	35.4	0.5	0.3	8.3
Ложный сустав	(11)	47.4	17.1	50.4	4.8	—	12.7
Остеомиелит	(12)	44.2	17.0	67.0	3.6	1.1	—
Комбинация	(13)	—	—	83.2	17.1	—	—

Key: (1). Basic issue. (2). Associated issue. (3). Strain. (4).

Damage of nerves. (5). Contracture. (6). Ankylosis. (7). False joint.

(8). Osteomyelitis. (9). Good. (10). Damage of nerves. (11). False joint. (12). Osteomyelitis. (13). Combination.

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Table 344. Distribution of injured people with the bullet break of the bones of forearm according to the clinical issues in connection with the form/species of break (in the percentages).

Вид перелома	Клинический исход		Хороший	Деформации	Повреждение нервов	Контрактура	Анкилоз	Ложный сустав	Культи	Остеомиелит	Комбинации	Прочие	Итого
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Дырчатый (15)			49,1	—	17,9	26,1	0,6	—	—	2,3	1,1	2,9	100,0
Поперечный (16)			33,6	2,2	19,6	34,1	1,1	2,2	0,5	1,7	2,8	2,2	100,0
Продольный (17)			41,5	—	14,6	34,2	7,3	—	—	—	2,4	—	100,0
Косой (18)			40,8	0,7	15,6	27,6	3,7	1,7	0,2	3,0	2,7	4,0	100,0
Раздробленный (19)			9,3	0,8	9,3	24,5	6,2	10,8	26,0	4,2	7,9	0,7	100,0
Крупнооскольчатый (20)			31,5	1,8	15,8	32,2	3,6	2,9	0,3	5,1	3,9	2,9	100,0
Мелкооскольчатый (21)			33,2	1,3	13,2	31,7	3,7	3,1	0,7	4,4	5,8	2,9	100,0
Краевой (22)			56,8	—	15,8	20,3	1,8	—	—	1,4	0,7	3,2	100,0
Вколоченный (23)			33,4	—	11,1	22,2	11,1	—	—	—	—	22,2	100,0
В среднем по установленным видам перелома (24)			32,8	1,2	14,7	29,1	3,7	3,5	4,1	4,0	4,2	2,7	100,0
Вид перелома не установлен (25)			45,0	0,8	13,6	24,4	2,9	1,0	5,1	1,7	2,0	3,5	100,0
В среднем (26)			36,6	1,1	14,4	27,7	3,4	2,7	4,4	3,3	3,4	3,0	100,0

Key: (1). Form/species of break. (2). Clinical issue. (3). Good 1.

FOOTNOTE 1. Good in anatomical and functional sense. ENDFOOTNOTE.

(4). Strain. (5). Damage of nerves. (6). Contracture. (7). Ankylosis.
(8). False joint. (9). Stump. (10). Osteomyelitis. (11). Combination

2.

FOOTNOTE 2. In the graph "combination" are referred the data about those injured people in who it was difficult to secrete any basic issue. ENDFOOTNOTE.

(12). Other 3.

FOOTNOTE 3. In the graph/count "other" are shown injured people whose issue was poor not as a result of the break, while as a result of the associated injuries or diseases. ENDFOOTNOTE.

(13). Altogether. (14). It died. (15). Perforated. (16). Cross. (17). Longitudinal. (18). by scythe. (19). Crushed. (20). Large-splintered. (21). Small-splintered. (22). Edge/boundary. (23). Packed in. (24). On the average according to established/installed forms/species of break. (25). Form/species of break is not established/installed. (26). On the average.

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Based on the example of five basic clinical issues, given in Table 345 it is evident that the associated consequences of injuries in the estimation of the state of injured person with the extraction were

actually/really less considerable than basic issue, and in some scarce injured people they did not interfere to relate issue to good ones.

In the majority of injured people these associating basic issue consequences of injury to a considerable degree burdened the issue of break and were encountered frequently; so, with the basic issues into osteomyelitis or pseudoarthrosis to one injured person it fell in average/mean 1.3 other consequences of injuries.

From table 345 it follows that with the perforated and edge/boundary bullet breaks of the bones of forearm good issues were observed more than in the half the injured people: with the cross ones, the longitudinal ones, the oblique ones and the fragmented ones - approximately/exemplarily in one third; the crushed breaks ended by a good issue less than in one tenth part of the injured people.

On the basis of other issues also are secreted the crushed breaks in connection with the fact that with them especially frequently were conducted the amputations. Thus, among the injured people with the perforated, longitudinal, packed in and edge/boundary break not in one treatments it ended by amputation; with the oblique, cross, longitudinal and fragmented breaks with the stump it remained 0.2-0.7o/o, but with those crushed - more than 25.0o/o of injured

people.

If we reject/throw the perforated, edge/boundary and crushed breaks, then between the remaining of large differences in the issues it is not noted.

All these data again confirm that the less were the damages the bone and soft tissues (perforating and edge/boundary breaks), the good proved to be the issues; the considerable decomposition of tissues (fragmented, crushed breaks) conditioned the worse issues.

Localization of break, character/nature of injury and issues.

Character/nature of injury and localization of break were quite significant in the clinical issues. This one can see well from table 346.

During the comparison of clinical issues in injured people with the break of the separate bones of forearm it proves to be that the best clinical issues were in injured people with the break of the ulna, somewhat worse the injured people have with the break of radial bone and it is considerably worse - with the break of simultaneously both bones. The explanation to this distribution of the bones of forearm according to the best clinical issues, apparently must be

searched for in the anatomical structure of forearm. Radial bone in the relation to nourishment is located under the worse conditions, than cubital, since it in most massive its half (extremital) barely is covered with muscles.

As far as issues are concerned clinical in connection with the character/nature of injuries, then the poorest proved to be after crushings, and then after tangential injuries, especially with the breaks of the ulna where on all issues, except osteomyelitis, were noted poor indicators; the small percentage of osteomyelitis is completely explained by the greatest lethality and the number of amputations in this group of injured people. The best issues were observed after perforating injuries, which also most pronouncedly came to light with the breaks of the ulna where with the smallest lethality and the smallest number of amputations proved to be a maximum number of good issues and minimum - contractures and ankylosis. This distribution of clinical issues in connection with the character/nature of injury is noted also with the breaks of the bones of other segments: it is explained by the general/common/total reasons for anatomical and bacterial character/nature.

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Table 346. Distribution of injured people with the bullet break of the bones of forearm according to the clinical issues in connection with the character/nature of injury and the localization of break (in the percentages).

Клинический исход		Хоро- ший	Дефор- мации	Повреж- дение нервов	Контран- тура	Ангилоз	Лок- ный сустав	Иульти	Остеоми- елит	Ком- бина- ции	Про- чие	Итого
Локализация перелома и характер ранения	(1) (2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Лучевая кость (15)												
Слепое (16)		38,4	0,6	14,9	26,6	5,4	0,9	—	6,6	3,6	3,0	100,0
Сквозное (17) (18)		38,9	0,9	15,5	29,3	3,2	2,4	0,4	3,1	3,5	2,8	100,0
Касательное (19)		25,7	—	15,8	37,9	6,1	7,3	1,2	2,4	2,4	1,2	100,0
Размозжение		—	20,0	20,0	—	60,0	—	—	—	—	—	100,0
В среднем (20)		38,5	0,8	15,5	29,2	3,6	2,3	0,5	3,4	3,4	2,8	100,0
Локтевая кость (21)												
Слепое (16)		42,9	0,3	14,0	27,2	1,9	1,9	0,8	4,0	2,4	4,6	100,0
Сквозное (17) (18)		45,8	0,7	15,4	24,2	1,6	3,0	0,4	2,7	2,8	3,4	100,0
Касательное (19)		23,8	—	26,3	33,8	3,7	6,2	1,2	2,5	—	2,5	100,0
Размозжение		—	—	40,0	60,0	—	—	—	—	—	—	100,0
В среднем (20)		44,8	0,6	15,5	24,9	1,7	3,0	0,4	2,9	2,7	3,5	100,0
Обе кости (22)												
Слепое (16)		12,9	4,3	12,1	31,9	11,2	1,7	7,0	7,7	10,3	0,9	100,0
Сквозное (17) (18)		12,6	2,8	11,1	37,0	8,1	5,1	8,7	5,7	7,1	1,8	100,0
Касательное (19)		—	4,3	13,1	43,4	4,3	—	26,1	—	4,4	4,4	100,0
Размозжение		—	—	0,5	1,0	—	1,0	97,5	—	—	—	100,0
В среднем (20)		10,7	2,5	9,7	31,6	7,1	4,1	21,5	5,0	6,3	1,5	100,0
Все переломы (24)												
Слепое (16)		37,7	0,9	13,8	27,5	4,3	1,4	1,7	5,3	3,9	3,5	100,0
Сквозное (17) (18)		37,9	1,2	14,7	23,2	3,3	2,9	2,0	3,2	3,6	3,0	100,0
Касательное (19)		21,6	0,5	21,6	36,1	4,6	5,7	4,6	2,1	2,1	2,1	100,0
Размозжение		—	0,5	1,8	3,2	1,4	0,9	92,2	—	—	—	100,0
В среднем (20)		30,6	1,1	14,4	27,7	3,4	2,7	4,4	3,3	3,4	3,0	100,0

Key: (1). Localization of break and character/nature of injury. (2).

Clinical issue. (3). Good. (4). Strain. (5). Damage of nerves. (6).

Contracture. (7). Ankylosis. (8). False joint. (9). Stump. (10). Osteomyelitis. (11). Combinations. (12). Other. (13). Altogether. (14). It died. (15). Radial bone. (16). Blind. (17). Through. (18). Tangent. (19). Crushing. (20). On the average. (21). Ulna.

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How the issues of the bullet breaks of the bones of forearm were found in the dependence on degree and vastness of the decomposition of soft tissues (muscles, tendons, nerves, vessels), testify the following observations.

Yu., 1926 birth, 29/VIII 1944 entered DHP 14 hours after the perforating fragmentation injury of upper third of left forearm with the fragmented break of the ulna. Wounds are not surgical processed in view of the insignificant damage of soft tissues. Is superimposed bandage with chloramine (20/o solution) and splint of Cramer. In 2 months is produced the operation/process apropos of osteomyelitis of the ulna, is removed sequestration. It was discharged into the part after 136 days with the healed break and a good function.

Sh., 23 years, entered 17/II 1945 in ^{Kh}PPG 56 hours after the blind-end fragmentation injury of upper third of right forearm with the fragmented break of the ulna. Extensive hematoma, which was

disseminated to entire forearm. Is produced the operation/process of dissection with the partial carving of wound, is superimposed anechoic gypsum bandage. In 2 months, 20/IV 1945, gypsum bandages it is taken/removed; was observed the sharp limitation of motor function in the elbow, wrist joint and in the fingers/pins. In spite of energetic treatment by physiotherapy and therapeutic gymnastics, remained difficulty of movement in the radiocarpal joint, contracture of fingers and limitation of motions in the elbow joint. It is discharged 98 days after injury.

Despite the fact that in Yu. was not produced surgical treatment and subsequently the injury of the ulna it was complicated by osteomyelitis, which required surgical treatment, injured person was discharged with a good function. Sh., also with the fragmented break of the ulna, but in the presence of blind-end fragmentation injury, underwent primary surgical processing with dissection and carving of wound; result was obtained poor. In this case sufficiently clearly it is revealed/detected, that the issue depended mainly on the vastness of the damage of soft tissues.

In injured people with break of both bones the forearms were observed also simultaneously first more, then less considerable decomposition of muscles, tendons, vessels, nerves. As a result of the disturbance/breakdown of anatomical-physiological state were

detected the expressed pathological deviations in the the lympho- and the blood circulation, which caused the development of edemas and the damage of the nourishment of tissues.

S., 34 years, entered ^{16h} PPG 14/VIII 1943 12 hours after the perforating bullet injury of upper third of right forearm with break of both bones and considerable hemorrhage into the muscles to the elbow joint. Is produced primary surgical treatment in the form of the dissection of wounds with the subsequent immobilization by gypsum casts. Is roentgenologically established/installed the fragmented oblique break of upper third of cubital and radial bone without the displacement of scrap. In 1 1/2 months in the front hospital is changed gypsum cast. Is discovered durable callus. Are initiated massage and galvanization (detachable cast). It is discharged after 93 days (17/XI 1943) with the limitation of motions in the elbow joint and the fingers/pins when moderate edema of hand is present,.

T., 20 years, entered DMP 10/XII 1944 4 hours after through bullet injury of lower third of right forearm with damage of both bones. Restricted hemorrhage on the spot of break.

Is produced dress/lavatory of wounds, are superimposed bandage with the solution of Rivanol, splint of Cramer; on the 5th day in the front hospital is made the X-ray photograph; is discovered oblique

break of both bones of forearm without the displacement of scrap. Is superimposed circular gypsum bandage; 5/II 1943 it is taken/removed.

The limitation of motions in the radiocarpal and elbow joint is removed by therapeutic gymnastics. It is discharged after 84 days (4/II 1943) with a good anatomical and functional result.

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The given observations show, what great effect on the issue had the damages of soft tissues with break of both bones. In both injured people were damaged to bone the forearms without the displacement of scrap; different state of soft tissues with these breaks conditioned the dissimilar issues: in S., which had simultaneously with the break of the damage of soft tissues, that were being accompanied by extensive hemorrhage into the muscles to the elbow joint, issue was unsatisfactory; in T., which did not have the considerable damages of soft tissues, the issue was good.

Means of injury and issues.

The clinical issues of the bullet breaks of the bones of forearm after bullet injuries were considerably best, than after the fragmentation injuries: lethality is less 5 times, amputations it is

less 8 times and so forth (table 351).

This is explained by the fact that besides the special anatomical character/nature of fragmentation injuries and larger contamination of wounds with them, the crushed breaks of the bones of forearm after injury by fragment it proved to be almost 3 times more than after injury by bullet (table 352).

Primary surgical processing and issues.

The practical problems of fight from the developing with infection wound in war posed the surgeons before the need for operating in any periods after injury. Therefore into the system of the treatment of injured people in the Great Patriotic War entered the late surgical processing of wound generally, also, with the bullet breaks of the bones of forearm in particular. This gave the specific results in the clinical issues which it is possible to illustrate tables 347.

To given in Table 347 data one should add that from a total number of subjected to primary surgical processing injured people with the break of the bones of forearm in the first 12 hours there was treated 41.20/o from 13 to 24 hours - 17.00/o, in the first twenty-four hours (without the refinement of hour) - 14.10/o, into the second day it is later - 27.70/o.

Table 347. Clinical issues in injured people with the bullet break of the bones of forearm in connection with the period of production in the primary surgical processing (in the percentages, .

Время производства первичной хирургической обработки после ранения	Клинический исход		Хороший	Контрактура	Анкилоз, ложный сустав, остеомиелит и комбинации	Культи	Прочие	Итого	Умерло
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
До 6 часов (10)			27,3	29,7	17,7	8,2	17,1	100,0	1,0
7—12 часов (11)			27,6	28,0	18,4	8,6	17,4	100,0	0,9
13—24 часа (12)			33,5	27,0	16,3	6,3	16,9	100,0	1,4
В течение первых суток без уточнения часа (13)			27,7	29,6	18,6	7,1	17,0	100,0	0,7
Вторые сутки и позднее (14)			32,1	28,4	15,5	5,1	18,9	100,0	0,7
В среднем у подвергшихся обработке (15)			29,6	28,4	17,4	6,9	17,7	100,0	0,9
Обработка не производилась (16)			45,3	26,7	14,1	1,3	12,6	100,0	0,4
В среднем у всех раненых (17)			36,6	27,7	15,8	4,4	15,5	100,0	0,7

Key: (1). Time of production in the primary surgical processing after injury. (2). Clinical issue. (3). Good. (4). Contracture. (5). Ankylosis, false joint, osteomyelitis and combinations. (6). Stump. (7). Other. (8). Altogether. (9). It died. (10). To hours. (11). hours. (12). hour. (13). During first day without refinement of hour. (14). Second day and late. (15). On the average in those subjected to processing. (16). Processing was not performed. (17). On the average in all injured people.

It will at first glance seem that the more lately was performed the primary surgical processing, the greater was good terminations. For example, after the surgical processing, realized in the first 6 hours or in the first twenty-four hours, percentage of good issues it reached 27.3-27.7, and if it was conducted through the days and later, a good result was observed almost in third of injured people. Then it is possible to note, also, in the relation to issues with the severe complications; in injured people, who were subjected to primary surgical processing within the later periods, then it proved to be less than during the processing, produced during the first day.

However, this is explained by the fact that within the earlier periods underwent surgical processing the injured people with the most heavy, and within the late periods - with comparatively the less heavy break of the bones of forearm. For the confirmation it is possible to give numbers of the same table 347 relative to issues with the loss of the extremity: during the primary surgical processing, realized within the periods of 7-12 hours after injury, it was necessary to produce amputation in 8.60/o of recovered injured people, and during the processing through 2 and more than days - in 5.10/o of injured people. Furthermore, according to the data of the deepened development of the histories of

disease/sickness/illness/malady, primary surgical processing in time from 7 to 12 hours they underwent from a number of injured people with crushed break 43.20/o, with the fragmented - 37.20/o, with the perforated, oblique and longitudinal - 34.50/o.

If one takes into account, that in 94.80/o of injured people, in whom was amputated the forearm during the primary surgical processing, by the reason for amputation was crushing, breakaway or injury of large vessels, then becomes clear a comparatively high percentage of amputations, produced for the first 12 hours. Within this period the majority of the group of injured people indicated was delivered into the surgical institutions of the army region where they underwent the primary surgical processing, which ended by amputation.

The noted in Table 347 best issues in injured people, who were not undergoing primary surgical processing, in comparison with the group of injured people by which it was produced, are explained by the fact that the majority of the injured people of the first group as a result of a comparative ease/lightness of damage lacked readings to the primary surgical processing. So, with perforated and edge/boundary breaks it was not conducted primary surgical processing in 51.70/o of injured people, with the fragmented ones - in 42.60/o, with those crushed - in 29.50/o.

Are especially exponential in this respect data of issues with the loss of the extremity: in those not undergoing primary surgical processing the forearm was amputated 5 times less frequently than in those undergoing.

The expanded readings to the primary surgical processing within the different periods from the moment/torque of injury undoubtedly played the significant role in an improvement in the issues. By this it is possible to explain the considerable percentage of the primary surgical processings, produced within late periods (27.7).

The analysis of the clinical issues of the bullet breaks of the bones of forearm in connection with the character/nature of primary surgical processing showed that the greatest percentage of good issues was observed in those injured people, in whom was conducted only the dissection of wound; the primary surgical processing, which was consisting in the dissection with the carving of wound either, furthermore, with the removal/distance of bone fragments, or with other interventions on the bones, it ended by a good issue in a smaller number of injured people (table 348).

Data of table 348 indicate also a considerably larger quantity of heavy issues in the injured people, in whom were driven out bone fragments or was performed processing bone in the form of the sawing of the ends of the basic fragments or their cutting. This can be explained by the fact that the surgical processing of wound usually was undertaken in injured people with the heaviest breaks. The latter is confirmed even and by the fact that a quantity of amputations, and also deaths considerably exceeded a number of such issues with simpler interventions (dissection, removal/distance of foreign bodies, etc.).

Poor clinical issues in injured people, who were undergoing "other" processing, are explained by the fact that to the latter are related the dressings of vessels and combination of the enumerated elements of processing, i.e., the removal/distance of foreign bodies and bone fragments, and also processing bone fragments.

The dependence of clinical issues on the character/nature of primary surgical processing more full/totaler/more complete can be presented during the distribution of the injured people, isolated in the groups according to the form/species of break (table 349).

Thus, with the perforated and edge/boundary breaks the best results are obtained with the abstention from the processing. In this case was observed most of all of good issues, it is small contractures and damages of nerves; after dissection and use/application of other elements of processing the results were more badly; at the latter/last place proved to be the injured people, who were undergoing dissection and carving.

With the fragmented and crushed breaks it is possible to note the same sequence: the absence of processing, dissection, dissection and carving and use/application of other elements of processing.

With the cross, longitudinal and oblique breaks it is possible to note in the decreasing order sequence according to the best indicators of the clinical issues: abstention from the processing - on good issues, contractures and damages of nerves;

dissection - on good issues, amputations, damages of nerves and contractures;

dissection and carving - on the amputations, other heavy issues, good issues and contractures.

Table 348. Distribution of injured people with the bullet break of the bones of forearm in connection with the character/nature of primary surgical processing (in the percentages).

Характер вмешательства (1)	Клинический исход (2)	Хороши (3)	Контрактура (4)	Анкилоз, ложный сустав, остеомиелит и комбинация (5)	Культи (6)	Прочие (7)	Итого (8)	Летальность (9)
Рассечение (10)	(10)	37,8	28,6	15,0	0,8	17,8	100,0	0,5
Рассечение и иссечение		25,6	32,0	20,2	3,3	18,9	100,0	1,6
Рассечение и иссечение с удалением инородных тел (12)	(12)	36,4	27,6	20,7	1,5	13,8	100,0	—
Рассечение и иссечение с удалением костных осколков (13)	(13)	20,1	31,5	28,0	3,5	16,9	100,0	1,8
Рассечение и иссечение с обработкой костных фрагментов (14)	(14)	16,1	20,0	35,9	4,0	24,0	100,0	7,4
Ампутация (15)	(15)	—	—	—	100,0	—	100,0	2,9
Прочие (16)	(16)	14,3	36,7	32,7	6,1	10,2	100,0	2,9

Key: (1). Character/nature of intervention. (2). Clinical issue. (3). Good. (4). Contracture. (5). Ankylosis, false joint, osteomyelitis and combinations. (6). Stump. (7). Remaining. (8). Altogether. (9). Lethality. (10). Dissection. (11). Dissection and carving. (12). Dissection and carving with removal/distance of foreign bodies. (13). Dissection and carving with removal/distance of bone fragments. (14). Dissection and carving with processing of bone fragments. (15). Amputation. (16). Other.

At the latter/last place there was the group of injured people, by which were applied other elements of processing.

If we consider that to compound fractures corresponded the greatest decomposition of soft tissues, then, using the given materials, clearly is revealed/detected the advantage of the simpler means of the primary surgical processing, which was being conducted in the majority of injured people at DMP (74.30/o).

Table 349. Distribution of injured people with the bullet break of the bones of forearm according to the clinical issues in connection with the form/species of break and the character/nature of primary surgical processing (in the percentages).

Вид перелома (1)	Характер первичной хирургической обработки (2)	Клинический исход (3)					Итого (6)
		(4) хоро- ший	(5) контрак- тура	анимало- ломный сустав, остеоми- елит и комби- нация	нуль- тя (7)	про- чие (8)	
Дырчатый и краевой (10)	Рассечение (11) . . .	52,8	23,0	5,2	—	19,0	100,0
	Рассечение и иссече- ние (12) . . .	44,4	25,9	1,9	—	27,8	100,0
	Рассечение и иссече- ние с другими эле- ментами обработки (13) . . .	45,1	25,1	7,3	—	22,5	100,0
	Обработки не произ- водилось (14) . . .	59,8	19,1	3,2	—	17,9	100,0
Оскольчатый (15)	Рассечение (11) . . .	32,3	32,4	12,7	0,2	22,4	100,0
	Рассечение и иссече- ние (12) . . .	22,1	33,6	19,9	0,5	23,9	100,0
	Рассечение и иссече- ние с другими эле- ментами обработки (13) . . .	20,3	32,4	25,1	1,4	20,8	100,0
	Обработки не произ- водилось (14) . . .	38,9	31,7	13,0	0,2	16,2	100,0
Раздробленный (15)	Рассечение (11) . . .	14,2	30,2	52,3	2,6	20,7	100,0
	Рассечение и иссече- ние (12) . . .	7,0	31,7	40,3	12,2	8,8	100,0
	Рассечение и иссече- ние с другими эле- ментами обработки (13) . . .	4,7	27,1	45,8	9,0	13,4	100,0
	Обработки не произ- водилось (14) . . .	16,9	33,5	30,7	7,9	11,0	100,0
Поперечный, продольный, косой (16)	Рассечение (11) . . .	39,6	29,2	10,4	—	20,8	100,0
	Рассечение и иссече- ние (12) . . .	30,0	31,7	6,6	—	31,7	100,0
	Рассечение и иссече- ние с другими эле- ментами обработки (13) . . .	23,0	35,2	15,4	1,1	25,3	100,0
	Обработки не произ- водилось (14) . . .	43,8	27,1	9,0	0,3	19,8	100,0

Key: (1). Form/species of break. (2). Character/nature of primary surgical processing. (3). Clinical issue. (4). good. (5). contracture. (6). ankylosis, false joint osteomyelitis and combination. (7). stump. (8). other. (9). Altogether. (10). Perforated and edge/boundary. (11). Dissection. (12). Dissection and carving. (13). Dissection and carving with other elements of processing ¹.

FOOTNOTE ¹. Other elements of processing on all breaks comprised: the dressing of vessels - 16.60/o; the removal/distance of foreign bodies - 14.70/o; the removal/distance of bone fragments - 61.70/o; processing the fragments of bone - 2.40/o; the combination of the enumerated elements/cells - 4.60/o. ENDFOOTNOTE.

(14). Processings it was not conducted. (15). Crushed. (16). Cross, longitudinal, by scythe.

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In this case it is necessary to add that the group of injured people by which were applied other elements of processing, it is not possible to count especially aggravated, since into it entered only 31.70/o of injured people with the damage of large vessels and about 31.80/o of injured people with the presence of foreign bodies (on all segments, see Vol. 15, pg. 84); remaining injured people with the damage of vessels and by the presence of foreign bodies was obtained another genus processing (among other things amputation) or it they did not completely obtain. That presented is confirmed also by character/nature and frequency of the subsequent operations/processes after the primary surgical processing of different content, which is represented in volume 15, pg. 162-163. It is there shown that it was not the considerable difference in frequency and character/nature of the operations/processes, produced after the primary processing of the different content.

However, even the timely and being all-inclusive primary surgical processing could prove to be barely effective, if it did not

follow timely, rational and sufficiently prolonged therapeutic immobilization. And here sizable effect on the issues had the early careful therapeutic immobilization of the bullet breaks of the bones of forearm. Fixation of forearm in the functionally advantageous position was achieved by gypsum or other splints (45.3o/o), anechoic gypsum bandage (53.0o/c) or other improvised substances (1.7o/o).

According to the data of author's development, most favorably they flowed/occurred/lasted and gave the best functional issue those breaks, with which gypsum immobilization was realized during the first five days after injury (table 350).

Data of table 350 show that the best issues were observed with the immobilization by anechoic gypsum bandage during the first five days after injury.

It goes without saying that the character/nature of therapeutic immobilization and the time of its use/application were found in the dependence on the character/nature of break and associating it complications. Anechoic gypsum bandage within the early periods could be superimposed only during the favorable course.

Table 350. Clinical issues in injured people with the bullet break of the bones of forearm in connection with the period, which passed from the moment/torque of injury before the use/application of immobilization, and by the character/nature of the latter (in the percentages).

(1) Характер иммобилизации	(2) Срок применения иммобилизации	(3) Клинический исход							
		(4) хороший	(5) контрактура	(6) анкилоз, ложный сустав, остеомиелит и комбинации	(7) культя	(8) прочие	(9) итого	(10) летальность	
(11) Глухая гипсовая повязка	До 5 дней (12) . .	65,7	7,1	9,1	0,1	18,0	100,0	0,2	
	5—10 дней (13)	49,4	12,9	12,1	0,5	25,1	100,0	0,1	
	Позже 10 дней (14)	32,5	16,8	29,8	0,8	20,1	100,0	0,5	
(15) Гипсовая лонгета	До 5 дней (12) . .	42,3	12,0	11,3	5,5	28,9	100,0	0,1	
	5—10 дней (13)	35,1	15,4	23,1	2,1	24,3	100,0	0,7	
	Позже 10 дней (14)	33,3	18,8	21,7	0,5	25,7	100,0	0,2	

Key: (1). Character/nature of immobilization. (2). Period of use/application of immobilization. (3). Clinical issue. (4). good. (5). contracture. (6). ankylosis, false joint, osteomyelitis and combinations. (7). stump. (8). other. (9). altogether. (10). lethality. (11). anechoic gypsum bandage. (12). To 5 days. (13). days. (14). It is later than 10 days. (15). Gypsum longet.

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During the uneven course it was applied either within the late periods or it was not applied completely; therefore in injured

people, which superimposed gypsum cast, clinical issues were more badly than during the use/application of a gypsum bandage (table 350).

It is important to also note the dependence of clinical issues on the frequency of the exchange of gypsum bandage in the process of the treatment of injured people with the bullet break of the bones of forearm.

It turned out that the best issues were observed in injured people, when gypsum bandage was changed 1-2 times; this exchange is produced during the favorable course; with the most severe complications gypsum bandage they changed many times, and also is produced treatment through the made in it window. A quantity of good issues was almost twice more as in injured people, whose gypsum bandage was changed 1-2 times or was not changed completely, in comparison with those, in which gypsum bandage was changed repeatedly or treatment it was conducted through the window in the gypsum bandage.

Associated injuries and clinical issues.

To what degree the associated injuries burdened the bullet breaks of the bones of forearm, it is possible to see from the data

of table 351.

It proves to be that in the group of injured people without the associated injuries on all clinical issues there were the considerably best indicators, than in the group with the associated injuries (number of those amputated is less 2 times, and dead persons - 4 times).

This is explained, first of all, fact that, besides the additional injury, the basic break of the bones of forearm proved to be somewhat heavier in the group of the injured people, who have the associated injuries, than in the group of the injured people, who do not have such injuries (table 352).

Furthermore, additional injuries also proved to be sufficiently serious, since in one quarter of injured people they were or those penetrating in the cavity or the breaks of the bones of other segments of extremities.

Table 351. Distribution of injured people with the bullet break of the bones of forearm according to the clinical issues in connection with the presence of the associated injuries and the means of injuries (in the percentages).

(1) Группа раненых	(2) Клинический исход	(3) Хороший	(4) Дефор- мации	(5) Повреж- дение нервов	(6) Контрак- тура	(7) Анкилоз
(15) Без сопутствующих ра- неней		39,3	1,0	14,1	27,4	3,0
(16) С сопутствующими ра- ненями		26,6	1,1	15,3	28,6	5,1
(17) С пулевым ранением . .		42,8	1,2	14,4	27,3	2,7
(18) С осколочным ранением		23,1	0,8	14,4	28,5	4,9

(8) Ложный сустав	(9) Рукави	(10) Остео- миелит	(11) Комби- нации	(12) Прочие	(13) Всего	(14) Умерло
2,6	3,5	3,2	3,2	2,7	100,0	0,4
3,3	7,9	3,6	4,5	4,0	100,0	1,8
2,0	1,3	2,6	2,6	3,1	100,0	0,3
4,4	11,2	4,3	5,4	2,5	100,0	1,6

Key: (1). Group of injured people. (2). Clinical issue. (3). Good. (4). Strain. (5). Damage of nerves. (6). Contracture. (7). Ankylosis. (8). False joint. (9). Stump. (10). Osteomyelitis. (11). Combinations. (12). Other. (13). In all. (14). It died. (15). Without associated injuries. (16). With associated injuries. (17). With bullet injury. (18). With fragmentation injury.

It is logical that in the absence of complications and associated damages in of the injured with bullet break of bones of forearm the issues were others; good issues in the latter reached 90.90/o (Vol. 15, pg. 315).

Descants during different years of war.

Is of significant interest the comparison of clinical issues with the preventive measures and the severity of injuries for the years of war.

As showed the experiment/experience of the Great Patriotic War, the clinical issues of the bullet breaks of the bones of forearm on the separate years did not have the sharp oscillations/vibrations (see further tables 354). Should be noted an insignificant reduction in the number of good results, contractures, osteomyelitis and combinations of poor issues and a small increase in the number of false joints, ankylosis and stumps with barely changing lethality.

Such results were obtained in essence because the character/nature of the turning point of the bones of forearm in the course of war changed little (table 353).

However, in spite of this, severity of injuries with the years of war continuously it grew on; thus, for instance, a number of injured people with the associated injuries and with the fragmentation injuries, with which were obtained the worse issues, it was increased (table 355).

Table 352. Distribution of injured people with the bullet break of the bones of forearm according to the form/species of break in connection with the presence of the associated injuries and the means of injuries (in the percentages).

(1) Группа раненых	(2) Вид перелома	(3) Дырчатый. краевой	(4) Осколь- чатый	(5) Раздроблен- ный	(6) Поперечный. продольный. косой	(7) Всего
(8) Без сопутствующих ранений		14,7	58,5	13,3	13,5	100,0
(9) С сопутствующими ранениями		11,4	54,0	19,9	14,7	100,0
(10) С пулевым ранением		14,7	61,2	9,9	14,2	100,0
(11) С осколочным ранением		12,4	50,2	24,4	13,0	100,0

Key: (1). Group of injured people. (2). Form/species of break. (3). Perforated, edge/boundary. (4). Fragmented. (5). Crushed. (6). Cross, longitudinal, by scythe. (7). In all. (8). Without associated injuries. (9). With associated injuries. (10). With bullet injury. (11). With fragmentation injury.

Table 353. Distribution of injured people with the bullet break of the bones of forearm according to the form/species of the break during the different years of war (in the percentages).

(1) Год войны	(2) Вид перелома	(3) Дырчатый, краевой	(4) Оскольчатый	(5) Раздробленный	(6) Поперечный, продольный, косой	(7) Всего
(8) Первый		13,6	53,2	13,3	14,9	100,0
(9) Второй		12,2	56,1	15,9	15,8	100,0
(10) Третий		16,9	55,5	15,5	12,1	100,0
(11) Четвертый		17,0	57,5	13,7	11,8	100,0

Key: (1). Year of war. (2). Form/species of break. (3). Perforated, edge/boundary. (4). Fragmented. (5). Crushed. (6). Cross, longitudinal, by scythe. (7). In all. (8). The first. (9). The second. (10). The third. (11). The fourth.

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Because of the improved with each year preventive and therapeutic aid by injured person it was possible to a considerable degree to avoid the unfavorable consequences of the fragmentation and associated injuries.

The direct results of break, which were being noted with the extraction of injured people from the hospital, in the course of time changed. M. M. Bronstein via personal observation and

questionnaire-survey of several hundred injured people it traced these changes and a considerable number of injured people with the bullet break of the bones of forearm. In this case for a period of 2-7 years after injury in a number of subjects it is discovered: healthy - 58.80/o, with the strain - 1.50/o, with the consequences of the damage of nerves - 13.4 o/o, with the contracture - 18.30/o, with ankylosis - 1.50/o, with the false joint - 3.00/o, with osteomyelitis - 3.50/o.

Consequently, 41.20/o of injured people with the break of the bones of the forearm after 2-7 years had these or other defects as a result of injury. This is, of course, large percentage. It is necessary, however, immediately to be specified, that a known quantity of those injured people who were discharged from hospital (good issue), immediately returned into the system and in connection with their further combat activity many of them no longer could hit under the observation for the establishment of the distant results. Thus, the in actuality recovered injured people with the collection of the distant results it had to be considerably more.

During the comparison of the given distant results with the direct issues in the fourth year of war (table 354) it proves to be that a number of injured people with a good issue increased from 33.4 to 58.80/o mainly due to the decrease of a number of injured people

with the contracture (from 26.2 to 18.30/o), with the consequences of the damage of nerves, with ankylosis and false joint. Within the same time somewhat increased a number of injured people with the strain and with osteomyelitis.

Considerably best were within the distant periods functional results: able-bodied they proved to be 97.00/o of subjects, of them it worked on the old specialty without limitation by 69.10/o of injured people, and under the lightened conditions - 8.10/o, specialty they changed in connection with the data by injury by 21.35/o, also, as a result of other injuries or diseases - 6.6%

Table 354. Distribution of injured people with the bullet break of the bones of forearm according to the clinical issues during the different years of war (in the percentages).

(1) Год войны	(2) Клинический исход	(3) Хороший	(4) Дефор- мация	(5) Повреж- дение нервов	(6) Контрак- тура
(15) Первый		36,5	1,2	9,3	32,9
(16) Второй		39,3	1,0	13,3	26,8
(17) Третий		36,7	1,3	16,1	25,1
(18) Четвертый		33,4	0,6	19,2	26,2

(7) Анкилоз	(8) Ложный сустав	(9) Культи	(10) Остеоми- елит	(11) Комбина- ции	(12) Прочие	(13) Всего	(14) Умерло
3,6	2,9	3,0	4,1	3,1	3,4	100,0	0,6
2,6	2,2	4,8	3,4	3,8	2,8	100,0	1,0
4,2	2,8	4,6	2,8	3,6	2,8	100,0	0,6
3,1	3,1	5,2	2,8	3,5	2,9	100,0	0,6

Key: (1). Year of war. (2). Clinical issue. (3). Good. (4). Strain. (5). Damage of nerves. (6). Contracture. (7). Ankylosis. (8). False joint. (9). Stump. (10). Osteomyelitis. (11). Combinations. (12). Other. (13). In all. (14). It died. (15). The first. (16). The second. (17). The third. (18). The fourth.

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These results were better than in injured people during the war with the White Finns (1939/40) 1-2 years after injury. Thus, G. Ya. Epstein determined a number of workers into 67.50/o and M. N.

Bronstein - into 79.90/o (of them on old specialty 41.80/o).

This improvement in the distant results occurred because of the more advanced methods of treatment during the Great Patriotic War, had a value also the fact that after the Great Patriotic War the information was collected within the more distant periods after injury.

Clinical issues in different age groups.

For explaining the clinical issues in the different age groups in injured people with the bullet break of the bones of forearm is produced the analysis of data of the deepened development of the histories of disease/sickness/illness/malady, moreover are taken into consideration only those injured people, who did not have the associated injuries.

As it was shown earlier, the principal factor, which conditions these or other issues, was the character/nature of break. Therefore during the solution of a question about the effect of age on the issues of the bullet break of the bones of forearm it is necessary to have data about the distribution of the breaks according to the form/species in the different age groups. If we look tables 356 about the issues of the bullet break of the ulna at the different age, then

it emerges, that the majority of the best indicators on the different issues relates to those wounded to a 30- year age.

However, in this it is not possible to perceive the unconditional beneficial effect of young age on the course and the descents of the bullet breaks of the ulna, since among the injured people of young age it proved to be incomplete breaks more, and fragmented and crushed less than in the more elderly (table 357).

Table 355. Frequency of the associated and fragmentation injuries in injured people with the bullet break of the bones of forearm during the different years of war (in the percentages).

(1) Группа раненых	(2) Год войны			
	(3) первый	(4) второй	(5) третий	(6) четвертый
(7) С сопутствующими ранениями	16,3	21,2	23,2	23,8
(8) С осколочными ранениями . . .	26,7	30,6	33,2	36,7

Key: (1). Group of injured people. (2). Year of war. (3). the first. (4). the second. (5). the third. (6). the fourth. (7). With associated injuries. (8). With fragmentation injuries.

Table 356. Clinical issues the injured people have with the bullet break of the ulna in different age groups (in the percentages).

(1) \ (2) Клинический исход		(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Группа раненых по возрасту		Хороший	Контрактура	Анкилоз	Ложный сустав	Остеомиелит	Культи	Прочие	Всего
(11) До 29 лет		51,5	22,2	1,2	2,6	3,3	0,2	19,0	100,0
30-39		45,8	28,3	1,6	2,6	2,1	0,4	19,2	100,0
(12) 40 лет и более		39,5	28,0	1,9	3,2	2,6	1,2	23,6	100,0

Key: (1). Group of injured people on the age. (2). Clinical issue. (3). Good. (4). Contracture. (5). Ankylosis. (6). False joint. (7). Osteomyelitis. (8). Stump. (9). Other. (10). In all. (11). Of up to 29 years. (12). years and more.

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With the acquaintance with the distribution of the issues of the bullet breaks of radial bone it proves to be that almost all best indicators were grouped also among the injured people of young age (of up to 30 years) (table 358).

The reason for this, according to data of table 359, the same - the preponderance of a number of simple breaks at the young age above a quantity of the same breaks in the more elderly and a smaller quantity of compound fractures at the young age in comparison with the more elderly.

With breaks of both bones these relationships/ratios also are retained, but they are not so/such relief, because frequently was not obtained the completely identical in form break of each bone.

Taking into account everything that outlined above in the relation to age special features/peculiarities, it is necessary to note one law - the concentration of incomplete breaks predominantly among the injured people of younger age (of up to 30 years) and, on the contrary, compound fractures among the injured people of more elderly age.

Table 357. Form/species of the bullet break of the ulna in the injured different age groups (in the percentages).

(1) Группа раненых по возрасту	(2) Вид перелома	(3) Дырчатый и краевой	(4) Оскольчатый и раздроб- ленный	(5) Прочие	(6) Всего
(7) До 29 лет		14,5	73,0	12,5	100,0
30—39		9,5	75,5	15,0	100,0
(12) 40 лет и более		11,0	74,6	14,4	100,0

Key: (1). Group of injured people on the age. (2). Form/species of break. (3). Perforated and edge/boundary. (4). Fragmented and crushed. (5). Other. (6). In all. (7). Of up to 29 years. (8). years and more.

Table 358. Clinical issues the injured people have with the bullet break of radial bone in the different age groups (in the percentages).

(1) Группа раненых по возрасту	(2) Клинический исход	(3) Хороший	(4) Контрак- тура	(5) Анкилоз	(6) Ложный сустав	(7) Остеоми- елит	(8) Культи	(9) Прочие	(10) Всего
(11) До 29 лет		46,6	25,1	2,2	1,9	4,0	0,2	20,0	100,0
30—39		36,2	33,1	3,4	1,9	2,7	0,5	22,2	100,0
(12) 40 лет и более		32,8	31,0	5,3	3,3	5,0	0,3	22,3	100,0

Key: (1). Group of injured people on the age. (2). clinical outcome. (3). Good. (4). Contracture. (5). Ankylosis. (6). False joint. (7). Osteomyelitis. (8). Stump. (9). Other. (10). In all. (11). Of up to 29 years. (12). years and more.

Table 359. Form/species of the bullet break of radial bone in the injured different age groups (in the percentages).

(1) Группа раненых по возрасту	(2) Вид перелома	(3) Дырчатый и краевой	(4) Оскольчатый и растроб- ленный	(5) Прочие	(6) Всего
(7) До 29 лет		20,2	64,0	15,8	100,0
30—39 "		13,5	70,8	15,7	100,0
(8) 40 лет и более		14,9	70,6	14,5	100,0

Key: (1). Group of injured people on the age. (2). Form/species of break. (3). Perforated and edge/boundary. (4). Fragmented and crushed. (5). Other. (6). In all. (7). Of up to 29 years. (8). years and more.

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In this, undoubtedly, pronounced the age special features/peculiarities of the structure of the bones of forearm. By this precisely distribution of breaks it is possible to explain the issues given above. Consequently, the effect of age on the issues of the breaks of the bones of forearm undoubtedly, but it in essence straight line, but indirect.

Periods of consolidation.

On the basis of data of the deepened development of the

histories of disease/sickness/illness/malady are established/installed the following average periods of the intergrowth of the bones of forearm after the bullet break: radius - 1.8 months, cubital - 1.9, both bones (with the simultaneous break) - 2.4; for entire forearm as a whole - 1.9 months.

The distribution of injured people according to the periods of consolidation is represented in Table 360.

Almost in 2/3 injured consolidation it began earlier than the average period, and in 1/3 - it is later than this period; thus, delayed consolidation was observed relatively infrequently.

With the complication of osteomyelitis the formation of the callus was detained by 0.7 months. The damage of nerves somewhat slowed down an advance of consolidation - for 0.3 months.

Deserves to be noted the dependence of the consolidation of scrap from the frequency of the exchange of the immobilizing bandages in the process of treatment to the extraction of injured person from the hospital.

The analysis of issues, based on materials of the author's development of the histories of disease/sickness/illness/malady,

showed that the immobilizing bandage was not changed in 2.60/o of injured people with the consolidation of later than 3 months, it was changed 1-2 times - in 13.60/o of 3-4 times - in 37.30/o, more than 4 times - in 34.00/o; immobilization was conducted in the gypsun bandage with the window in 12.50/o.

Consequently, during the conducted treatment without the exchange of the immobilizing bandage, and also upon the exchange of its 1-2 times the delayed consolidation was noted almost 4 times thinner/less frequent than with the repeatedly changed bandages. This fact should be explained not only the disturbance/breakdown of regenerative process upon the frequent exchanges of immobilization, which contributed to the delayed coalescence of bone scrap, but also thereby that the majority of such injured people related to the group with the severe complications, with which there were readings to the repeated exchange of immobilizing bandage.

Table 360. Distribution of injured people with the bullet break of the bones of forearm according to the periods of the formation of the callus.

(1) Срок образования мозоли	(2) 1-5 мес.	1,6-2,0	2,1-2,5	2,6-3,0	3,1-3,5	3,6-4,0	4,1-4,5	4,6-5,0	5,1-6,0	6,1 и бо- лее мес. или	(3) Итого	(4)
(5) Процент раненых	39,6	26,6	15,6	9,6	3,0	2,9	0,8	0,9	0,5	0,5	100,0	

Key: (1). Period of the formation of corn. (2). month. (3). and more than months. (4). In all. (5). Percentage of injured people.

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Duration of hospital treatment.

According to the data of the deepened development of the histories of disease/sickness/illness/malady, the duration of hospital treatment apropos of the bullet break of the bones of forearm was calculated on the average in 3.6 months; the information about the separate bones was given in Table 361.

From the data of table 361 it is evident that after the onset of the consolidation of the bones of forearm it was required almost as much time for the treatment in the hospital, was as spent to the onset of consolidation; breaks of both bones appeared to be

exception/elimination. There is no doubt that with these breaks was spent more than time on the subsequent treatment after consolidation how it is represented in the table; however this fact is not reflected, since during the calculation of the average period of the hospitalizations were not excluded those amputated which with break of both bones it was many times more than with the break of one bone (table 346).

The duration of the hospital treatment of injured people to the break of radial and ulna was almost identical, and injured people with break of both bones (simultaneously) were treated longer by 0.3-0.4 months, i.e., only on 9-12 days. This small difference is also explained by a more considerable number of amputations, produced with breaks of both bones in comparison with the break of one bone.

The effects of age on the duration of hospital treatment according to the data of the deepened development of the histories of disease/sickness/illness/malady establish/install could not. With the complication of osteomyelitis the duration of hospitalization apropos of the bullet break of the bones of forearm in comparison with the injured people, who did not have this complication, was increased on the average by 1.6 months.

During the simultaneous with the break damage of nerves the

duration of hospitalization on the average was increased by 3 weeks in comparison with the injured people, faultless of nerves.

With the complication of the bullet breaks of the bones of forearm gas infection the duration of hospital treatment was more on 11 days in comparison with the average period for all breaks of the bones of forearm.

In injured people with the break of the bones of forearm and the presence of foreign bodies the treatment in the hospital in comparison with the average period for all injured people was more prolonged (on 19 days). and finally in those injured people with the break of the bones of forearm, which did not have complications and associated injuries, the average duration of hospital treatment on 35 days was more shortly than in all injured people.

Table 361. Average period of consolidation of the bullet breaks of the bones of forearm and the average duration of their hospital treatment (in the months).

(1) Срок	(2) Локализация перелома	(3) Лучевая кость	(4) Локтевая кость	(5) Обе кости пред- плечья	(6) Вид кости не уста- новлен	(7) В сре- днем
(8) Консолидации		1,8	1,9	2,4	1,6	1,9
(9) Госпитального лечения		3,5	3,6	3,9	3,1	3,6

Key: (1). Period. (2). Localization of break. (3). Radial bone. (4). Ulna. (5). Both bones of forearm. (6). Form/species of bone is not established/installed. (7). On the average. (8). Consolidations. (9). Hospital treatment.

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Lethality.

Concerning a question about the lethality with the bullet breaks of the bones of forearm, it is necessary to note that this issue was observed as a result of severe complications, as is evident from the following distribution of the reasons for death: the injuries, incompatible with the life, - 1.70/o, shock - 8.60/o, hemorrhage - 5.10/o, anaerobic infection - 41.40/o, sepsis - 7.00/o, pneumonia - 3.50/o, other (not connected with the break of the bones of forearm)

- 32.70/o.

Lethality with the break of cubital and radial bone was identical, and with break of both bones - 6 times more than with the break of one bone.

During the analysis of data of the deepened development of the histories of disease/sickness/illness/malady it is revealed, that the lethal outcomes occurred only in injured people with the crushed, edge/boundary and large-splintered break of the bones of forearm. If we accept the total number of lethal outcomes with the edge/boundary breaks for 1.00/o, then with the large-splintered ones it will be expressed by numeral 0.20/o, and with those crushed - 3.00/o. It should be noted that in injured people with the bullet break of radial bone in the absence of the associated injuries it was observed not one lethal outcome.

As has already been indicated above, the associated injuries with the bullet breaks to a considerable extent burdened issue; the same affected also the lethality: with the associated injuries lethal outcomes were observed $4 \frac{1}{2}$ times more frequently than without those associating.

As far as dependence is concerned of lethality on the

character/nature of injury and localization of break, then, according to data of the deepened development of the histories of disease/sickness/illness/malady, blind-end injuries were finished with lethal outcome more frequently than through: with the isolated/insulated breaks of the ulna - 3 times, the radial bone 4 1/2 times; lethality with breaks of both bones was approximately/exemplarily identical both with the blind ones and with the perforating injuries, and with crushed (and separating) - into 2 and the more of times more than with the blind ones or the through ones.

If we accept a quantity of lethal outcomes in injured people after blind-end bullet injuries with the break of the ulna for 1, then with break of radius it will be expressed by numeral 3, and both bones of forearm - 5.6; after accepting a quantity of lethal outcomes after perforating injuries with the break of the ulna for 1, it is possible to note that with the break of radial it comprised 2, but both bones of forearm - 16.

Lethality with the isolated/insulated breaks of radial and ulna was approximately/exemplarily identical at the different ages, with break of both bones of forearm it is more than with one bone, and besides at the more elderly age (it is older than 40 years) it is considerably higher than in the young (table 362).

Table 362. Lethality with the bullet breaks of the bones of forearm in connection with the age of the injured people (number of lethal outcomes with break of both bones at the age of up to 29 years is undertaken 8) .

(1) Группа раненых по возрасту	(2) Локализация перелома	(3) Лучевая кость	(4) Локтевая кость	(5) Обе кости
(6) До 29 лет		2	2	8
30-39 "		2	1	5
(7) 40 лет и старше		Не было	3	35

Key: (1). Group of injured people on the age. (2). Localization of break. (3). Radial bone. (4). The ulna. (5). Both bones. (6). Of up to 29 years. (7). years it is older. (8). It was not.

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It is important to analyze lethality in connection with the period of the primary surgical processing of injured people with the bullet break of the bones of forearm, and also with the character/nature of this processing. It proves to be that a great number of lethal outcomes was in injured people, who were undergoing primary surgical processing in the first six hours after injury. That, if we accept average/mean lethality with all periods of primary surgical processing in injured people with the bullet break of the bones of forearm for 1, then lethality in those processed in the

first six hours is equal to 1.2 from 7 to 12 hours - 1.1, during the first day - 0.8 and during the second day are later - 0.8.

The given indicators of lethality depending on the period of primary surgical processing from the moment/torque of injury correspond to data of the deepened development of the histories of disease/sickness/illness/malady, which showed that within the early periods primary surgical processing underwent the injured people with the heaviest breaks.

If we accept for 1 average/mean lethality in injured people in all forms of primary surgical processing, then a number of lethal outcomes during the dissection composes 0.3, with the dissection and the carving - 0.9, with the dissection and the carving with the removal/distance of bone fragments - 1.0, with processing of bone fragments - 4.1, upon the amputation - 1.6, during the combination of different elements of treatment - 1.6.

It is necessary to note that among the injured people with the bullet break of the bones of forearms in which it was not observed complications, it was not one lethal outcome.

Finally, concerning the dynamics of lethality with the injuries indicated on the years of war, it is possible to establish/install,

according to this of the deepened development of the histories of disease/sickness/illness/malady, that it barely changed, with exception of the second year when it was 1 1/2 times more than into each of other years.

Clinical issues in injured people with the bullet break of thigh.

Docent is the Lieutenant Colonel of medical service I. L. Bregadge.

Issues in the previous wars.

The fate of injured people with the bullet break of thigh since olden times interested surgeons. Literature data on this score, however, are scanty, apparently from the fact that the interest in the bullet injuries ceased each time with the termination of war.

If we trace lethality with the bullet breaks of thigh in the chronological order up to the first two years of the first world war 1914-1918, then it will seem that a number of dead injured people with this heavy damage little decreased, in spite of the successes of the surgery of the second half the past century (table 363).

"From those bandaged by me in the field of battle in the Turkish war (1828-1829) of the compound fractures of the femoral and shoulder

bones, caused by bullets by the number more than 12, wrote A. Charukovskiy in his "military-march medicine", published into 1836, recovered not one soldier, and reason this was their transfer through the great distance aboard the ships which through the head wind were very for long located on the way of floating into Odessa".

The attempts to lower lethality with the bullet breaks of thigh led, as is known, Larrey (Larrey) to the conclusion about the need for the ultra-radical methods of treatment. But, together with the supporters of unconditional amputations with the bullet breaks of thigh, were given out the voices, which called to the "saving" treatment and the left amputations and exarticulations for injured people, whose conservative treatment was is clearly unsuccessfully.

Table 363. Lethality with the bullet breaks of the thigh in the different wars of the XIX and XX century.

(1) Война	(2) Армия	(3) Этап	(4) Автор	(5) Количество наблюдений	(6) Летальность (в %)
(7) Крымская 1853—1856 гг.	(8) Французская	(9) Не указан	(10) Шеню (Chenu)	337	65,0
(11) Гражданская война в Америке 1861—1866 гг.	(12) Федеративная	(13) То же	(14) Уолтер Штук (Walter Stuck)	386	84,6
(15) Итапо-французская 1859 г.	(16) Французская	» »	(17) Демме (Demmet)	163	52,1
(18) Фришко-германская 1870/71 г.	(19) Германская	» »	(20) Бильрот (Billrot)	2021	60,8
(21) Русско-турецкая 1877—1878 гг.	(22) Русская	» »	(23) Н. П. Пирогов	Не указано	(24) От 53,0 до 69,0
(25) Первая мировая война 1914—1915 гг.	(26) Английская	» »	(27) Джонс, Грей, Опп (Johns, Grey, Orr)	То же	(28) От 65,6 до 90,0
1914—1915 гг.	(29) Германская	(30) Полевой лазарет	(31) Франц (Franz)	711	42,5
1914—1915 гг.	»	(32) Тыловые госпитали	(33) Он же	664	9,0
1916—1918 гг.	(34) Английская	(35) Не указан	(36) Боултон, Синклер, Опп (Bowby, Sinclair, Orr)	Не указано	(37) От 12,0 до 17,5
1916—1918 гг.	(38) Американская	(39) То же	(40) Официальная статистика	3256	24,4
1914—1918 гг.	(41) Французская	(42) Этапные и тыловые госпитали	(43) То же	37 746	13,3
1914—1918 гг.	(44) Русская	(45) Головной эвакуационный пункт	(46) Мальцева-Вилкова	180	16,7
1914—1918 гг.	(47) Французская	(48) Не указан	(49) Патель (Pathel)	843	10,9
1914—1918 гг.	(50) Американская	(51) То же	(52) Грйлл (Grill)	1 700	8,0
(53) В Испании 1937 г.	(54) Республиканская	(55) Барселонские госпитали	(56) Видуаль (Widal)	600	3,6

Key: (1). War. (2). Army. (3). Stage. (4). Author. (5). Number of observations. (6). Lethality (in o/o). (7). Crimean. (8). French. (9). It is not shown. (10). Chenu. (11). Civil war in America. (12). Federative. (13). ditto. (14). Walter Shtuk. (15). Italo-French. (16). Denmet. (17). Franco-German. (18). German. (19). Billrot. (20). Russo-Turkish. (21). Russian. (22). N. I. Pirogov. (22a). It is not shown. (23). First world war. (24). English. (25). Johns, Grey, Orr. (26). Field infirmary. (27). Franz. (28). Back hospitals. (29). The very same. (30). Bowlby, Sincler, Orr. (31). American. (32). Official statistics. (33). Line-of-communication and back hospitals. (34). Head evacuation point. (35). Mal'tsev-Vilkov. (36). Pathel. (37). Grill. (38). In Spain. (39). Republic. (40). Barcelona hospitals. (41). Vidal. (42). From. (43). to.

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Walter Shtuk gathered from the military medical literature of the times of American civil war 1861-1866 the data about 386 injured people with the bullet break of thigh. It turned out that of 304 injured people, who were undergoing the expectant treatment, perished 249 (81.90/o), and of 27 injured people, which produced the amputation of thigh, died 25 (93.00/o). However, in the group of the injured people, in who it was applied exarticulation of thigh (55

people), died 53 (96.30/o).

However, during Franko- German war (1870/71) came to light contradictory/opposite relationships/ratios. Billroth published the issues of 2021 bullet break of thigh, treated operationally; from a number of injured people of this group died 1229 (60.80/o), while of 1339 injured people, in whom was applied expectant therapy, died 949 (70.80/o).

Arnold (Arnold) ¹, who produced in Franko- German war 1870/71 of 133 sections of dead persons from the pyaemia of injured people, indicated that in the first place stood the bullet breaks of thigh.

FOOTNOTE ¹. It is quoted according to A. P. Avtsyn. ENDFOOTNOTE.

Following a Franko-German war flamed up the Russo-Turkish war (1877-1878), during which the "saving" treatment of the bullet breaks of thigh, according to N. I. Pirogov's evidence, was reinforced by the Lister antiseptic method of treatment. However, lethality decreased very insignificantly. Sizable value in this had the poor organization of the medical institutions of army.

During the Russo-Japanese war 1904-1905 and even the first two years of the first world war 1914-1918 the issues of the bullet

breaks of thigh, according to V. A. Oppel's evidence, they differed little from N. I. Pirogov's times. At present by all it is clear that this occurred due to following causes: a) the adverse effect of Bergmann's concepts (Bergmann), which was manifested in the fact that the surgeons carried bullet injuries to those little infected, considering sufficient one aseptic treatment alone; b) the changing character/nature of injuries themselves due to an increase in the number of fragmentation injuries and c) deficiencies/lacks in the army medical administration (insufficient value was added to the timely carrying out/removal of injured people from the field of breakage, to the approximation/approach of surgical aid to a front line and organization of the specialized aid).

Since 1916 in all theaters operations lethality with the bullet breaks of thigh began to descend, which depended first of all on the more active methods of treatment, earlier and more careful surgical processing and wide application of antiseptic substances.

As a result of these measures the lethality in the English army with 65.0-90.00/o in 1914-1915 (Jones, Orr and Grey) was lowered into the second half war to 17.50/o (Bowlby) and 12.00/o (Sinclair-Orr). Bowlby explained a reduction in the lethality by introduction to the use of Thomas's splint. Americans and in this war extolled Thomas's splint. Gilson Engel (Gilson Engel) in 1942 wrote that in the first

battle on Somme in the war 1914-1918 the lethality with the bullet breaks of thigh was equal to 70.00/o, whereas with the second battle on Somme when by injured person was applied the foot splint of Thomas, lethality fell to 14.00/o, after being lowered by 56.00/o (it is given according to B. A. Petrov).

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However, as is known, Thomas's splint did not provide reliable immobilization with the breaks in upper and middle third of thigh, and therefore it is difficult to agree with a similar statement.

In the old Russian army, in spite of the inertia of army medical administration, on that thus lamented N. A. Vel'yaminov at the 14th congress/descent of Russian surgeons, which was assembled at the very erosion/climax of the first world war, lethality with the bullet breaks of thigh in the second half war also was lowered: according to S. K. Solov'yev's data - to 26.00/o, Trofimov (14- spare field hospital) - to 13.40/o and Mal'tsev-Vilkov (hospitals of near rear) - to 16.70/o.

Table 364 gives military-expert issues in injured people in the first world war (according to different authors' data).

Tyuff'ye, coming forward in 1917 at the specially called resultant inter-union conference, reported 16392 injured people with the healed bullet break of thigh.

Final hospital issues on this largest material, sometimes published, proved to be the following: full/total/complete functional unsuitability - 22.40/o, difficulty of movement of joints - 76.20/o pseudoarthrosis - 1.40/o.

The issues of the bullet breaks of the thighs, published by individual surgeons - participants in the first world war, were considerably better, but these indicators could not serve as the criterion of the quality of surgical aid in all theaters operations also in all periods of war.

Remote outcomes of injured with bullet break of thigh in the previous wars.

In the beginning of past century surgeons' majority skeptically related to the possibility of the functional suitability of extremities after the conservative treatment of the bullet breaks of thigh. A. Charukovskiy (1836) wrote in regard to this: "in injured person with shattering of bone, after the lasting sufferings of recovered with the retention/preservation/maintaining member, the

latter is ugly: dried up, agitated, that aches, it is not mobile/motile in the articulation, on the hand or the foot are located the fistulas from the remaining in them foreign body, the not separated deadly pale bone, the tendon. Fistulas this sometimes themselves heal, and then again they are opened/disclosed, or are formed the new abcesses, excreting pus and foriegn bodies".

Certain improvement in the issues of the bullet breaks of thigh is noted when veins/strands worked N. I. Pirogov.

Table 364. Determined military-expert issues the injured people have with the bullet break of thigh in the war 1914-1918 (according to different authors' data) (in the percentages).

(1) Страна и автор	(2) Иходы	(3) Негодные и военной службе	(4) Годные и военной службе
(5) Германия [Пертес (Perthes)] . .		41,1	20,7
(6) Франция [Франц (Franz)] . . .		54,6	26,2

Key: (1). Country and author. (2). Issues. (3). Unfit to military service. (4). Suitable for military service. (5). Germany (Perthes). (6). France (Franz).

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The first surgeon, who interested himself in the distant issues of the bullet breaks of thigh and who published his observations, was, apparently Denmet (Denmet). On it supplied N. I. Pirogov at his "beginnings of general/common/total military field surgery". Denmet traced the issues in 165 injured people with the bullet break of thigh in the Italian war 1859; of them in 43 were the break in upper third of thigh, in 46 - in middle third and in 76 - in lower third. From the first group of injured people recovered 18 people (in four of them foot proved to be unfit to the use), from the second group - 18 people (foot it proved to be functionally unfit in 6 injured

people), from the third group - 43 people (foot proved to be unfit in 10 people). There N. I. Pirogov cite data of Hutten (Hutten), for whom it was possible to find in Paris among the war veterans of 63 invalids with the healed bullet break of the thigh: in 17 of them proved to be the break in upper third of thigh, in 28 - in middle third and in 18 - in lower third.

In all subsequent wars, switching on Russo-Japanese, the distant observations of the bullet breaks of thigh in the literature were not illuminated.

Somewhat better proceeded with the publication of the issues of the bullet breaks of thigh in the first world war 1914-1918.

R. Beshtel'meyer (R Bestelmeyer) for a period of 3 years (1927, 1928, 1929) inspected 95 injured people with the bullet break of thigh (in connection with the determination of the pension to the invalids of the first world war) and found in them a decrease in the ability to work on the average to 58.00/o.

The data, obtained by Bestelmeyer are of special interest; therefore one should stop at them in more detail.

of 95 injured people with the bullet break of thigh, studied by

Bestelmeyer 10-15 years after injury, in 17 were the break in lower third of thigh, in 54 - on the average and in 24 - in upper third (57 bullet, 28 fragment and 9 shrapnel). Treatment was applied different, but most frequently stretching. In 25.0-30.0o/o of injured people the wounds healed in 2 months, but of the remaining majority was treated many months and years. The large part of the injured people underwent operations/processes, some were operated more than 10 times. In 19 injured people it was not noted pathological changes, in the remaining 76 injured people (80.0o/o) were discovered the complications from the side of knee joint; in 6 (7.8o/o) injured people proved to be the ankylosis, also, in 70 (72.2o/o) - the limitation of flexure.

From the side of the hip joint are discovered: chronic arthritis - in 3 to injured, more or less significant the limitation of motions - in 13 and ankylosis - in 2. talocrural joint was in 3 injured people almost completely fixed in the position of horse foot.

The shortening of extremity on the average was 4.8 cm; it was not observed shortening in 2 injured people; shortening to 3 cm was in 26 injured people; shortening in 4 cm - in 16, in 5 cm - in 20, in 6 cm - in 9, in 7 cm - in 12, in 8 cm - in 2, in 9 cm and more than - in 7. In one injured person was noted elongation of extremity on 2.5 cm (it was found on the skeletal/skeleton stretching of 17 weeks).

7 Injured people with the break simultaneously had the damage of the nerve trunks, but most bad there was the fact that each fourth injured person, inspected by Bestelmeyer 12-15 years after injury, suffered chronic osteomyelitis.

Even more interesting data in the relation to the distant issues of the bullet breaks thighs were obtained with mass treatment of injured American armies, participants in the war 1914-1918. Injured people they inspected 3 times: 1 1/2 years, 3 and 8 years after injury.

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Table 365 shows the dynamics of the reduction of ability to work in injured people with the bullet break of thigh (according to American data, war 1914-1918).

Thus, in the course of time the distant results of the bullet breaks of thigh considerably were improved.

Illustrates well the quality of surgical treatment during the first world war and its distant results (32 years after injury) the

following observation of the author.

P., 1892 birth, vicinal of the 172nd Leeds rifle regiment, obtained during the breach/inrush of the hostile front 7/III 1916 the perforating zero injury of left thigh on the boundary of lower and middle third. First aid (cast and splint) was shown/rendered after 3 hours. In the splints/pulp publications the foot was located 12 days. injured person it was treated in Chortkov, and then after 12 days in the hospital at Zhmerinka station. Was superimposed wire splint to the hip joint. In the same splint in a month it was converted into the 13th infirmary of the All-Russian society of red cross (in Ekaterinoslav), where was made the X-ray photograph. By this time in exit zero opening/aperture was formed fistula with abundant suppurative discharge. At Ekaterinoslav the injured person lay/rested a fortnight, after which it was converted into Kherson: here to it in the infirmary was superimposed gypsum bandage with the wadded packing and the window on the spot of wound. During the 1.5-month stay in this infirmary the fistula was not occluded also through it moved away the sequestrations. Toward the end of the stay in the infirmary was superimposed gypsum splint, injured person began to walk on the crutches. After a military-medical board recognized the injured person by unfit to the military service, it returned home into Moscow. On the arrival into Moscow knee joint did not fold. Injured person itself dealt by gymnastics and in a year could already bend

foot at the right angle. In 1919 and in 1920 it was operated on one time apropos of osteomyelitis. Extremity is shortened by 7 cm. Since 1920 it began to put to use orthopedic foot-wear. Since 1921 on the present time of the relapse of osteomyelitis it was not.

The history of the disease/sickness/illness/malady of this injured person (written on his story) is very exponential for the characteristic of the treatment of the breaks in the first world war.

The distant results of the bullet breaks of thigh after war with the White Finns 1939/40 studied V. G. Weinstein, but for the duration of very short period after the injury (year and more). It obtained following data: of 714 people, who answered the questionnaire about the distant results, $2\frac{8}{10}\%$ reported the presence in them of permanent fistulas and 6.40/o - about the relapsing/recidivise/recidivist/recidivity fistulas; 65.10/o of fistulas did not have. 45 injured people (6.30/o) reported the stable disorders of the function of sciatic nerve.

The periods of the consolidation of the bullet breaks of thigh, based on materials of war with the White Finns, assembled V. G. Weinstein, were following, consolidation began during 3 months in 71.10/o of injured people later than 3 months - in 24.70/o, it did not begin completely - in 3.60/o.

Table 365. Reduction of ability to work after the bullet break of thigh after extraction from the hospital (in the absolute numerals and in the percentages).

(1) Сроки освиде- тельствования после ранения	(2) Всего освиде- тельствовано	(3) Полная потеря трудоспо- собности	(4) Трудоспо- собность по- теряна боль- ше чем на 50%	(5) Трудоспо- собность потеряна ме- нее чем на 50%
(6) 1 1/2 года . . .	3 341	28,6	19,8	51,6
3 (7) . . .	3 352	8,4	37,7	53,9
8 лет . . .	3 357	0	45,6	54,4

Key: (1). Periods of examination after injury. (2). In all it is examined. (3). Full/total/complete loss of ability to work. (4). Ability to work is lost more than to 50o/o. (5). Ability to work is lost less than to 50o/o. (6). year. (7). years.

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V. G. Weinstein noted the repeated break within the time of treatment in the hospital in 0.2o/o of injured people, one year after extraction (on the questionnaires) - in 1.1o/o of injured people and among those long treating - in 10.0o/o.

The information about the shortening V. G. Weinstein obtained the following: thigh grew together itself without in 18.0o/o of injured people, shortening to 2 cm was in 22.4o/o, 3-4 cm - in

35.70/o, 5-6 cm - in 18.80/o, more than 6 cm - in 5.10/o.

The considerable limitation of mobility in the knee joint proved to be in 45.40/o, small - in 30.00/o of injured people.

The average duration of the hospital treatment of injured people with the bullet break of thigh during the war with the White Finns 1939/40, according to P. V. Stadler's data, was 101 days, and according to M. G. Lazarev's data - 134.

Issues in a Great Patriotic War.

The clinical issues of the bullet breaks of thigh in the Great Patriotic War are of exceptional interest. Already N. I. Pirogov considered the bullet breaks of thigh the most accurate standard/criterion of the quality of treatment, since they were the most difficultly solvable problem in all wars.

In the Great Patriotic War in the Soviet Union were applied the completely new methods of the treatment of breaks, was used the new organization of surgical aid. The treatment of the bullet breaks of thigh and large/coarse joints was given to specialists, were used all contemporary achievements of science.

The issues of the bullet breaks of thigh are the specific indicator of the achievements of contemporary Soviet science.

Issues depended, first of all, on the severity of injury, overall operational and medical circumstances and on the complex of the therapeutic measures, which were being conducted in injured people on entire way of their evacuation from the field of breakage to the back therapeutic institutions.

Issues in connection with the form/species of break.

As showed the experiment/experience of great patriotic war, bases and, it is possible to say, the decisive moment/torque in the issues of bullet breaks generally and the breaks of thigh was in particular the severity of injury.

Therefore during the estimation of issues it is necessary to, first of all, take into consideration the severity of injury which is determined mainly by the form/species of break and by the character/nature of injury (table 366).

It is necessary to consider that in Table 366 is reflected only the most important part (basic issue) of that complex diagnosis with which the majority of injured people was discharged from hospital. In

6.40/o of injured people it was difficult to secrete this principal part of the diagnosis - such injured people were referred in the group "combination of issues" (basic).

For the illustration of that how frequently and with how was combined basic issue, is given table 367.

Thus, in 24.00/o of the injured people, referred in the group the "damage of nerves" was observed, besides the damage of nerves, strain, in 35.50/o - contracture, etc.

In 44.90/o those discharged with the basic diagnosis "contracture" it was noted, besides it, the strain, the damage of nerves - in 3.60/o, etc.

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Table 366. Distribution of injured people with the bullet break of thigh according to the clinical issues in connection with the form/species of break (in the percentages).

Вид перелома	Клинический исход		(5) Повреждение нервов	(6) Контрактура	(7) Анкилоз	(8) Локонный сустав	(9) Кудити		(12) Остеомиелит	(13) Кольчатый исход	(14) Прочие	(15) Итого	(16) Умерло	(17) Неизвестно
	(3) Хороший	(4) Деформация					(10) Хороший	(11) Плохой						
3) Дырчатый	39,5	—	4,6	34,9	5,0	—	2,1	1,3	5,5	2,9	4,2	100,0	2,5	1,6
4) Поперечный	4,3	2,1	7,4	52,6	9,0	0,5	4,3	1,6	5,9	9,6	2,7	100,0	5,5	2,9
20) Продольный	27,3	3,0	—	45,5	9,1	—	6,1	—	3,0	3,0	3,0	100,0	2,9	2,9
21) Косой	6,9	2,3	3,4	61,7	8,1	0,2	3,1	1,0	3,4	6,5	3,4	100,0	4,0	2,7
22) Раздробленный	1,4	0,7	1,7	25,0	9,0	1,9	40,3	8,7	5,4	5,4	0,5	100,0	28,4	1,3
23) Крупнооскольчатый	4,2	2,3	3,7	52,5	8,1	0,8	7,6	1,4	7,7	9,7	2,0	100,0	9,0	1,9
24) Мелкооскольчатый	5,2	1,7	0,9	58,3	7,8	—	8,7	1,7	8,7	7,0	—	100,0	12,2	2,2
25) Кривой	44,3	—	8,9	31,7	2,6	—	0,6	—	6,7	1,8	3,4	100,0	4,4	4,3
26) Включенный	—	2,9	—	79,5	5,9	—	5,9	—	2,9	2,9	—	100,0	2,9	5,4
27) В среднем по установленным видам переломов	12,6	1,6	4,3	47,0	7,3	0,6	9,2	2,0	6,2	6,8	2,4	100,0	9,9	2,4
28) Вид перелома не установлен	8,0	2,0	4,8	37,7	5,7	0,5	25,0	6,3	2,5	4,0	3,5	100,0	35,1	2,9
В среднем	11,9	1,7	4,3	45,6	7,0	0,6	11,6	2,6	5,7	6,4	2,6	100,0	15,0	2,5

Key: (1). Form/species of break. (2). Clinical issue. (3). Good ¹.

FOOTNOTE ¹. Good in anatomical and functional sense. ENDFOOTNOTE.

(4). Strain. (5). Damage of nerves. (6). Contracture. (7). Ankylosis.

(8). False joint. (9). Stump. (10). good. (11). poor. (12). Osteomyelitis. (13). combination of issues ².

FOOTNOTE ². In the graph "combination of issues" are referred those injured people in who it was difficult to secrete any basic issue.
ENDFOOTNOTE.

(14). Other ³.

FOOTNOTE ³. In the graph "other" are referred the issues, unfavorable not as a result of the break, while as a result of the associated injuries or diseases. ENDFOOTNOTE.

(15). Altogether. (16). It died. (17). Issue is unknown. (18). Perforated. (19). Cross. (20). Longitudinal. (21). By scythe. (22). Crushed. (23). large-splintered. (24). Small-splintered. (25). Edge/boundary. (26). Packed in. (27). On the average according to established/installed forms/species of breaks. (28). Form/species of break is not established/installed. (29). On the average.

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Into the "Combination of the terminations" most frequently entered the contracture, osteomyelitis and deformity.

In the heading "Good" are referred those terminations, which were accompanied by full/total/complete anatomical reduction, and also all functions of extremity. The presence of a good anatomical result during the disturbance/breakdown of bending function of one of the joints was occasion for the translation/conversion of this issue into the rank of contractures. In exactly the same manner strain virtually not reflecting in the function of extremity, it was connected with the heading of the failures.

Furthermore, it is necessary to consider that the given clinical issues related to the moment/torque of the extraction of injured people from the latter/last therapeutic institution and that then it is not possible to consider final; some of them (contracture, false joint, osteomyelitis) in the course of time under the effect of the treatment could be improved and change into the heading of good

issues (pg. 578) .

As can be seen from Table 366, good terminations with the bullet breaks of the thigh composed on the average 11.90/o. But if we consider another graph "Other issues" (2.60/o), where there is a considerable number of favorable outcome of the break of the thighs which did not hit the heading "Good" due to the consequences of other associated injuries or diseases, which made the injured person by invalid, then it is possible to consider that a number of good issues of break was approximately 14.50/o.

The best results were obtained with the edge/boundary and perforated breaks (44.3 and 39.50/o of good issues). Relatively many good issues were noted, also, with the longitudinal breaks - 27.30/o. The remaining breaks, connected with the considerable decomposition of bone tissue, became a much smaller quantity of the good issues: large-splintered ones - 4.20/o, small-splintered - 5.20/o, oblique - 6.90/o and those crushed - 1.40/o. This shows that the considerable decomposition of bone with the formation of the bone fragments, scattered throughout the wound canal or the wound cavity, that it is characteristic for the crushed breaks, and also the packed in breaks, which are communicated usually with the joint, became a small quantity of good results.

Thus, the experiment/experience of war shows that the clinical issues of the bullet breaks of thigh were found in the direct dependence on the severity of break and that on the best clinical issues the breaks in the decreasing order were disposed of as follows: edge/boundary, perforated, longitudinal, scythe, cross, large-splintered, small-splintered, packed in and crushed.

Table 367. Frequency of the combination of the associated issues with some basic issues the injured people have with the bullet break of thigh (in the percentages).

(1) Основной исход	(2) Сопутствующий исход							
		(3) Деформация	(4) Повреждение нервов	(5) Контрактура	(6) Анкилоз	(7) Ложный сустав	(8) Остеомиелит	(9) Прочие
(10) Повреждение нервов		24,0	—	35,5	1,1	—	4,4	4,4
(11) Контрактура		44,9	3,6	—	0,3	0,1	2,1	3,8
(12) Остеомиелит		43,9	5,7	64,9	4,4	—	—	1,6
(13) Комбинация исходов		55,6	14,8	70,7	22,6	0,4	63,3	10,7

Key: (1). Basic issue. (2). Associated issue. (3). Strain. (4). Damage of nerves. (5). Contracture. (6). Ankylosis. (7). False joint. (8). Osteomyelitis. (9). Other. (10). Damage of nerves. (11). Contracture. (12). Osteomyelitis. (13). Combination of issues.

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Issues in connection with the character/nature of injury.

The injury of soft tissues had a great effect on the course of the break of femoral bone. The degree of the damage of soft tissues is to a considerable extent determined by the character/nature of injury. The dependence of clinical issues on the character/nature of injury is represented in Table 368.

The most unfavorable results, naturally, were observed with crushing of thigh.

If we do not consider the lethal outcomes whose indicators differed little from each other in the groups of injured people with the blind-end, perforating or tangential injury, then the best clinical issues follow to note in the group with the blind-end injuries where there was most of all of good issues and it is less than amputated. In the second place it is necessary to place perforating injuries and on the latter - tangents which on the thigh, as a rule, were accompanied by the extensive decomposition of soft tissues upon the smaller decomposition of bone, than with other injuries (Table 369).

Thus, tangential injuries were accompanied by the smaller decomposition of bone, than blind and through, nevertheless they ended by the worse issues. This can be explained only by the presence of the large torn wounds of soft tissues.

Where the damage of soft tissues by the wounding projectile was approximately identical (blind-end and perforating injuries), the deciding role played the decomposition of bone. Therefore perforating injuries it gave the worse results, than blind ones.

Table 368. Distribution of injured people with the bullet break of thigh according to the clinical issues in connection with the character/nature of injury (in the percentages).

(1) Характер ранения	(2) Клинический исход											
	(3) Хороший	(4) Деформация и повреждение нервов	(5) Контрактура	(6) Анкилоз	(7) Ложный сустав	(8) Культи	(9) Остеомиелит	(10) Комбинированный	(11) Прочие	(12) Итого	(13) Умерло	
(14) Слепое	15,4	6,1	44,0	7,6	0,3	11,3	5,9	7,4	2,0	100,0	16,9	
(15) Сквозное	10,5	6,7	47,5	6,9	0,7	13,6	5,7	6,1	2,3	100,0	13,2	
(16) Касательное	5,6	2,8	55,2	8,3	—	16,7	2,8	—	5,6	100,0	14,3	
(17) Размозжение	—	—	—	—	—	100,0	—	—	—	100,0	38,0	

Key: (1). Character/nature of injury. (2). Clinical issue. (3). Good. (4). Deformity and damage of nerves. (5). Contracture. (6). Ankylosis. (7). False joint. (8). Stump. (9). Osteomyelitis. (10). Combination. (11). Other. (12). In all. (13). Died. (14). nonperforating. (15). Perforating. (16). Tangent. (17). Crushing.

Table 369. Distribution of injured people with the bullet break of thigh according to the form/species of break in connection with the character/nature of injury (in the percentages).

(1) Характер ранения	(2) Вид перелома					(7) Всего
	(3) Дырчатый и краевой	(4) Оскольчатый	(5) Раздробленный	(6) Поперечный, продольный и косой	(6) Поперечный, продольный и косой	
(14) Слепое	30,9	35,8	9,3	24,0	—	100,0
(15) Сквозное	16,2	49,0	10,9	23,9	—	100,0
(16) Касательное	33,3	24,2	12,2	30,3	—	100,0
(17) Размозжение	—	3,2	96,8	—	—	100,0

Key: (1). Character/nature of injury. (2). Form/species of break.

(3). Perforated and edge/boundary. (4). Fragmented. (5). Crushed.
(6). Cross, longitudinal and by scythe. (7). In all. (8).
Nonperforating. (9). Perforating. (10). Tangential. (11). Crushing.

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Issues in connection with the means of injury.

Fragmentation injuries usually gave more than complications and worse clinical issues. As this was expressed in the relation to the bullet breaks of thigh, it is represented in Table 370.

as can be seen from Table 370, the best indicators on the different issues were divided almost equally between both groups; however the specific gravity/weight of indicators is not completely identical. According to such principal indicators as lethality the stump, osteomyelitis and ankylosis, worse results are obtained after fragmentation injuries, moreover on the lethality it is more than 2 times, while on the stumps - almost 2 times. Such indicators should be placed in connection/communication mainly with the special features/peculiarities of the fragmentation injuries, which gave the considerable contamination of wounds by microbes and a larger number of crushing wounds (almost 6 times), than bullet ones ones.

Quantities of heavy breaks in the dependence on the injury by bullet or fragment differed from each other insignificant (Table 371).

From Table 371 it is evident that the heaviest breaks - crushed - it was more in the group of fragmentation injuries, but in this group there were simultaneously considerably less than the fragmented breaks and many perforated ones and edge/boundary ones.

Table 370. Distribution of injured people with the bullet break of thigh according to the clinical issues in connection with the means of injury (in the percentages).

(1) Вид ранения и его удельный вес	(2) Клинический исход													
	Хороший	Деформация	Поврежде- ние нервов	Контрактура	Ангилоз	Полный су- став	Культи		Остеомиелит	Комбинированный	Прочие	Итого	Умерло	
	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	
(16) Пулевое (55,9)	11,4	2,0	4,7	49,9	6,7	0,6	8,7	2,0	5,1	6,1	2,8	100,0	10,0	
(17) Осколочное (44,1)	12,5	1,2	3,8	39,5	7,5	0,5	15,8	3,6	6,5	6,8	2,3	100,0	21,2	

Key: (1). Means of injury and its specific gravity/weight. (2). Clinical issue. (3). Good. (4). Strain. (5). Damage of nerves. (6). Contracture. (7). Ankylosis. (8). False joint. (9). good. (10). poor. (11). Osteomyelitis. (12). Combination. (13). Other. (14). Altogether. (15). It died. (16). Bullet. (17). Fragmentation.

Table 371. Distribution of injured people with the bullet break of thigh according to the form/species of break in connection with the means of injury (in the percentages).

(1) Вид ранения	(2) Вид перелома					(7) Всего
	Дырчатый, краевой	Оскольчатый	Раздробленный	Поперечный, продольный, косой		
(16) Пулевое	15,7	49,3	12,8	22,2		100,0
(17) Осколочное	25,0	35,2	17,4	22,4		100,0

Key: (1). Means of injury. (2). Form/species of break. (3). Perforated, edge/boundary. (4). Fragmented. (5). Crushed. (6). Cross, longitudinal, by scythe. (7). In all. (8). Bullet. (9). Fragmentation.

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Table 372. Distribution of injured people with the bullet break of thigh according to the clinical issues in connection with the form/species of break and the character/nature of primary surgical processing/treatment (in the percentages).

(1) Вид перелома	(2) Характер первичной хирургической обработки
(14) Дырчатый и краевой	(14) Рассечение
	(14) Рассечение и иссечение . . .
	(14) Рассечение и иссечение с другими элементами обработки ¹
	(14) Обработки не производилось
(19) Оскольчатый	(19) Рассечение
	(19) Рассечение и иссечение . . .
	(19) Рассечение и иссечение с другими элементами обработки ¹
	(19) Обработки не производилось
(20) Раздробленный	(20) Рассечение
	(20) Рассечение и иссечение . . .
	(20) Рассечение и иссечение с другими элементами обработки ¹
	(20) Обработки не производилось
(21) Поперечный, продольный и косой	(21) Рассечение
	(21) Рассечение и иссечение . . .
	(21) Рассечение и иссечение с другими элементами обработки ¹
	(21) Обработки не производилось

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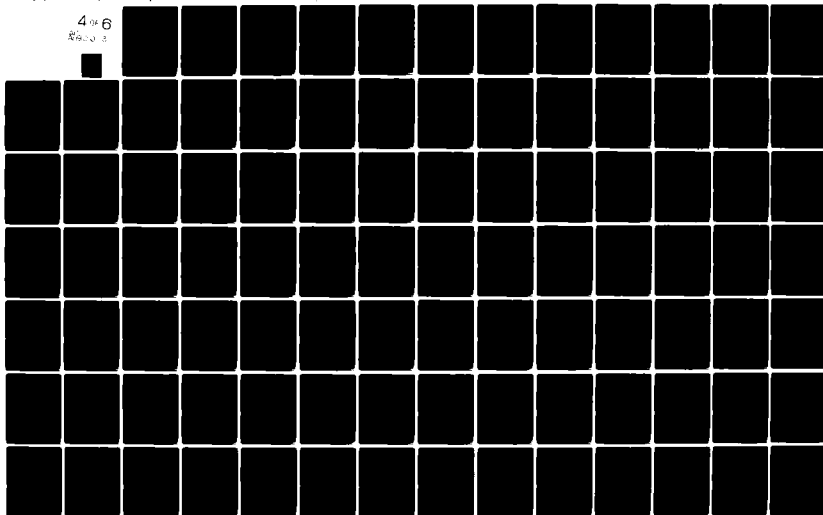
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(3) Клинический исход									
(4) хороший	(5) контрактура	(6) анкилоз	(7) ложный сустав	(8) культи	(9) остеомиелит	(10) комбинированный	(11) прочие	(12) итого	(13) умерло
39,9	37,0	5,1	—	1,8	5,1	0,9	10,2	100,0	1,2
33,8	38,0	2,8	—	—	5,6	7,1	12,7	100,0	5,3
45,0	28,0	0,9	—	3,7	4,7	2,8	14,9	100,0	9,2
48,1	27,7	1,9	—	0,5	8,7	2,4	10,7	100,0	4,6
4,2	54,2	7,2	0,4	7,2	8,3	11,1	7,4	100,0	9,7
3,8	51,9	10,1	0,6	10,8	8,9	9,5	4,4	100,0	9,2
1,6	53,4	9,8	1,3	14,7	7,3	9,8	2,1	100,0	8,0
7,8	52,0	7,1	0,3	3,3	6,0	7,1	16,4	100,0	7,1
1,8	28,5	14,3	0,9	38,3	5,4	6,3	4,5	100,0	26,8
2,6	28,9	7,9	—	44,8	7,9	5,3	2,6	100,0	22,4
1,6	28,0	8,8	4,8	38,4	7,2	7,2	4,0	100,0	29,7
—	41,3	12,7	—	28,6	7,9	6,3	3,2	100,0	34,4
6,3	61,8	8,2	0,3	3,6	4,2	6,9	8,7	100,0	4,1
3,3	58,2	15,4	—	5,5	5,5	5,5	6,6	100,0	7,1
4,4	54,9	10,2	—	7,0	5,1	9,6	8,8	100,0	6,0
9,9	58,3	5,8	0,4	3,3	3,7	5,4	13,2	100,0	2,0

Key: (1). Form/species of break. (2). Character/nature of primary surgical processing/treatment. (3). Clinical issue. (4). good. (5). contracture. (6). ankylosis. (7). false joint. (8). stump. (9).

osteomyelitis. (10). combination. (11). other. (12). altogether.
(13). it died. (14). Perforated and edge/boundary. (15). Dissection.
(16). Dissection and carving. (17). Dissection and carving with other
elements of processing/treatment ¹.

FOOTNOTE ¹. In a number of other elements/cells on all breaks they
entered: the dressing of vessels - 5.00/o, the removal/distance of
foreign bodies - 25.30/o, the removal/distance of bone fragments -
57.90/o, processing/treatment of the fragments of bone - 3.20/o and
the combination of the enumerated elements/cells - 8.60/o.

ENDFOOTNOTE.

(18). Processings/treatments it was not conducted. (19). Fragmented.
(20). Crushed. (21). Cross, longitudinal and by scythe.

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Issues in connection with the primary surgical processing/treatment
¹.

FOOTNOTE ¹. See also vol. 15 of this "work", pg. 388. ENDFOOTNOTE.

Primary surgical processing/treatment was one of the main links
in the circuit of preventive measures for warning/preventing the

complications of bullet breaks. Therefore should be examined materials about the interrelation between the character/nature of primary surgical treatment and the clinical terminations. Table 372 depicts these data in the relation to the groups of the uniform breaks.

To conduct to sharp boundary between clinical terminations, which followed after the diverse means of surgical treatment, is impossible, nevertheless, as can be seen from Table 372, in injured people with the perforated and edge/boundary break the best results were obtained with the abstention from the processing, more worse - during the dissection, the carving and the use/application of other elements of processing/treatment the poorest - with dissection and carving of wound.

In injured people with the linear break the best results were observed with the abstention from the processing or during the simple dissection of the wounds, worst - with the dissection and the carving with the use/application of other elements of processing.

Almost the same results, as in injured people with the linear break, they were noted in injured people with the fragmented break, only in them poorest results were obtained after dissection with the carving and other elements of processing.

Somewhat different results in injured people with the crushed break: a great number of good indicators on the issues are noted after dissection with by carving or after one dissection alone less - after the complex processing (dissection, carving and other elements of processing) and least in all - with the abstention from the primary surgical processing.

Thus, with all breaks, except crushed, the best clinical issues are noted after dissection or abstention from the processing, and with the crushed breaks - when to the dissection was added another carving of wound.

The worse issues with all breaks, except those crushed, began, if to the dissection were added another carving of soft tissues or other elements of processing, and with the crushed breaks - with the abstention from the processing.

Table 373. Distribution of injured people with the bullet break of thigh according to the clinical issues in connection with the presence of the associated injuries (in the percentages).

(1) Группа раненых и ее удельный вес	(2) Клинический исход			
	(3) Хороша	(4) Деформация	(5) Поврежде- ние нервов	(6) Контракту- ра
(7) Без сопутствующих ранений (89,4)	12,4	1,5	3,8	47,8
(8) С сопутствующими ранениями (30,6)	10,6	2,1	5,5	41,5

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ангиоз	Локный су- став	Культи	Остеомизлит	Комбинация	Прочие	Итого	Умерло
7,1	0,6	13,1	5,8	6,1	2,0	100,0	12,0
7,0	0,5	16,8	5,3	7,0	3,7	100,0	21,0

Key: (1). Group of injured people and its specific gravity/1. (2). Clinical issue. (3). Good. (4). Strain. (5). Damage of nerves. (6). Contracture. (7). Ankylosis. (8). False joint. (9). Stump. (10). Osteomyelitis. (11). Combination. (12). other. (13). Altogether. (14). It died. (15). Without associated injuries. (16). With associated injuries.

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There is no doubt that in the group of the injured people, who were subjected to the complex processing (with the use/application of other elements/cells), were the more heavily injured people, although with similar breaks, than in other groups. However, it is not possible to count this group of that of especially aggravated, since into it entered only 31.10/o of all injured with the damage large vessels and 13.20/o - with the foreign bodies; remaining injured

people with the damage of large vessels and with the foreign bodies underwent another processing or did not undergo it at all.

Terminations in the presence of the associated injuries.

To what degree and in relation to what terminations exerted influence the accompanied break thighs of injury, it is represented in Table 373.

As can be seen from Table 373, clinical terminations in the presence of the associated injuries in the majority it gave the worse indicators, especially in the relation to lethality, which 2 times was almost more, and also stumps. The best indicators in the presence of the associated injuries were on the contracture, the ankylosis, false joint and osteomyelitis. One should add that the noted difference between these groups is explained not only by the presence of the associated injuries, but also by the entirely not identical with respect to the form/species of the break composition of injured people in these groups (Table 374).

In the group of injured people with the break of thigh and the associated injuries was somewhat more than the heaviest 6 (crushed) breaks, but it is less than fragmented ones and it is more than perforated ones and edge/boundary ones, i.e., on the whole the

difference in the severity of breaks was not especially essential. Therefore the worse clinical terminations in the presence of the associated injuries must be related mainly due to these additional injuries which to a considerable degree frequently complicated the course of break, and also they led to the lethal outcome.

If one considers that the breaks of thigh with the associated injuries were about 1/3 all breaks, then it is necessary to recognize that the associated injuries had a sizable effect on the general/common/total issues of the bullet breaks of thigh.

In 8.90/o of injured people the cracks, which are generated with the bullet breaks of femoral bone, penetrated the joint, causing supplementary complications, which in the clinical issues led to an increase in the number of ankylosis to 16.00/o instead of 7.00/o in all injured people with the break of thigh and to an increase in the number of those discharged with the stump to 26.00/o instead of 14.20/o in all injured people. Lethality and severity of the breaks in both these groups were almost identical.

Table 374. Distribution of injured people with the bullet break of thigh according to the form/species of break in connection with the presence of the associated injuries (in the percentages).

(1) Группа раненых	(2) Вид перелома	(3) Дырча- тый и красной	(4) Осколь- чатый	(5) Раздроб- ленный	(6) Попереч- ный, про- должный и косой	(7) Всего
(8) Без сопутствующих ранений . . .		19,1	45,6	13,7	21,6	100,0
(9) С сопутствующими ранениями . . .		20,9	38,3	17,1	23,7	100,0

Key: (1). Group of injured people. (2). Form/species of break. (3). Perforated and edge/boundary. (4). Fragmented. (5). Crushed. (6). Transversal, longitudinal and by scythe. (7). In all. (8). Without associated injuries. (9). With associated injuries.

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Arrangement and anatomical special features/peculiarities of the joint which penetrated cracks of bone, to a considerable degree affected complications and issues of break. Thus, upon the penetration of cracks into the hip joint lethality was more than twice higher (22.0o/o), than upon the penetration into knee joint (9.5o/o), and a number of discharged with the stump upon the penetration of cracks into the hip joint was considerably below (13.6o/o), than upon the penetration into knee joint (30.7o/o). A number of good issues was also more upon the penetration into knee

joint (12.0o/o), than into the hip (8.1o/o).

Issues in connection with the use/application of skeletal/skeleton stretching in the front hospitals ¹.

FOOTNOTE ¹. See also that 15 of this "Work", pg. 429, 448.

ENDFOOTNOTE.

Stretching (skeletal/skeleton and different) with the bullet breaks of thigh was applied at some fronts as the element/cell of the specialized aid, in connection with which giving of this aid from the army therapeutic institutions it moved into the front ones (50-200 km from the front line). This led to the late delivery/procurement of injured people into the specialized hospitals.

Thus, according to A. N. Berkutov's data (1944), of 1 466 injured people from bullet break of thigh, that obtained the specialized aid in the front region, it entered into the hospitals during 6 days after injury only by 55.2o/o. In the data of the deepened development of the histories of disease/sickness/illness/malady, the majority of injured people the specialized aid was shown/rendered during 6 days after injury.

In connection with the late delivery/procurement of injured

people into the specialized hospitals was observed a large number of complications of sepsis and anaerobic infection (Table 375).

Besides the late admission of injured people into the specialized hospitals, the difference in a quantity of the complications of sepsis and anaerobic infection can be partly explained by the fact that the stretching was applied only with the full/total/complete breaks, whereas among all injured people they were also with the incomplete break.

Table 375. Frequency of the complications of sepsis and anaerobic infection the injured people have with the bullet break of thigh with different methods of treatment in the front region (in the percentages).

(1) Группа раненых	(2) Осложнение	(3) Сепсис	(4) Анаэробная инфекция
(5) С применением вытяжения во фронтовом районе (А. Н. Беркутов)		11,7	4,4
(6) Все раненые во фронтовом районе (углубленная разработка историй болезни)		4,1	1,8

Key: (1). Group of injured people. (2). Complication. (3). Sepsis. (4). Anaerobic infection. (5). With use/application of stretching in front region (A. N. Berkutov). (6). All injured people in front region (deepened development of histories of disease/sickness/illness/malady).

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For the comparison of the results of treatment with the use/application of stretching in the front region and without its use/application are given clinical issues in injured people with the bullet break of thigh, that obtained injury at the adjacent fronts, which fulfilled analogous combat missions under the similar conditions (Table 376).

As can be seen from table 376, in injured people at the 3rd Belorussian front where the specialized aid with the use/application of stretching proved to be in the front region, false joints and stumps was more, and lethality was higher than in injured people at the adjacent fronts. This cannot be related wholly due to the use/application of stretching in the front region, since the heaviest (crushed) breaks at this front it was considerably more than at other fronts (table 377).

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Table 376. Clinical issues the injured people have with the bullet break of thigh, that obtained injury at the different fronts (in the percentages).

(1) Фронт	(2) Клиниче-ский исход							
	(3) Хоро-ший	(4) Контрак-тура	(5) Ложная сустав	(6) Ступня	(7) Остеоми-елит	(8) Прочие	(9) Итого	(10) Леталь-ность
(11) 1-й Белорусский	15,5	46,5	0,5	18,8	4,1	14,8	100,0	13,5
(12) 2-й Белорусский	9,4	43,2	1,4	13,0	7,2	25,8	100,0	13,1
(13) 3-й Белорусский	10,5	39,5	1,9	24,1	4,3	19,7	100,0	16,5
(14) 1-й Прибалтийский	13,7	48,6	1,4	16,9	4,3	15,1	100,0	14,2
(15) 2-й Прибалтийский	9,9	48,5	—	17,4	3,8	20,4	100,0	10,8

Key: (1). Front. (2). Clinical issue. (3). Good. (4). Contracture. (5). False joint. (6). Stump. (7). Osteomyelitis. (8). Other. (9). Altogether. (10). Lethality. (11). 1st Belorussian. (12). 2nd Belorussian. (13). 3rd Belorussian. (14). 1st Baltic. (15). 2nd Baltic.

Table 377. Distribution of injured people with the bullet break of thigh, that obtained injury at the different fronts, according to the form/species of break (in the percentages).

(1) Фронт	(2) Вид перелома	(3) Дырчатый и краевой	(4) Оскольча- тый	(5) Раздроб- ленный	(6) Прочие	(7) Всего
(1) 1-й Белорусский		25,3	41,0	14,4	19,3	100,0
(2) 2-й Белорусский		26,2	42,4	10,2	21,2	100,0
(3) 3-й Белорусский		21,3	38,0	25,0	17,7	100,0
(4) 1-й Прибалтийский		23,4	42,8	15,5	18,3	100,0
(5) 2-й Прибалтийский		23,5	44,9	14,0	17,6	100,0

Key: (1). Front. (2). Form/species of break. (3). Perforated and edge/boundary. (4). Fragmented. (5). Crushed. (6). Other. (7). In all. (8). 1st Belorussian. (9). 2nd Belorussian. (10). 3rd Belorussian. (11). 1st Baltic. (12). 2nd Baltic.

Table 378. Number of injured people with the bullet break of thigh in autumn-winter period, a number of injured people with fragmentation and with the blind-end injury at the different fronts (in the percentages).

(1) Группа раненых	(2) Фронт	(3) 1-й Бело- русский	(4) 2-й Бело- русский	(5) 3-й Бело- русский	(6) 1-й При- балтийский	(7) 2-й При- балтийский
(8) Раненые с октября по март (включительно)		38,0	69,9	67,0	57,0	52,3
(9) Раненные осколком		43,4	44,1	40,5	49,8	48,4
(10) Раненные со слепым ранением		38,5	36,6	30,0	30,7	35,6

Key: (1). Group of injured people. (2). Front. (3). 1st Belorussian. (4). 2nd Belorussian. (5). 3rd Belorussian. (6). 1st Baltic. (7). 2nd Baltic. (8). Injured people from October through March (inclusively). (9). Wounded by fragment. (10). Injured people with blind-end injury.

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Consequently, with almost identical to other fronts number of incomplete breaks at the 3rd Belorussian front was noted a considerably larger (almost to 2 1/2 times) quantity of crushed breaks and it is smaller - fragmentation and linear breaks.

Besides this, the injured people of the 3rd Belorussian front obtained the break of thigh in the autumn-winter period somewhat more

frequently than other injured fronts (except the 2nd Belorussian) (Table 378).

In the relation to a number of fragmentation and blind-end injuries at the 3rd Belorussian front it was more happily than at the adjacent fronts.

The average value of shortening during the treatment stretching in the front region was more (4.7 cm), than in all injured people, who were putting to use stretching in the different regions (4.4 cm); more lasting there was also the average duration of treatment during the use/application of stretching in the front region (207 days), than in all injured people with the bullet break of thigh (183 days).

Thus, among the injured people with the bullet break of thigh, in whom was applied the stretching in the front therapeutic institutions, in comparison with the injured people, with which is not produced the stretching in the front region, was observed a larger number of heaviest (crushed) breaks. Among these injured people there was a considerable quantity of those obtained damages in the autumn-winter period, and a quantity of fragmentation and blind-end injuries in them was less.

Heavier clinical course and worse results with the extraction

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from the hospital in injured people, treated by stretching in the front region, should be, first of all, explained the presence among them of a large number of crushed breaks.

As far as aid is concerned specialized in the front region in the form of extension, then it a positive role both in the relation to a reduction in the quantity of early complications and in the relation to the best clinical issues it did not play.

Table 379. Distribution of injured people with the bullet break of thigh according to the clinical issues during the different years of war (in the percentages).

(1) Год войны	(2) Клинический исход	(3) Хороший	(4) Деформации	(5) Повреждение нервов	(6) Конт. гангура	(7) Анкилоз
(17) Первый		10,3	3,2	4,7	46,6	6,8
(18) Второй		11,3	1,9	4,8	46,0	7,4
(19) Третий		12,6	1,3	4,3	44,6	6,9
(20) Четвертый		12,4	0,8	3,6	46,1	6,9

(8) Лоп- ный су- став	(9) Рука		(12) Остео- миелит	(13) Комби- нация	(14) Прочие	(15) Итого	(16) Умерло
	(10) хоро- ший	(11) плохой					
0,6	6,8	3,0	7,4	7,1	3,5	100,0	13,2
0,1	10,0	2,9	5,2	7,3	3,1	100,0	14,8
0,6	11,6	2,3	6,2	7,1	2,5	100,0	22,6
0,9	16,7	2,7	4,3	4,1	1,5	100,0	14,3

Key: (1). Year of war. (2). Clinical termination. (3). Good. (4). Strain. (5). Damage of nerves. (6). Contracture. (7). Ankylosis. (8). False joint. (9). Stump. (10). good. (11). poor. (12). Osteomyelitis. (13). Combination. (14). Remaining. (15). Altogether. (16). It died. (17). The first. (18). The second. (19). The third. (20). The fourth.

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Outcomes of wounded during different war years.

From that presented in the preceding/previous chapters it follows that a number of many complications of the bullet breaks of thigh was increased with the years of war. In connection with this it is important to analyze clinical issues on the years of war (Table 379).

Judging according to the data, given in Table 379,

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insignificantly were improved within the time of war the following clinical issues: good, strains, damage of nerves, osteomyelitis and combinations; simultaneously with this occurred an increase in the number of those amputated (2 times) and somewhat increased lethality (by 1.15/o). This should be placed in connection/communication with certain increase in the severity of injuries during war (Table 380).

An increase in the years of the war of a number of injured people in each group, represented in Table 380, on the whole was small and did not exceed 5.80/o (group with the presence of foreign bodies), but the growing heavy of wound processes could be considerable during the combination of these unfavorable moments. Thus, it is known that with the fragmentation injuries the foreign bodies were encountered more frequently than with the bullet ones. It was above indicated also, with the fragmentation and associated injuries was noted more than the crushed breaks, etc.

The conducted measures of preventive and therapeutic character/nature conditioned improvement toward the end of the war of the indicators on the series/number of clinical issues.

Deserves attention the comparison of clinical issues with the extraction with the distant issues (author's development).

The distant results of the treatment of injured people with the bullet break of thigh were studied with the aid of the sent out by injured person questionnaires, majority of which was filled by doctors of the place of the residence of injured people. Average duration of observation after injury - 4 year 1 month. Examination/inspection underwent the group of injured people with the the full/total/complete break of thigh.

In 18.40/o of inspected injured people after the repeated processing of wound was applied skeletal traction, in remaining (81.60/o) the treatment was conducted only by anechoic gypsum bandage. In this case in 21.60/o of injured people the bandage was superimposed following the radical surgical processing of wound with the removal/distance of free bone scrap and the stitching of the edges of skin section/cut to the muscles, in 12.50/o - after early subperiosteal resection and in 47.50/o - after more palliative interventions.

Table 380. Frequency of the fragmentation and associated injuries, crushed breaks and injuries with the foreign bodies the injured people have with the bullet break of thigh during the different years of war (in the percentages).

(1) Группа раненых	(2) Год войны			
	(3) Первый	(4) Второй	(5) Третий	(6) Четвертый
(7) С осколочными ранениями . .	43,4	42,3	44,4	46,2
(8) С сопутствующими ранениями	28,6	30,2	32,1	30,6
(9) С раздробленным переломом .	13,9	14,3	15,6	14,8
(10) С наличием инородных тел .	44,5	42,6	45,0	50,3

Key: (1). Group of injured people. (2). Year of war. (3). The first. (4). The second. (5). The third. (6). The fourth. (7). With fragmentation injuries. (8). With associated injuries. (9). With crushed break. (10). With presence of foreign bodies.

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In the sent responses/answers into 2.40/o there were communications/reports about death of the wounded from the different diseases internal organs/controls (pulmonary tuberculosis, typhoid fever, etc.). The information about the remaining injured people is represented in Table 381 (data of author's development).

As can be seen from Table 381, during the author's development of the issues of the treatment of the bullet breaks of thigh were

considered separate complications without every combinations their.

In all injured people, inspected through several years after extraction of latter/last hospital, wound and ulcer healed, while up to the moment/torque of extraction the unhealing wounds were stated/established in 5.80/o of all injured people.

With the extraction almost in the half all injured people (46.60/o) howled discovered the strain on the spot of break. However, through several years the number of strains decreased to 27.50/o. Evidently, here has a value the resorption of excess callus and the rearrangement of the architectonics of bone. Return to the peaceful work and to the customary domestic circumstances has a favorable effect on the health of injured person; because of the motions in the labor process is improved the blood supply of the extremity: if bending of extremity is absent, strain on the spot of break gradually disappears.

Was lowered also a quantity of contractures. With the extraction from the hospital the considerable limitation of motions in the joints of the affected extremity (predominantly in the knee joint) was observed in 70.00/o of injured people. In the course of time under the effect of the motions, and also after the use/application of gymnastics, massage, physio- and balneotherapy difficulty of

movement in the joints in 36.70/o of injured people either was eliminated completely or considerably it decreased.

In 5.00/o of injured people with the bullet break of thigh the affected extremity continued to remain ankylosed.

Osteomyelitis in the region of break with the extraction from the hospital was stated/established in 23.30/o of injured people. This complication proved to be most stable and it is difficult to those yielding to treatment. Upon the examination/inspection of the same group of injured people the course of osteomyelitis proved to be those not finished or by that recurred through several years on the spot of the old break - into 21.60/o.

Table 381. Frequency of the separate clinical issues of the bullet breaks of thigh with the extraction of injured people and within the distant periods (on the average through 4 years 1 month) (in the percentages to a number of inspected injured people).

(1) Клинический исход	(2) Частота осложнений	
	(3) при выписке	(4) при последующем опросе
(5) Незажившая рана	5,8	0
(6) Деформация	46,6	27,5
(7) Контрактура	70,0	33,3
(8) Анкилоз коленного сустава	6,6	5,0
(9) Анкилоз тазобедренного сустава . .	1,7	0
(10) Остеомиелит	23,3	21,6
(11) Ложный (новый) сустав	1,7	0,8
(12) Культи хорошая	7,5	7,5
(13) Культи плохая	2,5	2,5
(14) Последствия повреждения нервов .	13,3	13,3

Key: (1). Clinically issue. (2). Frequency of complications. (3). with extraction. (4). with subsequent inquiry. (5). Unhealed wound. (6). Strain. (7). Contracture. (8). Ankylosis of knee joint. (9). Ankylosis of knee joint. (10). Osteomyelitis. (11). False (new) joint. (12). Stump good. (13). Stump poor. (14). Consequences of damage of nerves.

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Injured people with the false or new joint from the hospitals they did not usually discharge. The continuity of bone in this group of injured people was reduced in the specialized hospitals or in the institutes of restorative surgery. However, when injured people

categorically rejected the operation/process, it was necessary to discharge them, without subjecting by the latter. Such injured people proved to be little - 1.7o/o. Through several years a number of injured people with this complication because of the operation/process decreased half (0.8o/o).

As the illustration of that, how good with the persistent wish of patient it is possible to attain the reliable immobilization of pseudarthrosis by orthopedic apparatus, can serve the following observation.

S. obtained the perforating bullet injury of upper third of left thigh of 24/11 1944. Next day on DMP was produced primary surgical processing with the subsequent evacuation into the front rear where 4/IV apropos of suppurative infection under the cerebrospinal anesthesia was produced the expanded operation/process with the resection of thigh. The subsequent treatment was conducted in the gypsum bandage which was taken/removed during September 1944, moreover it turned out that the break did not grow together itself. 10/11 1945 injured person with pseudoarthrosis and resistive extended contracture of knee joint was equipped with orthopedic foot-wear, by splint and it was tempered home. About the future testifies the letter of patient which it is brought in the delays; letter is dated 6/1 1948: "I am the invalid of 111 groups. With the aid of the

apparatus successfully I am moved. The shortening of extremity - 8 cm, and therefore I also put to use orthopedic foot-wear. I walk with the bacillus/rod (I limp insignificantly with the large efforts/forces and the pains). With the aid of the baths I developed knee joint and now he bends to 90°. Foot considerably dried. Blood circulation is normal. Nerves are not damaged. Swellings barely is observed. Work I by the dispatcher of plant. For me it is necessary to walk daily on 5 km, and it occurs also to 10 km, since work is connected with the walking. It is necessary to acknowledge that with the teaching to walk I lost much time and forces, moreover with the large pains. Year was barely removed/taken apparatus and it fell and walked in it. Local surgeons proposed to graft/transplant to me bone, but I fear to risk".

In 10.00/o of injured people the inspected group the extremity was amputated. The distant observations showed that the relationship/ratio of a number of good stumps and number of poor ones did not change. The consequences of the damage of nerves also remained unchanged.

As far as function is concerned of injured extremity, then the study of form material revealed/detected that 16.30/o of injured people put to use extremity, without limping; 26.90/o - walk with the bacillus/rod, but 17.30/o - put to use prosthesis or orthopedic

foot-wear. On the crutches through several years after break walked 8.6o/o more of injured people, right/law, not due to the poor consolidation of break, but mainly due to the amputation, the consequences, connected with the injury of large/coarse nerve trunks, and, it is thinner/less frequent, as a result of the large shortening. 30.9o/o of injured people about the function extremity did not answer.

For V. G. Weinstein it was also possible to trace the fate of those obtained the bullet break of thigh in the war with the White Finns (1939/40 g.). According to his data, 1-1 1/2 years after injury by 48.0o/o of injured people they walked without the bacillus/rod, 39.0o/o - with bacillus/rod 12.5o/o were moved with the aid of the crutches, and 0.5o/o were found on the bed mode/conditions.

During the comparison of data of the author and data of V. G. Weinstein one should consider that the groups of injured people and the periods of their examination/inspection are not identical.

The ability to work of the injured people, who transferred the bullet break of thigh, was studied by P. R. Bogdanov (1948), which explained that it returned to usual work 37.2o/o of injured people, changed profession 39.2o/o, it does not work on disablement 17.8o/o and is continued treatment 5.8o/o. It needed treatment 19.7o/o of

injured people.

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Terminations in different age groups.

Value of the age of injured did not remain without effect on the course and the issues of the bullet breaks of thigh (Table 382).

The best indicators on many clinical issues (on good results, contractures, false joints and stumps) were in injured people to 29-year age inclusively despite the fact that in this group of the crushed and fragmented breaks was not less than in other groups.

Periods of the formation of the callus.

Before the war about the periods of consolidation knew little and that only in the relation to the closed breaks. From the work of the Soviet authors should be noted the article of I. Ye. Kazakevich and S. Ye. Kashkarov. The authors arrived at the conclusion that the average period of fixation in the gypsum bandage with the closed breaks composes for the adult 75.4 days.

In the problem of the healing of fractures and effect of

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different factors on the formation of the callus first of all it is necessary to note the value of the in proper time initiated specialized surgical treatment. The earlier injured person entered the specialized hospital, that within the shorter periods began consolidation.

Table 382. Clinical issues the injured people have with the bullet break of thigh in the different age groups (in the percentages).

(1) Группа раненых по возрасту	(2) Клинический исход									
	(3) Хороший	(4) Повреждение нервов	(5) Контрактура	(6) Анкилоз	(7) Ложный сустав	(8) Культи	(9) Остеомиелит	(10) Комбинированный	(11) Прочие	(12) Итого
(13) До 29 лет	13,4	4,7	45,4	6,3	0,6	13,5	6,1	5,0	5,0	100,0
30—39 "	10,5	5,4	46,1	7,5	0,8	14,4	4,7	7,9	2,7	100,0
(14) 40 лет и более	11,1	1,1	50,2	7,4	0,5	16,9	4,8	6,1	1,9	100,0

Key: (1). Group of injured people on the age. (2). Clinical issue. (3). Good. (4). Damage of nerves. (5). Contracture. (6). Ankylosis. (7). False joint. (8). Stump. (9). Osteomyelitis. (10). Combinations. (11). Other. (12). In all. (13). Of up to 29 years. (14). years and more.

Table 383. Distribution of injured people with the bullet break of thigh according to the periods of the formation of the callus (according to the data of the deepened development and according to the data of the Sverdlovsk institute of restorative surgery) (in the percentages).

(1) Данные	(2) Срок образования костной мозоли	(3)	(4)	(5)	(6)	(7)	(8)
		3 месяца	4—5 месяцев	6 месяцев и более	Сращения не наступи- ло	Всего	В сред- нем
(9) Углубленной разработки		62,1	26,1	11,4	0,4	100,0	3,2
(10) Свердловского института восстановительной хирур- гии (Ф. Р. Богданов) . .		37,9	49,8	6,8	5,5	100,0	—

Key: (1). Data. (2). Period of formation of callus. (3). month. (4). months. (5). months and more. (6). Adhesion did not set in. (7). In all. (8). On the average. (9). Deepened development. (10). Sverdlovsk institute of restorative surgery (F. R. Bogdanov).

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Fig. 135. Osteomyelitis of tibia as a result of its bullet break. Break grew together itself badly/poorly. On the spot its cavity with pus and sequestrations. Sclerotization of the ends of the scrap. Extensive periosteal layerings; the suppurative fistulas, which penetrate soft tissues.

(Artist V. S. Chumanova.).

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On the basis of the deepened development of the histories of disease/sickness/illness/malady, among the explained hospital issues of the bullet breaks of thigh are established/installed the different periods of consolidation; in Table 383 they are compared with the periods of the consolidation of such breaks based on materials of clinical institute.

According to the data of P. R. Bogdanov, who led by the hospital of restorative surgery, in which were concentrated most heavily injured people, proved to be increased both the periods of consolidation and the percentage of the not-grown-together breaks.

Based on materials of the author's development of histories the diseases/sicknesses/illnesses/maladies, the consolidation little

depended on the level of break. The bullet breaks of lower third of thigh on the average on 5 days were consolidated more rapid than the breaks in middle and upper third of thigh.

L. A. Rabinovich noted that the consolidation in lower third of thigh, being good almost in all injured people, began within the later periods.

It is completely logical that the periods of consolidation depended on the procedure of treatment. Was produced the development of the specially selected histories of the disease/sickness/illness/malady of injured people with the bullet break of thigh, treated not later than 4 weeks after injury by the radical processing of bone (according to V. S. Levit) and by the method of the removal/distance of free bone fragments; it turned out that the consolidation most rapidly began after the treatment of the bullet breaks of thigh by the economical processing of bone. Based on materials of the author's development of the histories of disease/sickness/illness/malady it was explained that after the early radical resection of thigh the consolidation began on the average 124 days, but after the economical treatment of bone - during 108 days.

The character/nature of therapeutic immobilization also influenced the periods of consolidation. For V. P. Kolosovskoy (of

the clinic of A. T. Lidskiy) during the treatment with the use/application of skeletal/skeleton stretching consolidation began more slowly than during the utilization of a gypsum bandage. Thus, in the first five months consolidation during the treatment by gypsum bandage began in 73.40/o of injured people and in 63.40/o - during the treatment by skeletal/skeleton stretching; V. P. Kolosovskaya, apparently began treatment with skeletal/skeleton stretching within the later periods.

If we compare the periods of consolidation during the early (V. S. Levit) and late (Ya. M. Bruskin) resections, then advantage remains after the first. The bullet breaks of the thigh in injured people by which the resection was produced in the first four weeks, were consolidated in 17.8 weeks, and during the later resections - in 20.2 weeks (on the author's development).

Ya. M. Bruskin, P. R. Bogdanov, A. T. Lidskiy, I. M. Levintov et al. noted that in the presence of osteomyelitis the consolidation began considerably later. The necrosis of the fragments of the broken thigh and the presence of the sequestrations between them were subject to radical intervention with the subsequent reposition and they for a long time detained the formation of durable callus.

However, was frequently necessary to observe the formation of

the callus in parallel with the very extensive sequestration, as is evident from Fig. 135, which relates to injured B.

For V. P. Kolosovskaya in the group of breaks with the chronic suppurative infection the formation of the callus began on the average after 258 days. P. R. Bogdanov calculated, that the small-splintered breaks, treated by skeletal/skeleton stretching, in the absence of osteomyelitis were coalesced on the average on 44 days of earlier than the same breaks, complicated by osteomyelitis. The even larger difference (64 days) within the periods of consolidation (based on materials of the same author) proved to be in the group of large-splintered breaks.

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According to the data of the deepened development of the histories of disease/sickness/illness/malady, the period of consolidation in the presence of osteomyelitis was lengthened on the average for 1.1 months. The delay/retarding/deceleration of the formation of the callus with terminal osteomyelitis of thigh depended on the duration of osteomyelitic process, its vastness, character/nature and period of operational intervention, changes in the soft tissues of thigh around the break and the general state of injured people.

Repeated breaks of thigh.

Based on materials of the deepened development of the histories of disease/sickness/illness/malady in 0.80/o of injured people with the bullet break of thigh was noted repeated break. Most frequently (0.90/o) this complication was encountered in 1941-1942, when questions of the immobilization of bullet breaks were still insufficiently depleted.

The most essential reasons for the onset of repeated break they were: it is insufficient prolonged and intermittent immobilization, poor comparison of basic scrap of bone and inflammatory process in the place of break. Is worthy attention the fact that in 41.40/o of injured people in whom was observed repeated break, was applied in this or other form/species stretching, which usually led to the intermittent immobilization.

Among the separate groups of injured people repeated breaks by the different authors were observed more frequently than according to the data of the deepened development of the histories of disease/sickness/illness/malady. Thus, L. S. Khavkin saw repeated breaks in 7.90/o of injured people with the infected break of thigh,

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and V. G. Weinstein (1939-1940) - in 10.00/o of the same injured people, who were being treated of year.

2.50/o of the injured people, traced after extraction from the hospital during 4 years, to the materials of the author's development of the histories of disease/sickness/illness/malady, had repeated breaks.

Of 95 injured people, operated by Ya. M. Bruskin, 4 entered to it conversely with the repeated break on the spot for the callus after the subperiosteal resection of thigh. All these refractures grew together themselves as the usual closed breaks during 6-8 weeks.

B. P. Kirillov for the elongation/extent of up to one-and-a-half years and more traced the fate of 35 injured people, who were discharged from hospital, and observed repeated break in one injured person.

Repeated breaks usually were coalesced well in the course of 1-1 1/2 months.

In the propaedeutic surgical clinic of the Moscow medical institute of the Ministry of Public Health of the RSFSR (head I. L. Faerman) L. N. Bolkhovitinova observed 3 injured people with the

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repeated break. These injured people, discharged from hospital through 9 1/2 months after injury and moved with the aid of two crutches, obtained repeated break with the incidence/drop. "This coincidence of the facts of trauma, writes L. N. Bolkhovitinova, is not by chance. It shows that under conditions of a similar hospital the defective corn proves to be sufficient, and with the extraction of this injured person the first trauma revealed/detected incompetence of corn, and came turning point".

The inferiority of the callus, in the opinion of L. N. Bolkhovitinovaya, could depend on the series/number of the reasons: 1) the short period, which passed after the first break; 2) the delayed consolidation of the first break (different etiology); 3) the incorrect intergrowth of the first break; 4) the large bone defect, which accompanied the first break.

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As the reasons, which contributed to the delayed consolidation of corn, they had a value both general/common/total and local factors. Among the general/common/total reasons great effect exerted the disturbance/breakdown of calcium metabolism/exchange, starvation, avitaminosis; among the local ones - incorrect intergrowth of scrap, osteomyelitis and insufficient sparing of periosteum during the

radical surgical processing of the bullet break of thigh.

Incorrect intergrowth either conditions the formation of defective corn, and then repeated break occurs in the region of the latter, or it disturbs the architectonics of bone near the corn as a result of a change in the axis of extremity and incorrect load distribution, and then thigh is broken above or under the corn (L. N. Bolkhovitinova).

The having obtained widespread use in the Great Patriotic War subperiosteal resections led to the formation of long, but not always reliable on their strength regenerates, an example of which can be the following observations.

T., 30 years, during January 1944 obtained the bullet break of thigh. At DMP is made primary processing with the removal/distance of a large quantity of fragments. During March and August of 1944 were conducted extensive operations/processes apropos of heavily flowed/occurred/lasted osteomyelitis.

In injured person was formed the defect of bone in 18 cm. In 15 months the ends of the scrap were connected by thin bone regenerate. Through 2 years of 8 months the injured person was delivered into the propaedeutic surgical clinic with the repeated break in the region of

the regenerated bone (Fig. 139).

24. 26 years, during October 1942 obtained the bullet break of thigh in lower third, which was complicated subsequently by osteomyelitis. It was discharged from hospital during January 1945 with the fistula, the ankylosis of knee joint and the shortening in 9 cm. With the bacillus/rod it began to walk only during July 1945, although the orthopedic foot-wear was obtained during February 1945.

During April 1946 it fell and was obtained the break of knee cap; due to the ankylosis in the joint to join it they did not begin, in spite of the considerable disagreement of fragments.

16/XI 1947 after insignificant trauma with the incidence/drop on the street, obtained the break of right thigh and it was delivered into the clinic.

In the X-ray photographs is visible the well consolidated break in lower third of thigh, and in the region of trochanters fresh break without the displacement of scrap; focuses attention sharp osteoporosis of bone, especially demonstrative during the comparison of the X-ray photographs of the broken and healthy/sound thigh (Fig. 140).

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There is no doubt, that the break of knee cap and the thighs, which began in $\bar{z}h$ in the different time and in the considerable distance from the first bullet break, occurred as a result of the pathological state of bone tissue, which was expressed in the mass resorption of bone beams/gullias. G. A. Zedgenidze considered that this type of osteoporosis begins as a result of many reasons among which has a value prolonged functional inactivity.

Studying the structure of bone in such injured people in the X-ray photographs, G. A. Zedgenizde revealed/detected: 1) the appearance of macroloop figure of bone, 2) an increase in the marrow canal, 3) thinning cortical layer, 4) spongiositis of cortical layer and 5) sharply pronounced of the edge of cortical layer, appear in connection with the abnormal porosity bones. It goes without saying that in injured people whose described changes sharply disturbed the strength of bone, repeated break could occur under the effect of the completely insignificant trauma.

Duration of hospital treatment.

The duration of the stay in the hospitals of injured people with the bullet break of thigh, according to the data of the deepened development of the histories of disease/sickness/illness/malady, proved to be on the average of the equal to 183 days.

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The majority of injured people were treated from 121 to 180 days. In the absence of the associated injuries the average duration of hospital treatment was 181 days, while with the associated injuries - 190 days.

Of the special dependence of the periods of hospitalization on the age of injured people, apparently it was not, as is evident from Table 384.

It is established/installed, that the periods of the hospitalization of injured people with the bullet break of thigh were the more lastingly, the later was started specialized treatment. Based on materials of S. A. Botashev in the group of the injured people, who began the specialized treatment in the course of the first month, the duration of hospital treatment was from 114 to 130 days; injured people, whose transition from the temporary/time immobilization by standard splints and casts to the therapeutic immobilization was realized later than the month, they lay in the hospitals from 127 to 170 days.

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L. L. Tuminyuk in 1943 was specially sent on mission by sanitary control of one of the fronts depthward of the country for studying the issues of the treatment of the bullet breaks of thigh. He inspected 150 injured his front and 200 other injured fronts and explained that in 47.9o/c duration of treatment was on the average 115 days from the moment/torque of injury; in 34.2o/o - 150 days and in 17.9o/o it exceeded 150 days. According to S. R. Mirotvortsev's data (Saratov hospitals), the average period of the treatment of the bullet breaks of thigh during the first year of war was equal to 169 days. Toward the end of the war on many back hospitals was established/installed the almost identical period of the duration of treatment - 140-150 days after injury. Thus, for instance, average duration of treatment in the evacuation hospitals of Daghestan with the bullet breaks of thigh (S. Yu. Alibekov) comprised in 1944 142 days from the moment/torque of injury, in the evacuation hospitals SIBVO - from 145 to 197 days (A. I. Manuylov).

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Table 384. Distribution of the recovered injured people with the bullet break of thigh without the associated injuries in the different age groups (in the percentages).

(1) Группа раненых по возрасту		(3) до 60	61-90	91-120	121-150
(3)	(4)				
До 29 лет		2,1	5,7	12,3	16,0
30-39 "		0,9	7,1	13,7	17,3
40 лет и более	(7)	1,7	4,8	16,3	20,7
(8) В среднем . .		1,6	5,7	13,5	17,3

(2) Число дней						(5) Всего
151-180	181-210	211-240	241-270	271-300	301 и более (4)	
18,2	12,7	10,9	7,2	4,9	10,0	100,0
19,1	11,6	8,1	7,0	4,6	10,6	100,0
16,6	12,7	9,9	5,5	4,8	7,0	100,0
18,2	12,3	9,7	6,7	4,9	10,1	100,0

Key: (1). Group of injured people on the age. (2). Number of days.
 (3). to. (4). and more. (5). In all. (6). years. (7). years and more.
 (8). On the average.

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Fig. 139. T., 30 years break in region of regenerated bone after bullet break of left thigh.

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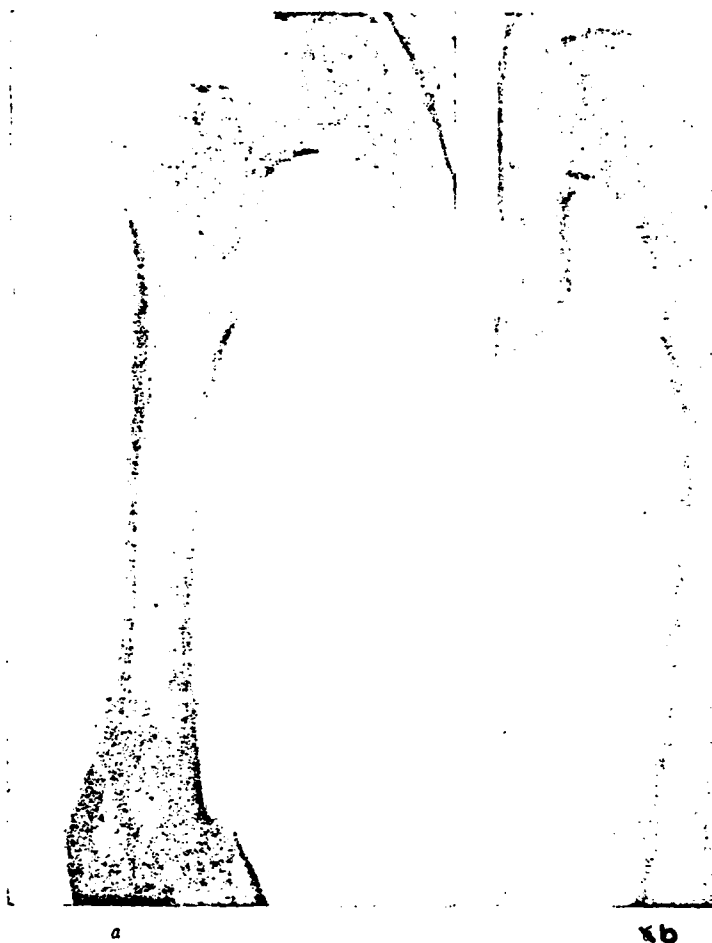


Fig. 140. 24, 26 years a) closed break of neck of right thigh 2 years and 5 months after consolidation of break in extremity 1/3 of the same thigh; b) left thigh for comparison.

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The duration of treatment depending on the level of break was traced by S. A. Botashev. It found that in the first place from the duration of treatment they stood the breaks of thigh in upper third (190 days), on the second - in lower third (176 days) and on the third - in middle third (166 days).

According to the data of the deepened development of the histories of disease/sickness/illness/malady, in the presence of osteomyelitis the period of the stay of injured people in the hospitals on the average was increased on 48 days. P. R. Bogdanov determined, what in the back hospitals average period of the stay proved to be equal to 187 days, and in injured people with osteomyelitis - 253 to days. In the separate hospitals the periods were considerably above. Evidently, this was explained by concentration in them heavily injured people, and possibly, and fact that during the statistical calculations were eliminated the dead persons.

Many injured people and after extraction from the hospital were continued to be treated. B. P. Kirillov succeeded in tracing during one-and-a-half years and it is more the fate of 35 injured people with the bullet break of thigh, who were discharged from the hospital in which it worked, moreover only 17 people did not need further treatment; 16 walked into the dispensary to the dressings, but 2 it

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was necessary again to lie into the hospital.

The general/common/total duration of disablement with the bullet breaks of thigh, on the calculations of A. M. Naravtsevich, proved to be equal to 14 1/2 months.

Lethality.

The bullet breaks of thigh are more frequently than the bullet injuries of many other localizations, they led to death.

The reasons for death in injured people with the bullet break of thigh were following (in the percentages): anaerobic infection - 40.1, sepsis - 25.9, shock - 13.1, hemorrhage - 5.6, the disease of internal organs/controls - 4.0, the injuries, incompatible with the life, 1.8, pneumonia - 1.7, the combination of the enumerated reasons - 7.4, osteomyelitis - 0.4. Thus, only in 1.80/o of dead persons death began only as a result of the severity of injury. In all remaining injured people came to light severe complications, among whom most of all it was necessary to the gas infection, the sepsis and the shock. These complications were conditioned on diverse reasons, as is evident from the following presentation.

The value of lethality was dissimilar with the different breaks;

it on the whole corresponded to the severity of break (Fig. 141).

Highest lethality, according to the data of the deepened development of the histories of disease/sickness/illness/malady, proved to be with the crushed breaks of thigh and the lowest - with the edge/boundary ones and impacted.

Lethality with the bullet breaks of thigh not different levels was dissimilar. To this paid attention already N. I. Pirogov, who considered that during the "saving" treatment the breaks upper third give the best results, than breaks middle third; after early amputation with the breaks of upper third results were more badly than during the "saving" treatment. General/common/total reference data in N. I. Pirogov are not given.

At present during the use/application of the combined treatment the greatest lethality is noted with the breaks in upper third (A. V. Melnikov, V. G. Weinstein, A. M. Brook, S. A. Botashev).

Apart stand A. P. Avtsyn's data, who studied the sectional material of 190 dead injured people with the bullet break of thigh, after excluding the damages of hip and knee joint. It obtained the following numerals: 38.00/o of the number of dead persons fall on the injured people with the bullet break of upper third of thigh, 40.00/o

- average/mean and 22.00/o - lower third of thigh.

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Data of the deepened development of the histories of disease/sickness/illness/malady confirm the observations of authors' majority about the fact that the highest lethality was noted with the breaks upper third. For example, after the exception/elimination of the breaks, which penetrate into the joint, and also with the associated injuries it turned out that the greatest lethality was with the breaks in upper third, and smallest - in lower third, which completely corresponds to the frequency of the complications of anaerobic infection, sepsis and osteomyelitis in the breaks at the different levels (see the appropriate chapters). In this case most frequently the cause of lethality with the breaks in upper third in comparison with middle and lower thirds there was the sepsis. It is known that the septic foci in upper third of thigh on the anatomical ones by conditions were with more difficulty distinguished also during the use/application of palliative operations/processes were poorly cured; whereas the removal of extremity with the breaks in the upper third as more difficult in the technical sense it was accepted more rarely than with the breaks of another localization.

These should be explained the highest lethality with the breaks

in upper third. Lethality and frequency of amputations with the bullet breaks on different levels of thigh were located in a strict inversely proportional dependence, and therefore it is difficult to solve, at what level the bullet breaks of thigh flowed/occurred/lasted more heavily.

The contemporary treatment of the bullet breaks of thigh, realized by the timely wide disclosure/expansion of suppurative focus on the spot of the break with the use/application in the necessary cases of subperiosteal resection, with the breaks middle and lower third found more wide application than with the breaks upper third.

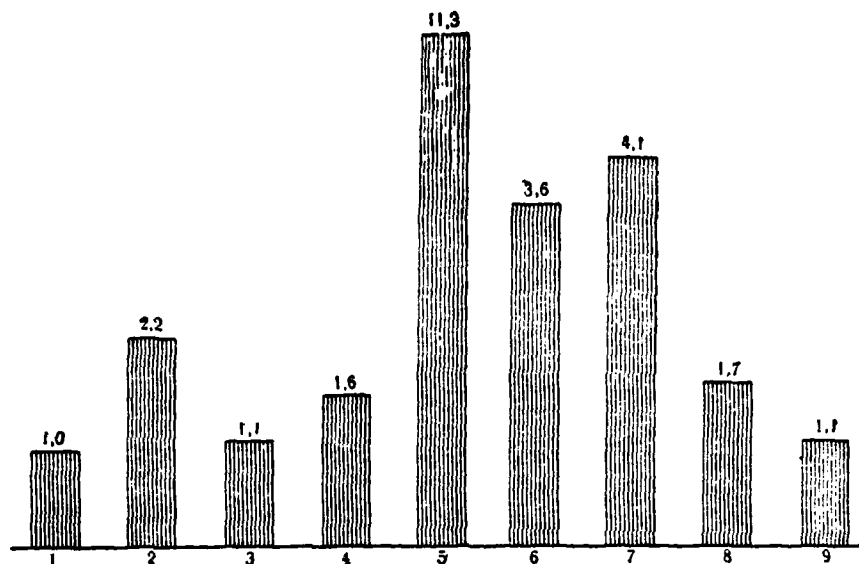


Fig. 141. Lethality with different the breaks of the bones of extremities. 1 - perforated; 2 - transversal; 3 - longitudinal; 4 - by scythe; 5 - fragmented; 6 - large-splintered; 7 - small-splintered; 8 - edge/boundary; 9 - packed in. (Lethality with the perforated break it is accepted as 1.0).

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Clinical issues in injured people with the bullet break of the bones of shin.

Major of medical service L. S. Kravchenko.

Issues in the previous wars.

In the past wars, including in the first world war, the specific gravity/weight of the bullet breaks of the bones of shin among the bullet breaks of the bones of extremities was very significant, but literature data regarding the bullet breaks of the bones of extremities in the first world war carry the accidental, interrupted/fragmentary character/nature (S. R. Mirotvortsev, B. V. Berlatskiy, N. A. Krotkina, I. A. Tikhomirov, etc.).

The only work, which lights the directly bullet breaks of the bones of shin in the first world war, is published only in 1937 and belongs to N. I. Shaviner.

N. I. Shaviner's work is based on the analysis of 127 injured people with the bullet break of the bones of shin, which passed in 1916-1917 through the infirmary of Tavricheskoye district council on the southwestern Front and treated with the direct participation by P. Yu. Rose. This infirmary was located from the line of entrenchments on 50-60 km and predominantly accepted injured people with the bullet damage of extremities. The positional character/nature of the military effects/actions gave the possibility to detain the majority of injured people, evacuating them into the deep rear only when the consolidation of break is present,. This analysis of a small quantity of bullet breaks of the bones of shin only approximately lights actual position with the treatment and the issues of the bullet breaks of the bones of shin in the first world war.

On the basis of the observations of N. I. Shaviner bullet injuries (60.50/o) with the bullet breaks of the bones of shin predominated above the fragmentation ones (39.50/o); through (75.40/o) - above the blind ones (24.60/o). The extensive damages of soft tissues with the bullet breaks of the bones of shin were observed in 18.00/o of injured people, conditioning the duration of healing of breaks to 4 months. The finely fragmented break was

encountered more frequently than large-splintered. In some injured people the bullet injuries, most which were being frequently encountered in the first world war, similar to the fragments of projectile caused the large-splintered breaks of the bones of shin with the large defect of bone. The so-called aseptic healing of the bullet fractures of the bones of shin with the bullet injuries composed 25.00/o. However, among this quantity of injured people with the "aseptic" healing occurred the weak, non-virulent infection, which was becoming apparent by scanty serous- suppurative discharge during the first days after injury.

The bullet breaks of the bones of shin with the damage of vessels were encountered in 3.20/o of studied injured people. The complication of osteomyelitis was observed in 50.00/o.

The associated injuries with the extensive damages were noted in 13 injured people of 124; their large part perished from the sepsis. Of 124 injured people with the bullet break of the bones of shin anaerobic infection was in 9 injured people, tetanus - in 3 injured people, sepsis - in 6, from whom died 4. The therapeutic immobilization of the breaks of the bones of shin was conducted by splints and skeletal/skeleton stretching in the course of 1 1/2-2 months (nail and spoke).

Issues in 127 injured people were following: died 9.00/o, it is amputated by 10.00/o, good issues in 51.00/o it is evacuated by 30.00/o.

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The results of treatment splints in 27 injured people were following: a good consolidation with the insignificant shortening and the healing of wounds was observed in 10 injured people; a good callus and the unhealing wounds - in 12; the shortening of extremity on 3-4 cm - in 2; difficulty of movement of talocrural joint - in 2; the delayed consolidation - in one injured person.

The results of treatment skeletal/skeleton stretching in 84 injured people, who remained in the living ones, were following: a good functional and anatomical result was obtained in 53 injured people, the contracture of talocrural joint - in one, strain - in 7, the defect of fibular bone - in one, difficulty of movement of talocrural joint - in 16, soft callus - in 4 and pseudoarthrosis - in 2 injured people. Shortenings during the treatment by skeletal/skeleton stretching it was not noted.

Stable difficulty of movement of talocrural joint was obtained only during the treatment by skeletal/skeleton stretching and this,

in the opinion of N. I. Shavinar, it depended on the severity of the bullet breaks of the bones of shin and on the complications of their osteomyelitis which prevented the use/application of therapeutic gymnastics.

Refracture, according to N. I. Shavinar's data, was not observed.

The issues of the bullet breaks of the bones of shin in the Great Patriotic War. (see also vol. 15 of this "work", pg. 525, 533 and 534).

Table 385. Distribution of injured people with the bullet break of the bones of shin according to the clinical issues in connection with the localization of break (in the percentages).

Локализация перелома	Количественный исход	Хороший	Деформации	Повреждение нервов	Контрактура	Анкилоз	Дополнительный сустав	Клинический		Остеомиелит	Комбинированный исход
								хороший	плохой		
(1)											
Малоберцовая кость	40,2	0,1	16,1	23,5	1,9	1,4	2,5	0,5	6,0	2,8	
Большеберцовая кость	30,7	0,6	7,6	24,4	2,7	2,1	3,3	0,4	18,9	4,9	
Обе кости	4,5	1,0	3,8	17,5	2,8	2,3	43,4	5,3	12,2	5,4	
Кость не уточнена	29,5	—	4,8	11,6	2,0	0,5	40,4	6,0	1,6	0,8	
В среднем	25,4	0,6	8,3	21,7	2,5	1,9	16,0	2,0	13,4	4,5	

Key: (1). Localization of break. (2). Clinical issue. (3). Good .

FOOTNOTE 1. Good in anatomical and functional sense. ENDFOOTNOTE.

(4). Strain. (5). Damage of nerves. (6). Contracture. (7). Ankylosis.

(8). False joint. (9). Stump. (10) is good. (11) is poor. (12).

Osteomyelitis. (13). Combination of issues 2.

FOOTNOTE 2. Combination - if it was difficult to secrete basic issue.

ENDFOOTNOTE.

(14). Other 3.

FOOTNOTE 3. Other - when the failure was due to the associated injuries or the disease, but not because of the break of the bones of shin. ENDFOOTNOTE.

Исходы	Число	Процент
5,0	100,0	1,7
4,4	100,0	1,8
1,8	100,0	9,0
2,8	100,0	20,4

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3,7 100,0 4,8
 (15). Altogether. (16). It died. (17). Fibular bone. (18). Tibia.
 (19). Both bones. (20). Bone is not refined. (21). On the average.

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The clinical issues of bullet breaks were the result of the action of a large number of diverse factors. Forthcoming tables depict data of the interrelation between the clinical issues of the bullet breaks of the bones of shin and the basic acted factors: localization of break, form/species of break, character/nature and means of injury, character/nature of primary surgical processing, presence of the associated injuries and age of injured people.

Localization of break and clinical issues.

The clinical issues of the bullet injuries of the bones of shin were different depending on that, one bone of shin was broken during the injury or both; if one, then what. Depending on localization of break, clinical issues were dissimilar (table 385).

Table 385 gives only basic issues.

It is completely obvious that the clinical issues were the more badly, the larger the bone mass it broke with the injury, since the injury of soft tissues was found in large dependence on degree and form of fracture of bone. Breaks of both bones of shin ended by the worst issues according to all indicators.

Combinations of the basic and associated clinical issues.

Table 386 depicts the data about how frequently the issues, acknowledged by bases, were combined with other different pathological states (associated issues).

From the examination of table it follows that among the injured people, referred in the group "good", were observed the strains, the damages of nerves, contracture, etc. However, these changes were expressed weakly and they were not reflected in a good functional ability of extremities.

A great number of associated issues was noted with osteomyelitis, damage of nerves, contracture, ankylosis and pseudoarthrosis.

Form/species of break and clinical issues.

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The form/species of break was one of the principal factors, which determined the severity of damage. To what degree this was reflected in clinical issues, it is possible to see from the data, given in Table 387.

Table 386. Frequency of the combination of the associated issues with the basic issues in injured people with the bullet break of the bones of shin (in percent).

Сопутствующий исход Основной исход	Дефор- мация	Повреж- дение нервов	Контрак- тура	Анки- лоз	Ложный сустав	Остеоми- елит	Про- чие
Хороший	1,7	0,1	1,0	—	—	0,2	1,4
Деформация	—	2,4	7,3	—	—	36,6	9,3
Повреждение нервов	11,9	—	38,6	0,2	0,4	5,4	1,9
Контрактура	22,7	5,5	—	0,1	0,2	9,6	5,6
Анкилоз	29,9	6,6	15,0	—	1,2	29,9	5,4
Ложный сустав	27,7	8,4	44,6	2,5	—	26,9	4,2
Культи плохая	—	2,2	6,7	1,5	—	4,5	7,5
Остеомиелит	29,0	6,8	48,8	2,1	0,5	—	3,5
Комбинация исходов	37,3	27,0	69,2	12,5	8,3	64,4	7,3

Key: (1). Basic issue. (2). Associated issue. (3). Strain. (4). Damage of nerves. (5). Contracture. (6). Ankylosis. (7). False joint. (8). Osteomyelitis. (9). Other. (10). Good. (11). Strain. (12). Damage of nerves. (13). Contracture. (14). Ankylosis. (15). False joint. (16). Stump poor. (17). Osteomyelitis. (18). Combination of issues.

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Table 387. Distribution of injured people with the bullet break of the bones of shin according to the clinical issues in connection with the form/species of break (in the percentages).

Вид перелома	Клинический исход		Повреждение нервов	Контрактура	Анкилоз	Псевдоартроз	Кульги		Остеомиелит	Комбинация
	Хороший	Деформация					хорошая	плохая		
Дырчатый	48,7	0,3	5,6	21,7	0,5	—	0,5	—	13,5	3,3
Поперечный	24,8	3,5	14,2	22,1	—	3,5	3,5	1,8	13,3	10,6
Продольный	44,2	—	14,0	20,9	2,3	—	—	—	7,0	7,0
Косой	25,3	0,9	8,4	33,8	4,5	1,4	0,5	0,2	16,7	2,9
Раздробленный	3,6	0,1	3,6	8,8	1,2	4,6	58,1	7,6	6,9	4,3
Крупнооскольчатый	18,5	1,0	9,9	28,8	4,0	2,4	3,5	0,2	22,1	6,1
Мелкооскольчатый	23,3	0,9	12,4	27,6	2,9	1,4	2,3	0,7	16,7	6,8
Краевой	54,5	—	8,0	18,5	2,2	0,1	0,9	0,3	7,9	2,6
Вколоченный	10,0	10,0	—	30,0	—	—	—	—	30,0	10,0
В среднем по установленным видам перелома	24,6	0,6	8,2	22,4	2,7	2,2	14,2	1,8	14,7	4,9
Вид перелома не установлен	23,6	0,5	8,9	19,0	1,9	0,9	22,5	2,7	8,6	2,7
В среднем	25,4	0,6	8,3	21,7	2,5	1,9	16,0	2,0	13,1	4,5

Key: (1). Form/species of break. (2). Clinical issue. (3). Good. (4). Strain. (5). Damage of nerves. (6). Contracture. (7). Ankylosis. (8). Pseudoarthrosis. (9). Stump. (10) is good. (11) is poor. (12) osteomyelitis. (13). Combination. (14). Other. (15). Altogether.

Про- чие	Итого	Умер- ло
5,9	100,0	0,5
2,7	100,0	1,7
4,6	100,0	2,3
5,4	100,0	0,2
1,2	100,0	9,6
3,5	100,0	1,9
5,0	100,0	1,6
5,0	100,0	0,6
10,0	100,0	—
3,7	100,0	3,1
3,7	100,0	10,7
3,7	100,0	4,8

(16). It died. (17). Perforated. (18). Cross. (19). Longitudinal. (20). By scythe. (21). Crushed. (22). Large-splintered. (23). Small-splintered. (24). Edge/boundary. (25). Packed in. (26). On the average according to established/installed forms/species of break. (27). Form/species of break is not established/installed. (28). On the average.

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From represented data evidently that the clinical issues were found in the doubtless dependence on the form/species of break. To establish/install the sequence between the breaks in the relation to the best indicators on all issues is difficult, but if we take the principal ones of the indicators of the issues: "good", "stump" and "died", and the packed in breaks completely to not consider due to the small number of observations, then it is possible to establish/install in the decreasing order this sequence of the breaks in the relation to a large number of best indicators on these issues: 1) edge/boundary and perforated, 2) cross, longitudinal and oblique, 3) large/coarse and small-splintered and 4) crushed.

Form/species and character/nature of injury and clinical issues.

It is known that the fragmentation injuries gave more than

complications and were finished with the worse results, than bullet. These data with the bullet breaks of bones shins, according to the data of the deepened development of the histories of disease/sickness/illness/malady, are represented in tables 388 and 389.

From table 389 it is evident that the fragmentation injuries ended by much worse clinical issues, than bullet. This could depend not only on the considerable contamination of wound by microbes with the fragmentation injuries, but also on the larger destruction of bone with these injuries.

According to the data, given in Table 388, it is at first glance difficult to determine, what group of injured people according to the character/nature of bone damages should be considered heavier. But if we consider clinical issues according to each form/species of break (table 389), then it is possible to recognize as heaviest the group of injured people with the fragmentation injuries, since in it the crushed breaks, which ended by the greatest number of poor issues, it was 2 times more than among the injured people with the bullet injury.

Consequently, fragmentation injuries were accompanied by the worse results not only as a result of the larger infection, but also

as a result of the fact that the decomposition of bone and soft tissues was considerably more serious.

From the data, given in Table 390 it is apparent that, in spite of prevailing opinion, a great number of best indicators was observed with the blind ones and small - with the perforating injuries. For explanation this necessary to examine the composition of injured people by the form/species of break (Table 391).

Table 388. Distribution of injured people with the bullet break of the bones of shin according to the form/species of break in connection with the means of injury (in the percentages).

Вид ранения \ Характер перелома	Дырчатый и краевой	Оскольчатый	Раздробленный	Прочие	Всего
Пулевое	21,9	51,3	14,2	12,6	100,0
Осколочное	23,3	35,5	29,9	11,3	100,0

Key: (1). Means of injury. (2). Character/nature of break. (3). Perforated and edge/boundary. (4). Fragmented. (5). Crushed. (6). Other. (7). In all. (8). Bullet. (9). Fragmentation.

Table 389. Distribution of injured people with the bullet break of the bones of shin according to the clinical issues in connection with the means of injury (in the percentages).

Вид ранения Клинический исход	Хоро- ший	Дефор- мации	Попреж- дение нервов	Контрак- тура	Анки- лоз	Ложный сустав	Культи		Остеоми- елит	Комби- нации
							хорошая	пло- хая		
Пулевое	30,6	0,8	9,5	24,1	2,2	1,8	7,6	0,9	14,1	4,9
Осколочное	20,9	0,4	7,2	19,6	2,8	2,0	23,4	3,0	12,7	4,1

Key: (1). Means of injury. (2). Clinical issue. (3). Good. (4). Strain. (5). Damage of nerves. (6). Contracture. (7). Ankylosis. (8). False joint. (9). Stump. (10) is good. (11) is poor. (12). Osteomyelitis. (13). Combinations. (14). Other. (15). Altogether. (16). It died. (17). Bullet. (18). Fragmentation.

Про- ше	Итого	Умер- ло
3,5	100,0	2,0
3,9	100,0	7,1

Table 390. Distribution of injured people with the bullet break of the bones of shin according to the clinical issues in connection with the character/nature of injury (in the percentages).

Характер ранения Клинический исход	Хоро- ший	Дефор- мации	Попреж- дение нервов	Контрак- тура	Анки- лоз	Ложный сустав	Культи		Остеоми- елит	Комби- нации
							хорошая	пло- хая		
Слепое	31,7	0,3	7,1	24,0	3,2	1,4	7,9	0,8	14,6	3,8
Сквозное	26,1	0,8	9,7	23,6	2,6	2,2	10,6	1,4	14,3	5,2
Насательное	25,9	0,4	9,9	19,4	3,0	3,9	8,6	1,3	18,5	3,9
Размозжешно	0,2	—	—	0,2	—	—	88,4	10,8	0,2	—

Key: (1). Character/nature of injury. (2). Clinical issue. (3). Good. (4). Strain. (5). Damage of nerves. (6). Contracture. (7). Ankylosis. (8). False joint. (9). Stump. (10) is good. (11) is poor. (12). Osteomyelitis. (13). Combinations. (14). Other. (15). Altogether. (16). It died. (17). Blind. (18). Through. (19). Tangent. (20). Crushing.

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Ипо- ше	Итого	Смер- но
5,2	100,0	4,4
3,5	100,0	4,1
5,2	100,0	1,7
0,2	100,0	12,5

It proves to be that with the perforating injuries was noted considerably more than heavy breaks - fragmented and crushed, than with the blind ones. Therefore according to given data it cannot be established/installed, did have the blind-end injury by itself (, other conditions being equal,) heavier course than through one.

In the solution of this question must have a value the presence of foreign bodies, since the issues of breaks with the foreign bodies were more badly than without the foreign bodies. Blind-end and perforating injuries are not the synonym of injuries with the foreign bodies and without them, since with the blind-end injuries of shin with the break foreign bodies were not discovered in 16.80/o, but with the perforating injuries they were discovered in 13.50/o of injured people with the bullet break of the bones of shin (vol. 15, pg. 73).

Thus, the indicated in Table 390 clinical issues are explained mainly by the combination of two factors - character/nature of break and presence of foreign bodies. The first of them proved to be more important, since the issues of blind-end injuries with the smaller degree of the decomposition of the bone and soft tissues were best, than through ones.

Primary surgical processing and clinical issues.

The interrelation between the character/nature of primary surgical processing and the clinical issues in the groups of the uniform breaks is represented in Table 392.

On the basis of represented data it is possible to set descending sequence according to the best indicators of clinical issues in the dependence on the character/nature of primary surgical processing, namely:

A. Injured people with the perforated and edge/boundary break:

1) not obtained primary surgical processing - on all clinical issues, except contractures;

2) injured people, who were subjected only to dissection, on good results, osteomyelitis and combinations;

3) injured people, who were subjected, besides the dissection and the carving, to other elements of processing, on the contractures, the lethality, good issues and combinations;

4) the subjected to carving wounds.

B. Injured people with fragmented break:

1) injured people, whose primary surgical processing was not performed, on overwhelming majority of issues;

2) injured people in whom is produced dissection, also on majority of issues, including on lethality, good results, osteomyelitis;

3) in third place can be placed both the group of injured people, who were subjected to carving, and group of those subjecting, besides dissection and carving, to other elements of processing.

Table 391. Distribution of wounded with a bullet fracture of the tibia according to the type of fracture in connection with the character of the wound (in percent).

Характер ранения \ Вид перелома	Дырчатый и краевой	Оскольчатый	Раздробленный	Прочие	Всего
Слепое	38,3	38,9	9,7	13,1	100,0
Сквозное	22,6	42,7	22,7	12,0	100,0
Касательное	35,2	40,5	12,9	11,4	100,0
Размозженде	—	0,8	99,2	—	100,0

Key: 1) Character of the wound; 2) Type of fracture; 3) Perforating and marginal; 4) Comminuted; 5) Comminuted; 6) Other; 7) Total; 8) Blind; 9) Through; 10) Tangential; 11) Crushing.

Table 392. Distribution of injured people with the bullet break of the bones of shin according to the clinical issues in connection with the form/species of break and the character/nature of primary processing (in the percentages).

1 Вид перелома	2 Характер первичной хирургической обработки	3 Клинический исход									
		хоро- ший	дефор- мация	повреж- дение нервов	контран- тура	анки- лоз	ложный сустав	ампу- тации	о-течи- влят	комби- нации	про- чие
Дырча- тый и красной	Рассечение	49,1	—	8,9	20,1	2,1	—	1,2	9,9	3,1	5,6
	Рассечение и иссечение	46,0	—	7,8	20,6	1,0	—	1,0	11,8	5,9	5,9
	Рассечение, иссечение и другие элементы об- работки ¹	46,7	—	6,6	16,1	7,2	—	1,2	13,8	3,6	4,8
	Обработки не было . .	62,4	—	4,6	17,4	0,8	—	0,6	7,2	1,3	5,7
Осколь- чатый	Рассечение	20,2	1,1	9,4	20,3	3,8	1,9	2,5	20,8	6,4	4,6
	Рассечение и иссечение	16,6	1,5	10,7	25,8	4,9	2,4	5,4	22,9	6,4	3,4
	Рассечение, иссечение и другие элементы об- работки ¹	12,6	0,5	11,7	30,2	3,6	3,6	3,8	23,9	8,0	2,1
	Обработки не было . .	28,3	1,3	10,2	27,3	3,6	1,1	2,1	17,1	4,7	4,3
Раздроб- ленный	Рассечение	8,2	—	7,1	17,9	3,3	3,8	32,6	16,3	9,2	1,6
	Рассечение и иссечение	—	—	7,2	12,7	—	14,6	45,5	9,1	9,1	1,8

Key: (1). Form/species of break. (2). Character/nature of primary

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Table 322 (cont.)

Раздроб- ленный	Рассечение, иссечение и другие элементы об- работки	4,1	0,5	6,0	15,2	1,8	10,6	45,1	9,7	6,0	1,0
	Обработки не было . .	11,0	0,8	6,3	14,2	2,4	7,1	33,8	13,4	5,5	5,5
Попереч- ный, про- доль- ный и косой	Рассечение	23,9	1,3	10,2	32,8	4,0	1,3	1,2	15,5	5,8	4,0
	Рассечение и иссечение	30,0	5,0	6,7	36,7	1,7	—	3,3	8,3	5,0	3,3
	Рассечение, иссечение и другие элементы об- работки	17,1	1,9	10,5	29,5	1,0	3,8	1,9	22,0	5,7	6,6
	Обработки не было . .	34,9	0,5	11,2	26,8	4,3	1,6	1,0	11,2	2,1	6,4

итого	умер- ло
100,0	0,8
100,0	1,0
100,0	0,6
100,0	0,3
100,0	1,0
100,0	2,0
100,0	1,6
100,0	1,5
100,0	6,1
100,0	16,6
100,0	6,4
100,0	17,0
100,0	0,9
100,0	3,2
100,0	1,0
100,0	—

surgical processing. (3). Clinical issue. (4) good. (5) strain. (6) the damage of nerves. (7) contracture. (8) ankylosis. (9) false joint. (10) amputation. (11) osteomyelitis. (12) combination. (13) other. (14) altogether. (15) it died. (16). Perforated and edge/boundary. (17). Dissection. (18). Dissection and carving. (19). Dissection, carving and other elements of processing 1.

FOOTNOTE 1. In a number of other elements of processing on all breaks they entered: the dressing of vessels - 12.00/o, the removal/distance of foreign bodies - 18.10/o, the removal/distance of bone fragments - 61.70/o, processing fragments - 1.20/o and the combination of the enumerated elements/cells - 7.00/o. ENDFOOTNOTE.

(20). Processings it was not. (21). Fragmented. (22). Crushed. (23). Cross, longitudinal and by scythe.

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C. Injured people with crushed break:

1) injured people, in whom was produced dissection, on lethality, amputations and false joints;

2) injured people, who did not obtain processing, on good

results, false joints, amputations and combinations;

3) injured people, who were subjected to other means of processing, on lethality, combinations, amputations, false joints and good issues;

4) injured people, who were subjected to carving of wound.

D. Injured people with oblique, cross and longitudinal break:

1) injured people, who did not obtain primary surgical processing, on good issues, amputations, lethality, combinations, etc.;

2) injured people, in whom is produced carving of wound, on good issues, osteomyelitis, pseudoarthroses, combinations of issues and by others;

3) injured people, in whom is produced dissection, according to lethality, amputations, osteomyelitis, good results and by others;

4) injured people, who were subjected to processing with use/application of other elements/cells.

Thus, not in one group of injured people with the uniform form/species of break it is not possible to note the best indicators on the clinical issues after the use/application of other elements of processing or worse with the abstention from the processing; on the contrary, the best clinical issues were with the abstention from the processing or after production in simplest interventions (dissection or carving).

The removal/distance of bone fragments and of foreign bodies, the dressing of vessels and processing bone fragments were applied in heaviest injured people; therefore issues in them were obtained worse, than in injured people with the uniform break apropos of which during the processing they were limited only to dissection or dissection with the carving.

Associated injuries and clinical issues.

The presence of other injuries, besides the basic break, to a considerable degree affected the clinical course and the issue of basic break. The issues of the bullet breaks of the bones of shin in connection with the presence of the associated injuries are represented in Table 393.

Thus, in the injured people, who had the associated injuries,

from whom 30.80/o were either the penetrating in the cavity or breaks of other bones (vol. 15 of "work", pg. 527), results proved to be considerably worse, than in those not had them.

However, it is necessary to say that not only the presence of the associated injuries burdened course in the dismantled group of injured people, but also the breaks in this group were heavier than in injured people without the associated injuries (table 395).

The bullet breaks of the bones of the shins, which penetrate into the joint, composed 5.60/o of all bullet breaks of the bones of shin. Clinical issues in injured people with this break were characterized by a somewhat large number of contractures, six times by a large number of ankylosis and one and a half times by a large number of those amputated, than in all injured people with the bullet break of the bones of shin; then lethality with the penetrating into the joint breaks was almost one and a half times less than with all breaks.

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Table 393. Distribution of injured people with the bullet break of the bones of shin according to the clinical issues in connection with the presence of the associated injuries (in the percentages).

1 Группа раненых	2 Клинический исход	3 Хороший	4 Деформации	5 Повреждение нервов	6 Контрактура	7 Анкилоз	8 Ложный сустав	9 Культе		10 Остеомиелит	11 Комбинация
								9a хорошая	9b плохая		
15 Без сопутствующих ранений		28,4	0,7	8,7	21,9	1,9	1,8	13,0	1,8	14,1	3,1
16 С сопутствующими ранениями		18,8	0,3	7,4	21,3	3,8	2,2	22,7	2,6	11,9	5,0

Key: (1). Group of injured people. (2). Clinical issue. (3). Good. (4). Strain. (5). Damage of nerves. (6). Contracture. (7). Ankylosis. (8). False joint. (9). Stump. (9a) is good. (9b) is poor. (10). Osteomyelitis. (11). Combination. (12). Other. (13). Altogether. (14). It died. (15). Without associated injuries. (16). With associated injuries.

Прочие	Итого	Умерло
4,6	100,0	3,1
4,0	100,0	8,3

Table 394. Distribution of injured people with the bullet break of the bones of shin according to the clinical issues during the different years of war (in the percentages).

1 Год войны	2 Клинический исход	3 Хороший	4 Деформация	5 Повреждение нервов	6 Контрактура	7 Анкилоз	8 Ложный сустав	9 Культе		10 Остеомиелит	11 Комбинация
								9a хорошая	9b плохая		
Первый		25,3	1,0	6,3	22,2	2,5	2,8	11,4	2,0	16,2	5,5
Второй		30,7	0,5	8,9	19,8	2,3	1,7	14,5	2,1	12,2	4,3
Третий		25,3	0,7	9,1	20,2	2,8	1,6	16,3	1,8	13,5	4,8
Четвертый		20,4	0,4	10,6	24,1	2,4	1,9	19,3	2,2	12,2	3,3

Про- чно	Итого	Умер- ло
4,8	100,0	4,7
3,0	100,0	6,1
3,9	100,0	4,4
3,2	100,0	4,2

Key: (1). Year of war. (2). Clinical issue. (3). Good. (4). Strain. (5). Damage of nerves. (6). Contracture. (7). Ankylosis. (8). False joint. (9). Stump. (9a) is good. (9b) is poor. (10). Osteomyelitis. (11). Combination. (12). Other. (13). Altogether. (14). It died. (15). The first. (16). The second. (17). The third. (18). The fourth.

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This difference in the clinical issues it is necessary to explain by the onset of arthritis in connection with the penetration of the cracks of bone into the joint, since the composition of the breaks by their form/species in these groups sharply was not distinguished.

The breaks, which penetrate into the knee joint, flowed/occurred/lasted considerably heavier than penetrating into the talocrural joint; amputations with them were conducted almost 2.5

times more frequent (38.5o/o), and lethality was 4 times higher (5.7o/o), than with those penetrating into the talocrural joint (16.0o/o and 1.4o/o).

Clinical issues during the different years of war.

From the data, given in volume 15 (pg. 141, 144, 491, 500, 520, etc.), it is known that from the for years Great Patriotic War to a considerable degree changed the volume and the character/nature of surgical aid by injured person with the bullet break of the bones of the shin: the periods of operations/processes from the moment/torque of injury were shortened, operations/processes became more radical and were conducted in essence in the specialized hospitals; considerably decreased a number of injured people, in whom was not produced primary processing.

In light of these achievements it is important to trace the dynamics of clinical issues on the years of war (table 394).

It proves to be that, together with the decrease of a number of injured people, discharged with osteomyelitis, and a reduction in the lethality, good issues it became also less, and a number of amputations is more; other clinical issues of special oscillations/vibrations over the years a war did not have.

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For the explanation, first of all, necessary to stop at the characteristic of breaks themselves on the years of war (table 396).

Table 395. Distribution of injured people with the bullet break of the bones of shin according to the form/species of break in connection with the presence of the associated injuries (in the percentages).

Вид перелома Группа раненых	Дырчатый и краевой	Оскольча- тый	Раздроб- ленный	Прочие	Всего
Без сопутствующих ране- ний	23,8	44,4	20,1	11,7	100,0
С сопутствующими ране- ниями	20,0	39,5	27,9	12,6	100,0

Key: (1). Group of injured people. (2). Form/species of break. (3). Perforated and edge/boundary. (4). Fragmented. (5). Crushed. (6). Other. (7). In all. (8). Without associated injuries. (9). With associated injuries.

Table 396. Distribution of injured people with the bullet break of the bones of shin according to the form/species of the break during the different years of war (in the percentages).

Вид перелома Год войны	Дырчатый и краевой	Осколь- чатый	Раздроб- ленный	Про- чие	Всего
Первый	15,9	48,7	19,9	15,5	100,0
Второй	20,6	45,5	22,7	11,2	100,0
Третий	25,4	40,7	22,6	11,3	100,0
Четвертый	25,7	39,1	24,2	11,0	100,0

Key: (1). Year of war. (2). Form/species of break. (3). Perforated and edge/boundary. (4). Fragmented. (5). Crushed. (6). Other. (7). In all. (8). The first. (9). The second. (10). The third. (11). The

fourth.

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From the table it follows that simultaneously with certain increase in the number of heaviest breaks (crushed) was noted a more considerable decrease of a number of fragmented breaks and an even larger increase in the number of perforated and edge/boundary breaks. However, on the whole it is at first glance of a considerable increase in the severity of breaks in the years of war cannot be noted.

However, if one considers that the clinical issues with the crushed breaks (table 387) were immeasurably more badly than with all other breaks, then it is necessary to recognize that the severity of breaks nevertheless was increased with the years of war.

The second factor, to a considerable degree which were affecting conical issues, was the form/species of the wounding projectile. Thus, fragmentation injuries had considerably worse issues, than bullet ones. On the years of war was noted an increase in the number of the fragmentation injuries: the first year - 50.50/o, the second - 49.70/o, the third - 54.90/o, the fourth - 59.30/o.

Simultaneously with this it is necessary to note that a number of injuries with the break of the bones of shin and the presence of foreign bodies increased within the time of war from 33.2 (1941) to 35.7o/o (1945); breaks with the presence of foreign bodies were finished with the more worse results than without the foreign bodies (vol. 15 of present "work", pg. 95).

The third factor, which unfavorably influenced clinical terminations, were the associated and combined injuries whose quantity considerably was increased each year of the war: the first year - 16.3o/o, the second - 22.2o/o, the third - 33.2o/o and the fourth - 27.8o/o.

The fourth factor which could affect the clinical issues, this is the specific gravity/weight of the bullet breaks of the separate bones of shin on the years of war (table 397).

Although sharp oscillations/vibrations on the years of war in a quantity of breaks of the separate bones of shin and it was not, it is doubtless, is noted an increase in the number of breaks of both bones even more tibial whose issues were less favorable than the breaks of fibular bone.

Thus, on the years of war was a considerable increase in the

severity of injury due to the increase of a quantity of crushed breaks and injuries of fragmentation ones, with the foreign bodies, associating and combined, and also quantities of breaks of both bones of shin and tibia.

The consequences of these unfavorable moments/torques to a considerable degree were decreased due to the improvement on the years of the war of the medical service of injured people and, in particular, expansion of readings to the amputations.

Table 397. Distribution of the bullet breaks of the bones of shin according to the localization of the break during the different years of war (in the percentages).

Год войны \ Локализация перелома	3 Малоберцовая кость	4 Большеберцовая кость	5 Обе кости голени	6 Вид кости не установлен	7 Всего
Первый	24,5	41,6	29,6	4,3	100,0
Второй	22,1	44,0	28,7	5,2	100,0
Третий	22,2	44,2	28,5	5,1	100,0
Четвертый	22,4	43,7	30,1	3,8	100,0

Key: (1). Year of war. (2). Localization of break. (3). Fibular bone. (4). Tibia. (5). Both bones of shin. (6). Form/species of bone is not established/installed. (7). In all. (8). The first. (9). The second. (10). The third. (11). The fourth.

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Issues in the different age groups.

The clinical issues of the bullet breaks of the bones of shin in the injured people of different age were dissimilar. The younger was the age of injured person, the better were the clinical issues.

In Table 398 very it is clearly represented: 1) the decrease of a number of good results with an increase in the age; 2) an increase

in the number of contractures, ankylosis, false joints, combinations of issues and number of dead persons at the old age. In this case it is necessary to note that a number of those amputated and discharged with osteomyelitis in the different age groups was almost equal. All these laws are explained not only by age special features/peculiarities, but also by dissimilar severity of the break in the same groups.

In Table 399 it is noted, that with the age continuously was increased a number of complex breaks (fragmented and crushed) and was decreased a number of simple ones (perforated and edge/boundary).

Thus, one should recognize that the dominant role in obtaining of the given issues played the severity of break, whereas the value of age is noted only with osteomyelitis whose number remained almost identical, in spite of an increase in the quantity of heavy breaks; in the injured people of older age osteomyelitis it flowed/occurred/lasted more favorable than in the injured people of young age.

Consolidation of the bullet breaks of the bones of shin.

It is known that bone tissue possesses high capability for regeneration.

Table 398. Clinical issues in injured people with the bullet break of the bones of shin in the different age groups (in the percentages).

2) Клинический исход	3)	4)	5)	6)	7)	8)	9)	10)	11)	12)	13)
Возраст раненых	Хороший	Повреждение нервов	Контрактура	Анкилоз	Ложный сустав	Исходы	Остеомиелит	Комбинированный	Прочие	Всего	Умерло
20—29 лет	29,0	8,7	20,1	2,1	1,7	18,1	13,0	4,2	3,1	101,0	3,0
30—39 "	22,9	8,5	23,1	3,0	2,5	17,4	13,2	5,4	4,0	100,0	3,2
40 лет и старше	19,4	4,7	28,9	3,4	2,5	18,5	13,8	4,5	4,1	100,0	5,3

Key: (1). Age of injured people. (2). Clinical issue. (3). Good. (4). Damage of nerves. (5). Contracture. (6). Ankylosis. (7). False joint. (8). Stump. (9). Osteomyelitis. (10). Combination. (11). Other. (12). In all. (13). It died. (14) years. (15) years it is older.

Table 399. Distribution of injured people with the bullet break of the bones of shin according to the form/species of the break in the different age groups (in the percentages).

2) Вид перелома	3)	4)	5)	6)
Возраст раненых	Дырчатый и краевой	Оскольчатый и раздробленный	Прочие	Всего
20—29 лет	23,9	64,3	11,8	100,0
30—39 "	19,6	68,7	13,7	100,0
40 лет и старше	19,2	69,9	10,9	100,0

Key: (1). Age of injured people. (2). Form/species of break. (3). Perforated and edge/boundary. (4). Fragmented and crushed. (5). Other. (6). In all. (7) years. (8) years it is older.

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The defects of the bone tissue, which were being formed as a result of multi-fragmented break, pyonecrotic process or surgical intervention, in majority their were reduced completely. However, in some injured people the consolidation of break either decelerated or it was disturbed entirely. From the general/common/total reasons had high value irregular nourishment, avitaminosis, disturbance/breakdown of metabolism, etc. One of the important factors, which influence the speed of the coalescence of bone scrap, was the degree of viability and the state of their blood supply; therefore for forming the callus the integrity of the muscular cover of shin had high value. With the multi-fragmented break with the extensive damage of the soft tissues of shin, and also with the crushed break frequently together with the complication of wound of infection was observed the delayed consolidation of break. Level with the bullet breaks of the bones of shin had the high value for the consolidation of break, especially during the damage to the tibia. The below arranged/located the break, the fact condition for its consolidation they were more badly, since in the lower division the shins of muscle convert/transfer into the tendons and the blood supply in this region considerably it is decreased. The fibular bone, arranged/located in the depth of the muscular cover of shin, is located under more favorable conditions, and its regeneration with the bullet breaks flowed/occurred/lasted

considerably more rapid than the tibia.

By most unfavorable factor for the regeneration of bone tissue was complication infection. In the absence of the complications of bullet breaks of infection the regeneration of bone began earlier by 3-4 weeks. The reason for the delay of the regeneration of bone tissue is considered the decomposition of periosteum for the large elongation/extent or the suppression of its viability under the effect of the infection [I. Bredikhin, 1862, Ollier (Ollier), 1859].

For forming the callus necessary the full/total/complete rest of the damaged extremity. This was provided by correct and continuous, to the full/total/complete coalescence of break, immobilization. Repeated traumatization disturbed the conditions of the consolidation of break. The insufficiently good immobilization, incorrectly superimposed gypsum bandage, and also its frequent exchange led to the delay of the consolidation of break. The periods of the consolidation of the bullet breaks of the bones of shin were very diverse. Together with the delay of consolidation to 4-6 months it is more were observed the breaks which were coalesced in time, close to the periods of the consolidation of the closed breaks of peacetime.

According to the data of the deepened development of the histories of disease/sickness/illness/malady, the periods of the

formation of durable callus with the bullet breaks of the bones of shin were following: in 3 months it was consolidated by 70.0o/o of breaks, in 4-5 months - 24.3o/o and later than 5 months - 5.7o/o.

These data show that in the very high percentage of the cases the periods of the consolidation of the bullet breaks of the bones of shin closely coincide with the periods of the consolidation of the closed breaks of peacetime.

In the opinion of the majority of the authors, who studied bullet osteomyelitis (Ya. M. Bruskin, A. T. Lidskiy, M. O. Fridlyand, P. G. Kornev et al.), complication of osteomyelitis of the bullet breaks of the bones of shin in many injured people it detained the consolidation of breaks. According to the data of the deepened development, osteomyelitis detained the consolidation of the bones of shin on the average by 33 days. The periods of consolidation with the bullet breaks of the bones of shin depended it goes without saying also on the procedure of surgical treatment.

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Duration of hospital treatment with the bullet breaks of the bones of shin.

The periods of treatment with the bullet breaks of the bones of shin were frequently lasting and very diverse.

The duration of the treatment of injured people in the Great Patriotic War in essence depended on the severity of the bullet breaks of the bones of shin and those complications which followed them. The preponderance of fragmentation injuries above the bullet ones, the large zone of the damages both soft tissues and bones of shin, the high frequency of multiple injuries are characteristic for the bullet breaks of the bones of shin in the Great Patriotic War. The associated injuries burdened the bullet breaks of the bones of shin and comprised with respect to all bullet breaks of the bones of shin 32.10/o. The character/nature of complications with the bullet breaks of the bones of shin is reflected in Table 400.

If we accept all complications for 100.00/o, then 88.90/o of complications depended on the bullet break of the bones of shin, and 11.10/o of complications fell to the diseases of internal organs/controls, the freezings and other diseases.

The duration of treatment in the hospitals of injured people with the bullet break of the bones of shin is illustrated by tables 401.

On the average the duration of the treatment of injured people with the bullet break of the bones of shin was 5.6 months.

The duration of treatment depending on localization of the break is shown in Table 402.

The average duration of the treatment of injured people with break of both bones of shin was 6.3 months, the tibia - 5.5 months, fibular - 5.1 months.

Table 400. Frequency of the different complications of the bullet breaks of the guests of shin (in the percentages).

Шок	Газовая инфекция	Сепсис	Гнойный артрит	Отморожение	Остеомиелит	Нагноение	Контрактура	Заболевания внутренних органов
5,3	10,0	2,2	1,8	1,2	41,8	33,0	46,7	16,0

Key: (1). Shock. (2). Gas infection. (3). Sepsis. (4). Suppurative arthritis. (5). Freezing. (6). Osteomyelitis. (7). Festering. (8). Contracture. (9). Diseases of internal organs/controls.

Table 401. Distribution of the recovered injured people with the bullet break of the bones of shin according to the duration of hospital treatment.

Срок госпитализации (в днях)	До 60	61-90	91-120	121-150	151-180	181-210	211-240	241-270	271-300	301 и более
Процент выздоровевших раненых	3,4	8,6	14,4	18,4	16,8	12,8	9,1	5,5	4,0	7,0

Key: (1). Period of hospitalization (in the days). (2). To. (3) and more. (4). Percentage of recovered injured people.

The duration of the treatment of the bullet breaks of the bones

of shin depended also on the form/species of break. The heaviest damages to shin were observed with the large-splintered and crushed break, and these two forms/species of break with respect to all bullet breaks of the bones of shin composed 56.80/o.

The duration of the treatment of such injured people can be judged from data as are given in Table 403.

These data show that the injured people with the crushed bullet break of the bones of shin were treated longer than with the large-splintered.

The average duration of treatment with the large-splintered break was 5.8 months, and with the crushed break - 6.4 months.

On the basis of author's development the data about the duration of treatment with the bullet breaks of the bones of shin, depending on the character/nature of injury, are represented in Table 404.

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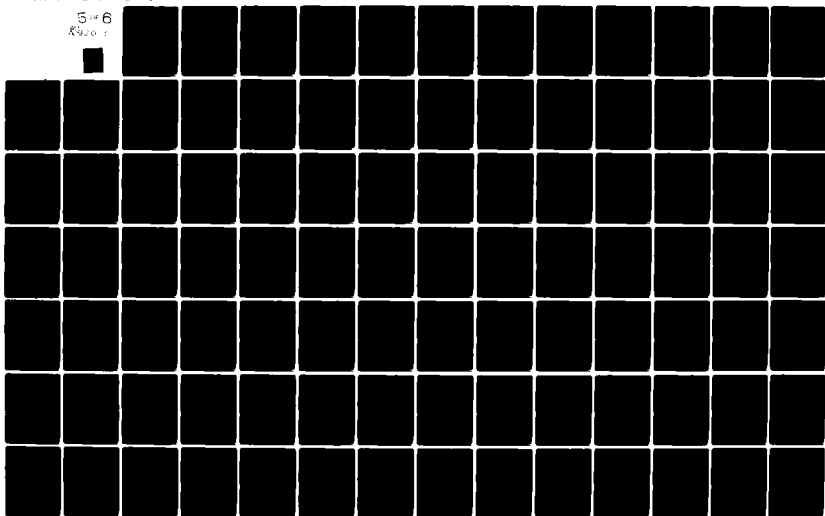


Table 402. Distribution of the recovered injured people with the bullet break of the different bones of shin according to the duration of hospital treatment (in the percentages).

Срок госпитализации (в днях)	До 60	61-90	91-120	121-150	151-180	181-210	211-240	241-270	271-300	301 и более	Итого
Локализация перелома											
Малоберцовая кость	5,7	12,3	17,7	20,5	16,3	8,5	6,9	4,2	3,7	4,2	100,0
Большеберцовая кость	3,8	9,3	15,1	18,7	16,3	12,9	9,2	4,7	4,0	6,2	100,0
Обе кости голени	1,0	3,9	10,2	16,4	18,5	16,4	10,8	8,1	4,8	9,9	100,0

Key: (1). Localization of break. (2). Period of hospitalization (in days). (3). To. (4) and more. (5). Altogether. (6). Fibular bone. (7). Tibia. (8). Both bones of shin.

Table 403. Distribution of the recovered injured people with the crushed and large-splintered bullet break of the bones of shin according to the duration of hospital treatment (in the percentages).

Срок госпитализации (в днях)	До 60	61-90	91-120	121-150	151-180	181-210	211-240	241-270	271-300	301 и более	Итого
Виды перелома											
Раздробленный	1,0	3,3	8,0	18,0	18,0	16,3	12,0	8,2	5,4	9,8	100,0
Крупнооскольчатый	1,9	6,6	13,4	18,1	19,0	14,5	9,1	5,4	4,4	7,6	100,0

Key: (1). Forms/species of break. (2). Period of hospitalization (in days). (3) and more. (4). Altogether. (5). Crushed. (6). Large-splintered.

Table 404. Distribution of injured people with the bullet break of the bones of shin according to the duration of hospital treatment in connection with the character/nature of injury (author's development, in the percentages).

1) / 2) Срок госпитализации (в днях)	3)	4)	5)	6)	7)
Характер ранения	60	61-90	91-180	181 и более	Всего
Слепое	3,8	9,0	48,0	39,2	100,0
Сквозное	4,7	10,4	49,0	35,9	100,0

Key: (1). Character/nature of injury. (2). Period of hospitalization (in days). (3) and more. (4). In all. (5). Blind. (6). Through.

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With the perforating injuries of shin with the break of bones the duration of treatment on the average was 5.2 months, while with the blind ones - 5.4 months.

The duration of the hospitalization of injured person with the bullet break of the bones of shin depended also on the in proper time initiated radical treatment: the earlier initiated this treatment, the shorter there were its periods. Thus, on the basis of the observations of the author, which pertain to the year 1945, under conditions of evacuation hospital it was possible to secrete three groups of injured people.

Injured first groups, with the bullet break of the bones of shin, underwent radical surgery during the first 15 days after injury; recovery began in 5.1 months.

Injured second groups after the first processing underwent for a period of 67 days from the injury of the second operation/process on the bones; the duration of the treatment of the injured people of this group was equal to 5.8 months.

Injured third groups for the elongation/extent on the average of 94 days from the moment/torque of injury underwent three repeated operations/processes; the duration of treatment was equal to 6.7 months.

Injured people with the bullet break of the bones of shin, complicated by infection, were treated longer than injured people without the complication of infection.

With bullet osteomyelitis of the bones of shin, as this follows from the deepened development of the histories of disease/sickness/illness/malady, treatment lasted 6.3 months, i.e., for 1.3 months longer than without osteomyelitis.

The duration of the treatment of the bullet breaks of the bones of shin, complicated by osteomyelitis, depended also on the procedure of surgical treatment. After the operations/processes of sequestrectomy and economical resections of bones the periods of treatment were more shortly than after the radical subperiosteal resection of the bones of shin.

This depended on the different periods of the consolidation of the breaks of the bones of shin. The tibia regenerated very slowly, especially with large diastases; in some injured people the regeneration of bones did not begin at all. The slow regeneration of the tibia greatly lengthened the periods of treatment.

According to Ya. M. Bruskin, after the radical subperiosteal resection of the tibia the full/total/complete substitution of defect to 24 months was observed only in a small number of injured people.

The periods of the treatment of injured people with the bullet break of the bones of shin could not be determined only by the duration of their stay in the hospital. Many of them also after extraction from the hospital for a long time continued to be treated. The healing of wounds, fistulas, the consolidation of break did not

indicate the an even more full/totaler/more complete reduction of the ability to work of injured person. The series/number of complications as difficulty of movement of joints, strain of shin, extensive scars, soldered with the subject tissues, and many other diseases as a result of injury for a long time disturbed the ability to work of injured person.

Lethality.

Lethality with the bullet breaks of the bones of shin was 3 times less than with the breaks of thigh.

The reasons for death with the bullet breaks of the bones of shin were following: gas infection - 45.10/o, shock - 20.00/o, sepsis - 17.20/o, the diseases of internal organs/controls - 7.00/o, hemorrhage - 5.00/o, the combination of the reasons pointed out above - 2.10/o, the injuries, incompatible with the life, 2.10/o, pneumonia - 0.90/o, osteomyelitis - 0.60/o.

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Thus, in the overwhelming majority of injured people the reason for death were the complications, which were the consequence of the infection of bullet break; only in its 2.10/o reason were the

injuries, incompatible with the life. Lethality was dissimilar depending on different aggravating injury moments/torques: of them, first of all, necessary to note the associated injuries whose presence to a considerable degree made issues worse (pg. 597).

According to the data of the deepened development of the histories of disease/sickness/illness/malady, among the injured people, who had, besides the bullet break of the bones of shin, other still injuries, the lethality was 2 1/2 times more than in injured people, who did not have such injuries.

The severity of injury was determined also by a number of broken bones of shin. Thus, with the isolated/insulated break of one tibial and one fibular bone lethality was almost identical then with simultaneous break of both bones it was greater 5 times, than with the break of one bone.

Such relationships/ratios are explained not only by the dissimilar severity of injury, but also by the complications of anaerobic infection whose quantity both with the isolated/insulated breaks of fibular and with the isolated/insulated breaks tibia proved to be almost identical, whereas with simultaneous break of both bones a number of complications gas infection was 4 times more than with the break of one bone.

Lethality on the whole corresponded to the severity of the break: the smallest lethality was observed with the oblique, and greatest - with the crushed break.

The value of infection as one of the main reasons for lethality relief is revealed/detected with the injuries of different form/species and character/nature. Thus, the difference in the severity of the breaks with the fragmentation and bullet injuries was expressed to the much smaller degree (table 388), than in the lethality which with the fragmentation breaks was in three and a one-half times more than with the bullet ones. This fact one cannot fail to place in connection/communication with the fact that the gas infection was observed with the fragmentation injuries 2 times more frequently than with the bullet ones.

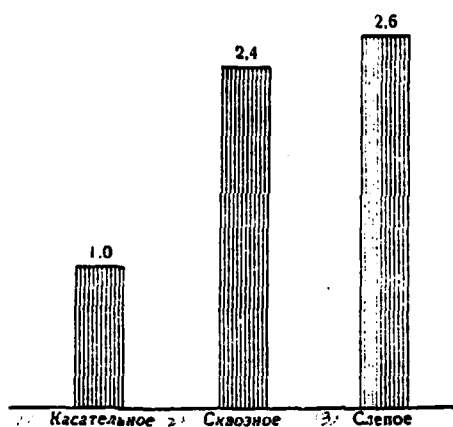


Fig 142. Lethality with the bullet breaks of the bones of shin in connection with the character/nature of injuries.

Key: (1). Tangent. (2). Through. (3). Blind.

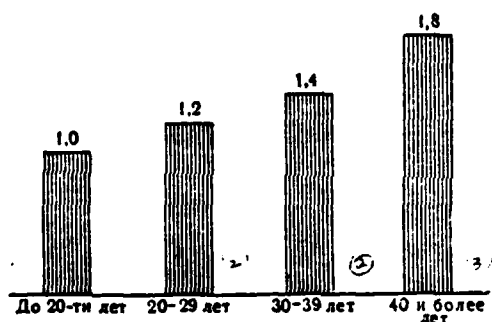


Fig. 143. Lethality with bullet breaks of bones of shin in different age groups.

Key: (1). Up to 20 years. (2) years. (3) and more than years.

Approximately the same conditions are noted with the blind-end, perforating and tangential injuries: lethality to the larger degree depended on infection, rather than from the severity of break. For example, with the blind-end injuries was observed considerable lethality despite the fact that with them heavy breaks was less than with the tangential and perforating injuries (Fig. 142).

The dependence of lethality on the age is represented in Fig. 143. With an increase in the age in parallel occurred also an increase in the lethality. However, this it is not possible to explain only by some age special features/peculiarities, since it is known that in parallel with an increase in the age was noted certain increase in the number of compound fractures (pg. 600).

Lethality was raised more intensely than an increase in the number of compound fractures; therefore it is possible to conclude that the preceding values had the age special features/peculiarities, the number of amputations in the separate age groups was almost identical (pg. 600).

Lethality each year of war continuously was decreased, with exception of the second year, which was seemingly transient year in

the relation to the utilization of the acquired experiment/experience in the treatment of injured people (Fig. 144).

From the appropriate chapters of this volume it is known that according to the form/species of break and according to a number of complications of the anaerobic infection of special oscillations/vibrations on the years of war it was not noted, therefore, a reduction in the lethality on the years of war must be related due to an improvement in rendering aid by injured person, mainly by applying the active operational methods of treatment, including timely amputations.

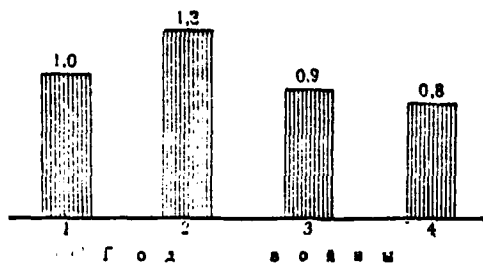


Fig. 144. Lethality with the bullet breaks of the bones of shin during the separate years of war.

Key: (1). Year of war.

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Conclusion to volumes 15 and 16.

Honored Scientist professor is the lieutenant general of medical service N. N. Yelanskiy.

General information on the bullet breaks of the bones of extremities.

The bullet breaks in the general/common/total mass of the bullet injuries of extremities were heaviest injuries. Among all injuries of shoulder they composed 36.60/o, forearms - 54.20/o, thighs - 16.50/o and shins - 43.70/o.

With respect to a total quantity of breaks of the bones of extremities the breaks of shoulder composed 18.80/o, forearms - 33.70/o, thighs - 19.90/o and shins - 27.60/o. Among all bullet breaks of the bones of extremities, with exception of shin, predominated bullet injuries (55.9-68.30/o). However, during entire war from year to year was noted the build-up/growth of fragmentation

ones (from 35.5 to 44.7o/o) and the decrease of bullet injuries with the bullet breaks.

Among the breaks of all forms/species predominated multi-fragmented breaks with the formation of large/coarse and fine/small fragments and crushed breaks with the formation of defect in the bone and scattering of bone scrap in the soft tissues. On the whole these heaviest breaks composed 70.6o/o of all breaks of shoulder, 72.4o/o - the bones of forearm, 57.2o/o - thighs 65.4o/o - bones of shin.

In accordance with the severity of the damage of bones were observed the heavy damages of soft tissues, nerves, large vessels and joints.

During the estimation of the issues of bullet breaks one cannot fail to consider the associated damages of nerves, large vessels, joints and soft tissues which with the breaks of bones were especially extensive. Thus, the damages of nerves with the bullet breaks of shoulder were observed in 35.6o/o of injured people, bones of forearm - in 30.5o/o, thighs - in 10.6o/o and with the breaks of the bones of shin - in 22.2o/o of injured people.

The injuries of large vessels with the bullet breaks of shoulder

were noted in 9.7o/o of injured people, bones of forearm - in 7.4o/o, thighs - in 8.0o/o and with the bullet breaks of the bones of shin - in 14.9o/o; on the average on all segments - in 10.0o/o of injured people.

The penetrating into the joint cracks with the breaks of thigh were observed in upper third in 8.6o/o of injured people, in lower third - in 17.7o/o, in upper third of shin - in 10.0o/o and lower third - in 8.4o/o with respect to a total number of injured people with the break each third.

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Foreign bodies were encountered with the bullet breaks of the bones of extremities in 31.0o/o of injured people. In 86.7o/o of injured people the foreign bodies, removed from the wound with the bullet breaks, gave an increase in the pathogenic flora. Sepsis, anaerobic infection and osteomyelitis were observed more frequently with the breaks with the presence of foreign bodies.

With the bullet breaks of the bones of extremities was observed the typical displacement of bone scrap because of the thrust/rod of muscles; therefore the significant part of the breaks needed redressment.

The majority of injured people with the bullet break obtained first aid in the first hour after injury. From year to year during the war steadily was increased the percentage of the injured people, who obtained first aid in the first hour after injury.

Primary surgical processing with the bullet breaks of the bones of extremities was performed in the majority of injured people within the early periods, besides a number of injured people with the bullet break, that obtained primary surgical processing, from year to year steadily it grew/rose, after achieving during the fourth year of war 86.80/o with the bullet breaks of shoulder, 76.40/o - with the breaks of the bones of forearm, 88.00/o - with the bullet breaks of thigh and 87.40/o - bones of shin.

The specialized aid with the bullet breaks of the bones of extremities (for example, with the bullet breaks of thigh) began already in the army region, servicing/maintaining at the end of the war during the first two days at some fronts to 91.10/o of all injured people.

The periods of the delivery/procurement of injured people with the bullet break of the bones of extremities into the back hospitals

varied from 30 to 60 days. These periods were determined not only by distance and duration of the stay of injured people in the way, but also by stay of injured people in the intermediate stages from the medical readings (different complications).

During the primary surgical processing of the bullet breaks of the bones of extremities was applied predominantly local anesthesia, with exception of the breaks of thigh with which into 59.10/o was applied anesthesia/narcosis.

Immobilization after the primary surgical processing of the bullet breaks of thigh was conducted in 63.30/o of injured people with the aid of the splints of Dieudrichs', and with the breaks of other bones immobilization was conducted predominantly by the splints of Cramer.

Primary surgical processing with the bullet breaks most frequently consisted in the dissection of soft tissues (44.6-51.90/o), the dissection with the removal/distance of bone fragments (16.0-20.00/o), the dissection and carving (11.1-12.90/o). In 77.20/o of all injured people with the break primary surgical processing was performed on DMP, in 16.90/o of injured people - in ^{Kh} PPG of the first line, in remaining 5.90/o - in the army and front evacuation hospitals. Dissection was the predominant means of

processing with all breaks, with exception of those crushed, with which most frequently was conducted the amputation.

The course of bullet breaks was accompanied by the complication of shock, anemia, sepsis, anaerobic infection and osteomyelitis, it is more frequent with the heavy forms/species of breaks with the considerable decomposition of tissues and after the more complex means of primary processing, which was connected with the considerable severity of injury.

Repeated operations/processes with the bullet breaks most frequently were conducted apropos of the complications, which developed after the removal/distance of bone fragments and complex processing of bone wound.

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Thus, amputation was produced in 22.60/o of injured, subjected to previously dressing vessels; sequestrectomy was produced in 38.20/o of injured, subjected to removal/distance bone fragments during the primary surgical processing, which is explained in essence by the character/nature of trauma itself and by the severity of the damage of tissues.

The sufficiently considerable group of injured people with the break of bones did not undergo primary surgical processing, which was connected with the severe conditions for the work of medical service, especially during the first year of the Great Patriotic War when yet was not completed the organization of the specialized medical service. These injured people composed in 1941 63.10/o, into 1945 - 15.20/o; on the average - 32.20/o with respect to a total number of injured people with the bullet break of the bones of extremities.

In majority their these breaks were accompanied by a small input and outlet, a comparatively small damage of soft tissues without the injury of large vessels and nerves.

During the Great Patriotic War was observed the gradual decrease (to 15.20/o) of a quantity of unfinished breaks. The basis of this is, first of all, an increase in the quantity of injuries with the presence of foreign bodies, combined and fragmentation injuries, but in some segments and number of crushed breaks, and also the expansion of readings to primary surgical processing of in view not completely satisfactory results from the conservative treatment, which was being treated initially too optimistically.

With the bullet breaks with the formation of fragments, and then there was the majority, with the injuries from the nearest and

average/mean distances the general/common/total elongation/extent of the damage to bone was approximately stable and it comprised: for the femoral bone 13-15 cm, tibial - 10-12 cm, shoulder - 7-10 cm and the bones of forearm - 4-5 cm.

The pathoanatomical study of wound process with the bullet breaks showed that in the majority of injured people the festering was limited to the zone of primary fault. However, this zone of primary fault with the bullet breaks stretched far beyond the limits of wound canal and seen with aided eye decomposition of tissues (A. V. Smol'yannikov, I. V. Davydovskiy, A. P. Avtsyn, S. M. Derizhanov). Suppurative inflammation in these injured people had a character/nature of demarcation and led to rejection/separation and elimination of dead substrate from the wound, being the factor of secondary cleansing.

Some bone fragments and even ends of the broken bone can be necrotized for a second time as a result of the propagation on them of suppurative inflammation.

The possibility of the onset of new necroses very impeded the surgical processing of wound, since during this operation/process it was not always possibly foresee, what sections will preserve viability and what to undergo numbness, especially as this depended mainly on

further course of wound.

The cleansing of bone wound occurred via the sequestration of the become numb sections of bone. Dead sections of bone were the source of festering, which did not cease to the full/total/complete rejection/separation and the removal/distance from the wound of all sequestrations.

On the basis of the essence of biological processes in the bone wound, to it is more right name/call sequestrations those sections of the necrosis of the bones which undergo rejection/separation, and should be differed them from the fragments of bone, free and wound. The removal/distance of the latter by surgical way can be produced at any time, after which the festering ceases. The removal/distance of sequestrations operationally to their independent rejection/separation is fraught with the fact that on the spot of their removal/distance can be formed the new sequestrations and the process of sequestration it can be continued further.

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The sections of the become numb bone, which lie out of the zone of festering, will not be sequestered, being included in the regenerate, which develops around the suppurative focus. With the

bullet breaks, not complicated by infection, reparative process flows along the type of the healing of the closed fractures, with which the fate of bone fragments and become numb ends of the break is analogous to the fate of free bone autotransplants.

The callus, which is generated with the healing with the festering bullet break, is full-valued and is never the conglomerate of the random bone growths, among which are arranged/located the ulcers, which contain free sequestrations. For the full/total/complete recovery of the pyonecrotic and inflammatory process in the bone are required repeated surgical interventions by applying of necrotomy or partial and even full/total/complete resection of regenerate.

Suppurative flows with the bullet breaks are the result of the active progressive infectious process, which is spread on the most susceptible to it tissues.

The sharp/acute phlegmon of bone marrow is developed in the later periods of festering wound against the background of sharp intoxication and changes in the reactive state of organism and flows/occurs/lasts clinically with the phenomena of sepsis.

Suppurative thrombophlebitis frequently appeared in the last

stages of festering break, especially with the injuries of thigh, and it frequently served as the focus of the propagation of septic infection.

The course of bullet break and the development of complications depended in the majority of injured people on the general/common/total resistivity of organism and state of nervous system. The sometimes multifragmented breaks healed according to the type of those closed within the very short periods, and in some injured people bullet injuries with a small input and outlet and the insignificant decomposition of bone were accompanied by the development of severe complications and by the prolonged course of reparative processes. Therefore the general state of organism, the state of its nervous system during the treatment of bullet breaks were considered equal with the local changes.

Bullet breaks of shoulder.

The injuries of shoulder with the break of bone composed 36.60/o of all injuries of this localization. Among them considerable percentage were large-splintered breaks (44.50/o), crushed (20.00/o) and small-splintered (6.10/o). These breaks in the sum composed 70.60/o of all breaks of shoulder. Here entered the heaviest damages not only to bone, but also soft tissues. With the bullet breaks of

shoulder were damaged the nerves in 35.6o/o and large vessels - in 9.7o/o of injured people.

The considerable majority of injured people (85.0-91.6o/o) obtained first aid for the first six hours. For the transport immobilization under conditions of army region proved to be most convenient the splint of Cramer.

Was manufactured the special procedure of the immobilization of the breaks of shoulder by the splint of Cramer at which was achieved the most ideal immobilization of extremity. For obtaining the more full/totaler/more complete and more reliable immobilization it was necessary the usual splint of Cramer, length 1 m, to lengthen on 25 cm by plywood splint. For the immobilization of the breaks of shoulder it is necessary to prepare the splints of Cramer in long in 125 cm, while for the breaks of forearm - by length in 75 cm.

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Primary surgical processing was produced in 69.7o/o of injured people, moreover from year to year was observed an increase in the number of surgical processings with 48.0o/o for 1941 g to 87.4o/o for 1945. In 68.1-82.9o/o of injured people primary surgical processing was performed during the first day after injury. The character/nature

of processing consisted most frequently in the dissection of wounds (44.6o/o) in the dissection and the carving with the removal/distance of bone fragments (20.0o/o) and in dissection and carving of wounds (12.6o/o). During war is noted a steady increase in the operations/processes with the removal/distance of bone fragments - with 9.9o/o in 1941 to 29.0o/o in 1945, which attests to the considerable attention, given by surgeons to processing bone wound and to preventive measures, directed toward warning/prevention of osteomyelitis.

The number of amputations during the primary processing decreased with 9.9o/o in 1941 to 6.4o/o in 1944 and increased to 10.6o/o in 1945. The great number of amputations during primary processing (30.5o/o) produced with the crushed breaks of shoulder 50.1o/o of those operated were subjected to the repeated operations/processes whose large part (60.2o/o) composed sequestrectomy.

Of the early complications of the bullet breaks of shoulder more frequently was observed the shock, anaerobic infection and hemorrhage. With the breaks of shoulder the shock was noted in 2.5o/o of injured people, gas infection - in 5.0o/o, whereas with the injuries of the soft tissues of shoulder gas infection was observed only in 0.4o/o of injured people. The complications of sepsis were

observed with the bullet breaks of shoulder in 1.10/o of injured people.

The complications of anaerobic infection and sepsis were encountered more frequently with the heavy crushed and multi-fragmented breaks of shoulder. These complications frequently could be set in connection/communication with the late or incomplete primary surgical processing. With repeated interventions in the presence of the already developing complications in the wound were detected the not removed during the primary processing foreign bodies, the fragments of projectile, deprived of nourishment the fragments of bone and the scraps of soft tissues.

With the breaks of shoulder were observed the combined damages of several nerves in 28.00/o of injured people, one ulnar nerve - in 5.00/o, one radial - in 48.80/o, one middle - in 7.10/o, brachial plexus - in 7.10/o of, those of other nerves - in 4.00/o of injured people.

The damages of the nerves of shoulder were identified in the course of the first month after injury only in 42.30/o of injured people, which indicates the delay in the recognition of this serious complication, which gave in the majority of injured people the failure in the form of paralyses and contractures.

The complication of osteomyelitis with the bullet breaks of shoulder was observed in 39.30/o of injured people and with this more frequent with large-splintered (50.10/o), crushed (56.20/o) and small-splintered breaks (64.10/o), which indicates the dependence of the development of osteomyelitis on the severity of injury.

Sometimes osteomyelitis was connected with the late carried out primary surgical processing; it was noted in 44.00/o of injured people, whose surgical processing was carried out into the second day. It is also necessary to note that interventions with the removal/distance of bone fragments were accompanied by osteomyelitis more frequent (53.20/o) than simple dissection (42.90/o), which indicates also the dependence of osteomyelitis on the severity of the injury, which required of more complex surgical processing. Osteomyelitis as issue with the bullet breaks of shoulder on the average composed 8.00/o with respect to all issues.

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Pseudoarthrosis of shoulder composed 5.10/o with respect to a total quantity of breaks of shoulder and 30.20/o with respect to a total quantity of the complications of pseudoarthrosis of the bullet

breaks of the bones of extremities. Most frequently pseudoarthrosis of shoulder appeared after the crushed (23.5o/o) and large-splintered (8.3o/o) breaks. Is noted also the effect of the character/nature of primary surgical processing on the frequency of the formation of pseudoarthroses. Thus, after processing of the basic ends of the broken bone the formation of pseudoarthroses of shoulder is noted in 34.6o/o, and after the removal/distance of some bone scrap - in 12.9o/o of injured people.

Very frequently (64.3o/o) with pseudoarthroses of shoulder was observed osteomyelitis, also, in 37.0o/o of injured people - damage of nerves.

Contractures as complication were encountered with the bullet breaks of shoulder in 68.0o/o of injured people. Contractures in the shoulder joint were noted in 31.4o/o, in the shoulder and elbow joints - in 27.4o/o, in the elbow joint - in 33.4o/o and in the elbow and radiocarpal joints - in 7.8o/o of injured people.

After treatment in the anechoic gypsum bandage the contractures of shoulder (as basic issue) were encountered in 41.5o/o, while after treatment in the splints in 32.1o/o of injured people, which, obviously, is connected both with the larger severity of the breaks of shoulder, treated with anechoic gypsum bandage and with a large

number of amputated injured people for treatment of whom before the amputation were applied only the splints.

A great effect on the origin of contractures with the bullet breaks of shoulder had different aggravating injury complications; so, contractures were observed in 50.00/o of the injured people, discharged with the false joint, in 68.00/o discharged with osteomyelitis and in 78.70/o of those discharged with the combined issue (i.e. during the combination of several basic issues).

With the extraction from the hospital in the half the injured people of contracture they remained without the change. They were eliminated in 22.20/o of injured people and considerably they decreased in 27.80/o.

Although 35.80/o of injured people with the bullet break of shoulder had with the extraction of contracture as basic issue after injury however these issues it is not possible to consider final, since subsequently with increase of the functional load of extremity a number of contractures and a degree of the limitation of the mobility of joints usually considerably were decreased. Consequently, a final quantity of contractures can be judged only from the distant results.

In the course of 5.2 months were treated the injured people, with the bullet break of shoulder, which were complicated subsequently by contracture.

Ankylosis were observed with the bullet breaks of shoulder in 3.70/o of injured people.

The incorrectly grown together breaks of shoulder in the issues were encountered in 18.10/o of injured people, including as basic issue in 0.40/o of injured people, and in the combination with other issues in 17.70/o. The shortenings of shoulder to 2 cm were noted in 28.30/o of injured people, from 3 to 5 cm - in 62.30/o, from 6 to 8 cm - in 5.60/o, 9 cm more - in 3.80/o of injured people.

A great number of shortenings fell to the fragmented and oblique breaks.

Shortenings and strain of shoulder by themselves it was not reflected by noticeable mode in the function of extremity and therefore special treatment they did not undergo. However, the disturbances/breakdowns of function depended for the most part of the associated contractures, the damages of nerve trunks and osteomyelitis.

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A good issue is noted in 16.10/o of injured people with the bullet break of shoulder, strain - in 0.40/o, the consequences of the damage of nerves - in 14.60/o, contracture - in 35.80/o, ankylosis - in 3.70/o, pseudoarthrosis - in 4.30/o, stump - in 9.10/o, osteomyelitis - in 8.00/o, the combination of issues - in 5.80/o and other - in 2.20/o of injured people.

Issues were determined, first of all, by the severity of the damage to bone and the soft tissues and therefore the smaller quantity of good issues (4.10/o) was observed with the crushed breaks of shoulder. With them the amputations composed 38.20/o, contractures - 18.20/o, the damage of nerves (as issue) - 6.10/o, osteomyelitis - 8.30/o, false joints - 12.80/o and other - 12.30/o.

The large/coarse and small-splintered breaks of shoulder were accompanied by a good issue in 13.3 and 9.20/o of injured people; in this case, however, were observed the damages of nerves in 16.6 and 14.80/o of injured people and contractures - in 41.5 and 40.00/o of injured people; the amputation stumps with them were only 0.6 and 0.80/o.

In spite of considerably best issues in the group of injured

people with the large/coarse and small-splintered breaks, by which with the crushed breaks, nevertheless they were accompanied in the considerable percentage of the injured people by the failures. The best results were obtained with the perforated, edge/boundary, longitudinal and oblique breaks which gave good issues in 45.1 and 23.5o/o of injured people.

All these numerals confirm basic condition/position that the character/nature of the damage to bone and the soft tissues, first of all, determines the final issue of injuries.

In the close connection with character/nature and severity of damages will cost the effect on the issues of one or the other means of primary surgical processing. With the simple breaks were observed the best issues, if wound did not undergo surgical processing or if processing carried the character/nature of simple dissection. With the more compound fractures were not always noted the best issues after the primary surgical processing, which consists of many elements/cells - dissection and carving with the removal/distance of bone fragments, etc., which is explained by the severity of trauma and by the presence of the not reversible changes in the tissues.

By anechoic gypsum bandage it was treated by 65.5o/o all of those wounded the shoulder, and by gypsum and other splints - 30.9o/o

of injured people. During the utilization for the treatment of splints was observed a good issue more frequent (21.80/o) than during the treatment by anechcic gypsum bandage (13.60/o). This is explained by the fact that the anechoic gypsum bandage was applied in heavier injured people.

The consolidation of the bullet breaks of shoulder on the average began in 2.3 montas, in this case in 46.70/o of injured people - during the periods up to 2 months and only in 31.20/o of injured people - after 2¹/₂ months.

The complication of the bullet breaks of shoulder of osteomyelitis detained the consolidation of the break on the average by 0.7 months.

The average period of hospitalization with the bullet breaks of shoulder was equal to 4¹/₂ to months. This difference between the periods of hospitalization and consolidation of break is explained by the fact that much time was required to the reduction of the function of extremity.

Lethality with the bullet breaks of shoulder was 6¹/₂ once less than with the bullet breaks of thigh, and 2 times it is less than with the bullet breaks of the bones of shin.

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Among all reasons for the fatal results with the bullet breaks of shoulder the first place occupied gas infection - 36.7o/o; further they follow: the diseases of internal organs/controls - 19.3o/o; sepsis - 17.4o/o, shock - 10.1o/o, the combination of the reasons pointed out above - 8.2o/o, hemorrhage - 6.4o/o and pneumonia - 1.9o/o. A large number of the fatal results falls on pneumonia and other diseases of internal organs/controls, which is explained by a considerable quantity of associated injuries of chest.

Of different means of damages the crushed breaks were accompanied by lethal outcome 4 times more frequently than all breaks of shoulder.

Lethality with the bullet breaks of shoulder each year of war, beginning from the second year, gradually it descended. If we accept lethality in last year of war for unity, then on the years of war it will be expressed as follows: in the first year - 1.4, for the second - 1.7 in the third year - 1.1 and for the fourth - 1.

The decrease of lethality should be explained by an improvement

in the rendering to medical aid, the approximation/approach of primary surgical processing and specialized aid to line of breakage and the expansion of readings to the amputation during the heaviest damages.

Considerably affected the issues of the bullet breaks of shoulder the associated injuries, which is completely explained by the intimal neighborhood of the chest the damage to which was reflected both in the course of break and in the final issues (lethality is 3 times more, amputations are almost 2 times more frequent in the presence of the associated injuries).

In recent years of war in the issues is noted the decrease of a number of complications: by osteomyelitis (from 9.6 to 5.6o/o), by ankylosis (from 5.2 to 2.9o/o), and lethality almost 1 1/2 time. However, increased a quantity of amputation stumps from 5.7 to 12.5o/o and a quantity of false joints - from 4.4 to 5.5o/o; a quantity of good anatomical and functional results decreased (from 15.3 to 12.2o/o).

A change in the final issues of the injuries of shoulder in the years of war should be examined in connection with a change in the severity of injuries.

A decrease of a quantity of good anatomical and functional issues and an increase in the number of amputations in the years of war were consequence an increase in the quantity of injuries by the fragments of projectiles and quantities of associated injuries and crushed breaks of shoulder.

In spite of these, such considerably aggravating moments/torques, nevertheless, because of the increased surgical activity and the specialized aid, it was possible to attain a reduction in lethality and quantity of discharged from hospitals injured people with osteomyelitis and ankylosis.

An increase in the number of amputation and false joints in recent years was connected with the increased radicality of the surgical processing of wounds, which, it is doubtless, contributed to a reduction in the lethality. Therefore an increase in the number of amputations and false joints with a reduction in the lethality must be related due to an improvement in the medical and surgical service of injured people.

Bullet breaks of the bones of forearm.

The bullet injuries of forearm were accompanied in 54.20/o of injured by break bones. Of all breaks of the bones of forearm 68.30/o

there were bullet and 31.7o/o - fragmentation. The large-splintered, small-splintered and crushed breaks together composed 72.4o/o of all breaks of the bones of forearm. The damages of nerves were observed in 30.5o/o and large vessels - 7.4o/o of injured people. The breaks of radial bone among the breaks of long tubular bones were 14.4o/o, one ulna - 13.6o/o, both bones of forearm - 6.2o/o.

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The form/species of the damaged bone is not established/installed ⁱⁿ ~~by~~ 2.5o/o of injured people: all breaks of the bones of forearm composed 33.7o/o of all breaks of long tubular bones.

First aid by 88.6o/o of injured people with the bullet break of the bones of forearm was shown/rendered in the company region: 27.3o/o of injured people the first transport immobilization was produced on PMP.

For the immobilization were applied mesh, carton, plywood and wire splints. The experiment/experience of the Great Patriotic War showed that the mesh splint for the immobilization of bullet breaks was inconvenient, since it does not provide full/total/complete rest with the breaks of the bones of forearm. Unsatisfactory also proved to be the splint of Cramer which badly/poorly is modeled for the

creation of functional position in the region of hand, in consequence of which during the transportation the forearm frequently accepts the faulty position of pronation.

Plywood splint also had its deficiencies/lacks, but it gave satisfactory immobilization and retained the correct position of forearm during the small attachment in the form of the wooden pin, fastened in the perpendicular to the splint position. This pin was seized by hand, and forearm by its ulnar edge leaned on the bent in the form of splint/pulp publications plywood splint.

By best was immobilization the gypsum splint, which was simultaneously and therapeutic; however it found to itself more wide application only in ^{Kh} PPG (24.10/o) and in army evacuation hospitals (73.10/o).

To primary surgical processing it underwent by 55.50/o of bullet breaks of the bones of forearm. With the crushed breaks of the bones of forearm primary processing was performed in 70.50/o of injured people. In $\frac{3}{4}$ injured people the processing was produced on DMP and in $\frac{1}{4}$ - in ^{Kh} PPG.

On the years of war a number of breaks of the bones of forearm, with which was performed primary processing, it was increased with

26.10/o for 1941 to 78.80/o for 1945.

The first therapeutic immobilization with the bullet breaks of the bones of forearm in the half all injured people was superimposed in the army region, in 38.60/o of injured people - in the front; during the periods up to 10 days the immobilization was produced in 70.20/o of injured people and from 11 to 20 days - in 20.50/o. Anechoic gypsum bandage was applied in 51.70/o of injured people, fenestrated - in 1.80/o. In 15.00/o of injured people the bullet breaks of the bones of forearm flowed/occurred/lasted without the complications; larger part this were the breaks of one bone. Primary processing with these injuries was required almost in 1 1/2 time less frequent than with all bullet breaks of the bones of forearm.

Early complications with the bullet breaks of the bones of forearm composed 11.80/o in the army region, 15.60/o - in the front and 23.40/o - in the deep rear to a total number of injured people with the bullet break, that were being treated in each region.

Of the early complications in the army region somewhat more than half composed shock and anaerobic infection, in the army region into 60.20/o were noted suppuration, flows and phlegmons; the same was observed also in front region (58.20/o). In the deep rear predominated in a number of late complications of festering both

osteomyelitis (35.40/o) and also contractures (87.00/o).

With the bullet breaks of the bones of forearm the shock was encountered in 0.90/o of injured people, gas infection - in 2.10/o, sepsis - in 0.20/o; osteomyelitis as complication was noted in 25.20/o of injured people with the break of the bones of forearm.

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The larger part of the injured people has the complication of osteomyelitis was developed with large-splintered, small-splintered and crushed break (34.0-39.70/o). Edge/boundary and longitudinal breaks were accompanied by osteomyelitis in 13.1-14.00/o of injured people. The treatment of osteomyelitis of the bones of forearm consisted in the operational removal/distance of sequestrations.

The periods of the treatment of the bullet breaks of the bones of forearm, which were being complicated by osteomyelitis, comprised from 4¹/₂ to 5 months. Osteomyelitis was cured in 65.40/o of all injured people, who had this complication. It composed 3.30/o of all basic issues of the bullet breaks of the bones of forearm.

Pseudoarthrosis of the bones of forearm was encountered as complication in 3.90/o of injured people. Pseudoarthroses of radial

bone were observed in 3.50/o of injured people, cubital - in 4.30/o, both bones - in 5.70/o. Very frequently with pseudoarthroses of the bones of forearm simultaneously was observed the dislocation: with pseudoarthroses of radial bone was noted the dislocation of the head of the ulna, also, with pseudoarthroses of the ulna - dislocation of the head of radial bone. Pseudoarthrosis more frequently appeared with the crushed breaks (20.60/c with respect to a number of crushed breaks). In connection with the severity of breaks and complications, which contributed to the formation of false joints, was observed also very frequently pseudoarthrosis (10.70/o) after processing of scrap of bone.

In 55.60/o of injured people with pseudoarthrosis of the bones of forearm was noted osteomyelitis, which could impede the intergrowth of scrap. In 33.00/c of injured people with pseudoarthrosis of the bones of forearm was observed the damage of the nerves of forearm. In spite of the considerable frequency of the damage of nerves with pseudoarthroses of the bones of forearm after operation of synostosis in 2/, injured people began the intergrowth of break. Pseudoarthroses composed 2.70/o of all issues in discharged from hospitals injured people with the bullet break of the bones of forearm.

Contractures were observed as complications with the bullet

breaks of the bones of forearm in 58.00/o of injured people and ankylosis - in 3.40/o. In this case the contractures in the elbow joint were encountered in 16.40/o of all injured people with the contractures, in the elbow and radiocarpal joint - in 9.80/o, cubital, radiocarpal and finger - in 19.50/o, in the radiocarpal - in 18.40/o, in the radiocarpal and the finger/pin ones - in 35.90/o of injured people. In the larger part of the injured people of contracture they were observed the afterward crushed and large-splintered breaks, and therefore they were in their considerable majority the result of damaging of nerves and cicatrical process in muscles and tendons of forearm.

The periods of treatment in injured people with the contractures after the bullet breaks of the bones of forearm exceeded 5 months in 16.20/o of injured people. In 29.70/o of injured people with the bullet break of bones the forearms of contracture were eliminated, in 23.90/o of injured people the degree of contracture considerably decreased also in 46.40/o of contracture they remained without the change, which is explained by the severity of injuries and by the special features/peculiarities of the anatomy of nerves, muscles, tendons and bones of forearm.

The incorrectly grown together breaks were observed in 16.40/o of all recovered with the break bones of forearm. From them 60.40/o

of injured people had a break of both bones, 32.40/o - radial, 5.20/o - the ulna and in 2.00/o of injured people it is not established/installed, what bone was damaged.

With bullet breaks of both bones of forearm and one radial bone was noted the typical displacement of scrap to the ulnar and dorsal side. In the half injured people with the incorrectly grown together break was observed osteomyelitis, in 96.80/o - contractures.

In the majority of injured people (77.60/o) with the incorrectly grown together break is noted the prolonged stay in the hospital (it is more than 3 months), connected with the presence of different complications.

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Attempts at one-time setting were undertaken only in 2.80/o of injured people, which is explained by the presence of the accompanying complications which served as contraindication to setting. Satisfactory function with the incorrectly grown together breaks of the bones of forearm was observed in 3.20/o of injured people, and in remaining injured people - limitation of the motions of fingers/pins, radiocarpal or elbow joint, pronation or supination.

The significant part of these functional disorders depended on the associated damages of the nerve trunks which with the incorrectly grown together breaks of forearm were observed in 35.20/o of injured people. The shortening of forearm on 2-5 cm was noted in 4.40/o of injured people, the synostosis between the bones of forearm - in 2.80/o.

The treatment of the breaks of the bones of forearm presents very difficult task even in peacetime. These difficulties immeasurably grow/rise with the breaks in the wartime.

The basic reason for the incorrect coalescence of scrap with the bullet breaks of the bones of forearm in the presence of heavy anatomical damages is the absence of systematic roentgenological checking in the process treatment, defects of immobilization, disturbance/breakdown of the rules of reposition, absence of reposition and bloody setting with the already formed callus with the incorrect position of bone scrap.

The bullet breaks of the bones of forearm just as the breaks of the bones of other segments of extremities, need conducting of the early specialized treatment.

Prophylaxis of the incorrect coalescence of the breaks of the

bones of forearm must consist in a good early reposition both after the primary processing and with the rendering of specialized aid with the use/application of the full/total/complete and ideal anesthetization and roentgenological checking with the subsequent retention of scrap in the correct position by gypsum bandage.

The treatment of the incorrectly grown together breaks of the bones of forearm must consist in the use/application of late reposition or the correction of the incorrect position of scrap operationally.

Amputations with the bullet breaks of the bones of forearm were produced in 4.50/o of injured people.

As basic reading served breakaway and crushing (53.30/o), ischemic gangrene (8.60/o), anaerobic infection (30.40/o) sepsis (4.80/o) and combination of different reasons (2.90/o). Large part of amputations was produced with breaks of both bones.

The damages of nerves with the bullet breaks of the bones of forearm were observed in 30.50/o of injured people, and the consequences of the damage of nerves were noted on the average into 14.40/o of all issues.

Somewhat more than $\frac{1}{3}$ injured people with the the bullet break of the bones of forearm finished treatment in the army and front rear, and remaining - in the internal regions of the country. The average period of immobilization with the breaks of one bone was 5-6 weeks, and with breaks of both bones - 9-10 weeks; the average period of treatment in the hospital in injured people, who did not have complications, was equal to 73 days, whereas with all breaks - 108 to days.

About $\frac{1}{3}$ the injured people, who were being treated in the rear with the bullet break of the bones of forearm, it underwent repeated operations/processes - removal/distance of sequestrations, transplantations of skin, imposition of secondary sutures, etc.

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The high value during the treatment of the bullet breaks of the bones of the forearm had physiotherapy and therapeutic gymnastics; the latter it was applied in 86.0 % of all of those treating.

Lethality with the breaks of the bones of forearm was smallest of all breaks of the bones of the remaining segments of extremities and during war remained almost on the identical numerals, and with exception of the second year of the war when there was an

insignificant increase in the lethality.

The reasons for lethality were following: the injuries, incompatible with the life - 1.70/o, shock - 8.60/o, blood loss - 5.10/o, anaerobic infection - 41.40/o, sepsis - 7.00/o, pneumonia - 3.50/o, other reasons, not connected with the break of bones of forearm, 32.70/o.

In the presence of the associated injuries lethal outcomes were observed in $4\frac{1}{2}$ time more frequently than without the associated injuries. With the crushed breaks lethal outcomes it was noted 3 times more frequently than with the edge/boundary ones.

Bullet breaks of thigh.

The bullet breaks of thigh were heavy ones of all breaks of the bones of extremities. Almost $\frac{1}{3}$ the part of all injured people with the bullet break of thigh had accompanying injuries of other organs/controls. In 8.60/o of injured people with the the bullet of break of femur were observed the damages of large vessels, in 10.60/o - damages of nerves.

About $\frac{4}{5}$ the injured people with the bullet break the thighs obtained first aid for the first six hours after injury, and $\frac{1}{5}$

injured people - within the later periods. In last year of war, according to some data, the first aid is shown/rendered in the first six hours after injury by 95.00/o of injured people.

More than 2/, injured people with the bullet break thighs were delivered on BMP and 50.30/o of injured people with the bullet break of thigh were delivered on PMP in the first six hours after injury. Transport immobilization was realized by injured person with the bullet break of thigh in 66.6 % in the company section and on BMP predominantly by the Diedrich splints which proved to be best of the transport splints, which were being applied for the immobilization of thigh.

The volume of the first medical aid on PMP was determined by concrete military and sanitary-tactical circumstances.

9.00/o of injured people with the the bullet of break of femur were delivered to PMP with the tourniquet, superimposed in the preceding/previous stages. Hemorrhage was not renewed after the removal/taking of tourniquet in 1/, injured people.

The blood transfusion and novocaine blockade with the bullet breaks of thigh were applied on PMP as the most powerful/thickest means of prophylaxis and combat with the shock.

The blood transfusion with the bullet breaks of thigh on PMP, according to some data, reached to 17.0-20.0o/o. According to the data of the deepened development of the histories of disease/sickness/illness/malady, it amount on the average to on more than 1.0o/o blood transfusions with the bullet breaks of thigh in all stages.

Novocaine blockade reached on some PMP 88.9o/o to a total quantity of injured people with the bullet break of thigh.

Primary surgical processing was produced by 92.5o/o of injured people with the bullet break of thigh on DMP and ^{Kh}PPG of the first line. About $\frac{2}{3}$, all injured people with the bullet break of thigh it underwent primary surgical processing during the first day and $\frac{1}{3}$ - during the second day it is later.

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During the entire Great Patriotic War is noted the considerable contraction/abbreviation of the periods of production in the primary surgical processing, an increase in the number of injured people with the use/application of radical methods of processing and a decrease

of a number of injured people, who were not being treated.

During the primary processing of the bullet breaks of thigh, produced in the first 12 hours, is achieved/reached a great quantity of good functional and anatomical issues.

All injured with the bullet break thighs obtained in the army and front region the specialized surgical aid. With this 22.60/o of all injured people with the bullet break the thighs underwent the repeated surgical processing readings to which were placed on the basis of common clinical picture, estimation of the general state of injured and x-ray examination.

In the army and front specialized hospitals in injured people with the bullet break the thighs changed transport immobilization by the therapeutic after x-ray examination, repeated surgical processing (in the presence of readings) and setting of bone scrap on the orthopedic table.

Therapeutic immobilization in army front region was realized in the majority of the injured people (61.70/o) by anechoic gypsum bandage and by skeletal/skeleton stretching with the subsequent gypsum bandage (in 13.10/o). Splints and other forms/species of immobilization in army front region were applied in 25.20/o of

injured people.

With the bullet breaks of thigh in 7.7o/o of injured people was observed the shock, in 12.3o/o - anaerobic infection, in 9.5o/o - sepsis, in 2.9o/o - suppurative arthritis, in 26.3o/o - festering and in 31.1o/o - osteomyelitis. In some injured people were noted several of the complications indicated.

Shock was encountered most frequently in the army (86.7o/o) and army (11.7o/o) region (in relation to all injured people with the shock), anaerobic infection - in army (65.6o/o), army (18.0o/o), front region (14.8o/o) and back (1.6o/o) with respect to all injured people with the anaerobic infection.

Sepsis was observed in the army region in 2.3o/o, in the army - in 35.6o/o, in the front - in 43.7o/o and in the back - in 18.4o/o of all injured people with the sepsis. The distribution of injured people with osteomyelitis of thigh according to the regions where is established/installed diagnosis, was following: army region - 1.3o/o, front - 6.6o/o and back - 92.1o/o.

With the bullet breaks of thigh in the army region more frequently were observed the shock and anaerobic infection, in the army and front region - sepsis and in the deep rear - osteomyelitis.

All enumerated complications with the fragmentation injuries were observed more frequently than with the bullet ones. During war a quantity of the complications of shock with the bullet breaks of thigh increased 4 times, by sepsis - almost 2 times and by osteomyelitis - almost in 1 1/2 time. This can be explained by an increase in the quantity of fragmentation and associated injuries, by an improvement in the carrying cut/removal of heavily injured from the field of breakage and by an improvement in the diagnosis, and also the account of these complications.

Without the complications flowed/occurred/lasted only 4.10/o of all bullet breaks of thigh. For the most part this was observed in the injured people with the edge/boundary and perforated break, the average period of treatment of whom was equal to 3.4 months; in 90.00/o of injured people was obtained a good anatomical and functional result.

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During the primary surgical processing of the bullet breaks of thigh was applied mainly the dissection of soft tissues, less frequent dissection with the economical carving of the crushed soft tissues and the removal/distance of the bone fragments, deprived of connection/communication with the periosteum. All large/coarse

fragments, connected with the soft tissues, during the primary processing on were driven out.

In last year of war was made the attempt (V. S. Levit) by means of expansion of the volume of intervention during the primary surgical processing prevent the complication of the infection of the bullet breaks of thigh. This so-called radical subperiosteal resection consisted in the removal/distance of the larger part of the bone fragments, connected with the periosteum, the filing of the prominent basic scrap of bone and scraping out by the spoon of bone marrow from the marrow canal of basic scrap.

This method of processing was applied mainly with the heavier forms/species of bullet breaks and therefore issues were determined to the larger degree by the severity of injury, than by the character/nature of processing itself.

However, under otherwise equal conditions on the basis of the author's development of the materials of the military medical museum it is explained that the radical subperiosteal resection with the bullet breaks of thigh during the primary surgical treatment was accompanied by a considerable number of amputations and false joints, by the more frequent complication of osteomyelitis and the larger duration of hospital treatment, than without the resection.

All these data, obtained via the deepened analysis of the experiment/experience of the Great Patriotic War, show that an improvement in the results with the heavy bullet breaks of thigh should be attained not by expanding the volume of surgical interventions during the primary surgical processing, but by the combination of saving operations/processes with other methods of fight with the infection, in particular, with the use/application of antibiotics.

Further treatment of the bullet breaks of thigh was conducted in the splints, the anechoic gypsum bandages and by skeletal/skeleton stretching.

The treatment of the bullet breaks of thigh by splints (most frequently by M. M. Diterikns's splints) was that forced in view of the impossibility apply anechoic gypsum bandage either skeletal/skeleton stretching as, for example, during the anaerobic infection or in the heavy septic state. In 54.70/o of the injured people, who finished treatment in the front rear, and in 15.6% of injured people, who finished treatment in the deep rear, the immobilization was conducted by splint.

The predominant type of therapeutic immobilization with the

bullet breaks of thigh was the anechoic gypsum bandage which among those finished treatment in the front rear was applied in 34.00/o of injured people, in the deep rear - in 67.80/o of injured people.

The therapeutic immobilization of the bullet breaks of thigh by anechoic gypsum bandage proved to be most convenient for the "line-of-communication treatment with the evacuation according to the designation/purpose", which most completely ensures rest and immobilization of the place of break.

Great achievement during the Great Patriotic War was the use/application of plaster orthopedic tables, which give possibility to perform on them the sanitary processing of injured people, surgical processing of wound, stretching extremities and retention in the correct position of bone scrap. The applied during the war equipment (orthopedic tables and X-ray machines) made possible to conduct on the wide scales the reposition of bone scrap and application of anechoic gypsum bandage in their correct position.

Most of all was recommended, according to the experiment/experience of the Great Patriotic War, method of treatment by blind gypsum bandage without the wadded littering.

In this case exclusively importantly the value acquired a question about the quality of gypsum. To the most satisfying medical targets proved to be the high-strength gypsum, which makes it possible to obtain the bandages of considerable strength with small expenditure/consumption of gauze.

Completely justified themselves the march plants, which prepared at the front gypsum for the medical targets from the local and imported raw material.

By a deficiency/lack in the treatment by anechoic hypo-owl bandage was the fact that sometimes under it unnoticeably were developed the complications of anaerobic infection, sepsis and hemorrhage.

The deficiencies/lacks indicated, however, must be related not to deficiencies/lacks in the method of treatment, and to its not always skillful use/application. In proportion to mastery of this method of treatment a quantity of similar errors in recent years of war became insignificant.

Skeletal/skeleton stretching with the bullet breaks of thigh was

applied in the army, front and back specialized for the treatment of the bullet breaks of thigh hospitals. Experiment/experience showed that the skeletal/skeleton stretching in the army and front hospitals was required more frequently in those injured people, whose specialized aid retarded and proved to be on the 10th day even later. But if injured people fell into these hospitals in the limits of the first three days after injury, then readings to the skeletal/skeleton stretching appeared rarely and for the most part it was possible to apply immediately therapeutic immobilization by anechoic gypsum bandage.

Skeletal/skeleton stretching in the army and front hospitals was applied only as expedient for dealing with the septic complications after liquidation of which usually was laid anechoic gypsum bandage.

Among the injured people, who finished treatment in the front rear, skeletal/skeleton stretching it was applied in 6.20/o of injured people, and in the deep rear - in 14.70/o.

Readings for removing/taking the anechoic gypsum bandage with that following application of skeletal stretching in the army and front rear they were: the septic intoxication (80.00/o of injured people whom have it was applied stretching), hemorrhage (8.00/o), presence of pains (8.00/o) the unsatisfactory standing of scrap

(4.00/o) .

An indication for skeletal/skeleton stretching in the deep rear were complication infection, unsatisfactory on the quality gypsum bandage, considerable shortening and strain of extremity.

The experiment/experience of the Great Patriotic War showed that the displacement of scrap, shortening and strain of the extremities, caused by the thrust/rcd of muscles, are developed with the specific law and with the bullet breaks, and for eliminating these displacement is necessary one-time or prolonged stretching on the apparatuses.

For the treatment by the skeletal/skeleton stretching of bullet breaks the thighs proved to be little convenient of the splint of Braun and Boehler, not giving possibilities to attach extremity the necessary position of flexure in the knee joint. Much those more advanced proved to be the hinged splints of the Sverdlov orthopedic institute, splint of Pankov, Land, etc.

Clinical issues with the bullet breaks of thigh depended, first of all, on the severity of break and damages of soft tissues. Good issues in anatomical and functional relationship are obtained with the bullet breaks of thigh on the average in 11.90/o of injured

people, where boundary breaks gave good issues in 44.30/o, perforated - in 39.50/o of injured people, whereas large-splintered - only in 4.20/o, and crushed - in 1.40/o of injured people.

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One of the most frequent complications, although it is insignificant, the nevertheless darkening issues bullet breaks of thigh, were the contractures which were encountered as basic issue with the bullet breaks of thigh in 45.60/o of injured people. A great quantity of contractures was connected with the character/nature of the break (finely fragmented breaks in 58.30/o of injured people were complicated by contractures).

The crushed breaks of distance relatively few contractures (25.00/o), because with crushed breaks 49.00/o of injured people were discharged after amputation.

The character/nature of immobilization little was reflected in the frequency of the formation of contractures with the bullet breaks of thigh. After skeletal/skeleton traction the contractures were encountered so frequently as after immobilization by anechoic gypsum bandage.

Strains after the bullet breaks of thigh as independent issue were observed in 1.7o/o of injured people, furthermore, in the combination with other issues - in 29.0o/o of injured people.

68.9o/o of injured people shortening of extremities had in the limits from 1 to 5 cm and in 31.1o/o - from 6 cm and it is more. The smallest degree of shortening was noted with the skeletal/skeleton stretching. Thus, to 5 cm shortening was in 71.6o/o of injured people and only in 28.4o/o it was 6 cm and it is more.

Are especially considerable and frequent were frequent the shortenings of extremities after the radical subperiosteal resections of thigh, which were being conducted during the primary surgical processing or during the surgical treatment of osteomyelitis.

False joints with the bullet breaks of thigh as basic issue were observed in 0.6o/o of injured people. Their significant part was the consequence of radical subperiosteal resections during the primary surgical processing and with the operations/processes apropos of osteomyelitis.

Osteomyelitis as basic issue was encountered in 5.7o/o, and together with those entered the combination with other issues - in 17.0o/o of injured people. Ankylosis as basic issue was observed in

7.0o/o, and together with those entered the combination with other issues - in 10.5o/o of injured people.

The experiment/experience of the Great Patriotic War showed that during the prolonged observation the function of joints is improved and that the systematically applied mechanotherapy and the therapeutic gymnastics gave the possibility to completely avoid ankylosis and to reduce to minimum a quantity of contractures with the bullet breaks of thigh.

Most frequent issue with the bullet breaks thighs - contracture (45.6o/o); they in the essence little were reflected in the function of extremity and in further course either disappeared or considerably they were decreased also in the majority of injured people they did not disturb ability to work.

Amputations as basic issue with the bullet breaks of thigh were observed in 14.2o/o of injured people.

Lethality with the bullet breaks of thigh in the army region depended on the periods of the carrying out/removal of injured people and time of rendering of first aid. The earlier was shown/rendered the first aid injured with the bullet break of thigh, the less there was the lethality. Thus, if the qualified surgical aid was

shown/rendered in the first 12 hours then the lethality was below than in injured people which the aid was shown/rendered toward the end of the first day. An increase in the lethality with the bullet breaks of thigh was observed with the late periods of the processing when already in the wound have time to develop the phenomena of infection.

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To a reduction in the lethality with the bullet breaks of femur contributed taking antishock measures and rapid evacuation of injured people into the army specialized hospital. In the army and army region the basic reasons of death of injured people with the bullet break of thigh were the shock and blood loss during the first 10 days and anaerobic infection during the first 15 days after injury.

The fatal results from the sepsis in the army region in essence were noted from the 15th day after injury. In the front region the basic reasons for death were the sepsis, anaerobic infection and secondary hemorrhages; in the deep rear - sepsis and wound depletion.

Lethality with the bullet breaks of thigh in the front and back hospitals during the Great Patriotic War considerably decreased (on some institutions 4 times), which is explained by more advanced

organization specialized surgical aid and increased surgical activity.

The duration of the treatment of injured people with the bullet break of thigh amount on the average to on, according to the data of the deepened development of the histories of disease/sickness/illness/malady, 183 days, oscillating from 60 to 300 days and more.

The duration of treatment was conditioned on the numerous factors: by the character/nature of injury, by period and quality of primary surgical processing, by beginning of the specialized treatment, by presence of complications, also, first of all by osteomyelitis, and also by quality of the specialized treatment. The presence of osteomyelitis retarded the period of the treatment of injured people with the bullet break of thigh on the average on 48 days.

Bullet breaks of the bones of shin.

The bullet breaks of the bones of shin were about half (43.7o/o) all bullet injuries of shin. From them 65.4o/o were the crushed and fragmented breaks, which indicates the preponderance of heavy injuries among the bullet breaks of the bones of shin.

First aid for the first six hours after injury was shown/rendered 85.90/o of injured people with the bullet break of the bones of shin. At PMP the tourniquet was superimposed in 2.30/o injured people, while in all stages - in 8.00/o.

Transport immobilization with the bullet breaks of the bones of shin was conducted mainly (77.80/o) by the splints of Cramer and was realized it in 48.20/o injured people at PMP, and in remaining injured people - at BMP and DMP.

Most ideal was immobilization the splint of Cramer in combination with the lateral plywood ones or immobilization by three Cramer splints.

Together with an increase in the general/common/total operability of injured people with the bullet break of the bones of shin with 48.50/o in 1941 to 88.60/o in 1945, is noted an increase in the number of injured people with the bullet break of the bones of shin, which were undergoing primary surgical processing at DMP, with 52.80/o for 1941 to 83.50/o for 1945. With respect to this was lowered a number of injured people, who were subjected to primary processing in army and front ^{KH} PPG and evacuation hospitals.

This testifies about the approximation/approach to line of breakage and the acceleration of the primary surgical processing of injured people with the bullet turning point of the bones of shin in the course of war. In the first twenty-four hours after injury it underwent primary surgical processing by 69.00/o of all wounded with the bullet break bones of shin; 24.40/o of such injured people on underwent primary surgical processing, of them 88.00/o as a result of the absence of readings, and 12.00/o - on other reasons.

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During the primary processing of wounds with the bullet break of the bones of shin in 45.90/o of injured people was applied anesthesia/narcosis, and in remaining - local anesthesia.

The predominant means of primary surgical processing was one dissection or dissection in combination with the carving of soft tissues, which on the whole comprised in average/mean 57.10/o, oscillating from 62.90/o for 1941 to 51.10/o for 1945. Was simultaneously noted the increase of the more complex means of processing wounds with the dressing of vessels and the removal/distance of bone fragments, which indicates an increase in

the radicality in the surgical tactics with respect to the bullet breaks of the bones of shin, revealed by surgeons in recent years of war in connection with the acquisition by them of large experiment/experience.

One dissection or dissection in the combination with the carving was applied in 77.10/o of injured people with the perforated break, whereas with the more complex - the fragmented breaks of the bones of shin - this means of processing was applied only in 60.20/o of injured people.

Repeated operations/processes in the army and army rear with the bullet breaks of the bones of shin were conducted in 21.90/o of injured people after dissection and carving, in 18.60/o - after dissection, in 21.10/o - after the removal/distance of bone fragments and in 32.90/o - after the dressing of vessels. The character/nature of primary surgical processing and the frequency of repeated operations/processes were found in direct dependence on the severity of the injury: the heavier there was the injury, the more complex there was the primary surgical processing and the more frequently it was necessary to resort to the repeated operations/processes.

Amputations most frequently (56.00/o) were conducted apropos of gas infection.

Therapeutic immobilization with the bullet breaks of the bones of shin in the army and army region was superimposed in 57.40/o of all injured people with the break of the bones of shin, in the front - in 37.40/o and in the back - in 5.20/o.

In the army and army region with the bullet breaks of the bones of shin more frequently there are the complications of shock and anaerobic infection and therefore to the quality of therapeutic measures predominated the revision of wounds, the autopsy of suppurative flows and amputations, removal/distance bone of fragments and of foreign bodies, and also processing scrap. In the front region with the bullet breaks of the bones of shin of the complications more frequently was noted rapidly elapsing osteomyelitis and sepsis. In accordance with this here predominated sequestrectomy, and a quantity of amputation, autopsies of flows and phlegmons decreased.

In the deep rear with the bullet breaks of bones the shins were conducted more frequent than sequestrectomy and reamputation apropos of osteomyelitis and faulty stumps.

The treatment of the bullet breaks of the bones of shin in the rear was conducted mainly by gypsum anechoic (64.80/o) and

busbar/tire bandages (34.70/o).

Good issues in functional and anatomical sense were observed in injured people with the bullet break of the bones of the shin: among those finished treatment in the front rear - in 53.80/o and among those finished treatment in the deep rear - in 22.30/o. This is explained by the fact that in the first group predominated the injured people with the incomplete break of the bones of shin (perforated and edge/boundary), and also with the break of one bone.

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On the whole a good result was obtained with the edge/boundary breaks in 54.50/o of injured people, with the perforated ones - in 48.70/o, longitudinal - in 44.20/o, oblique - in 25.30/o, cross - in 24.80/o, large-splintered - in 18.50/o and with the crushed breaks - in 3.60/o of injured people.

The best issues were noted with the breaks of any bone. Thus, with the breaks of one fibular bone good anatomical and functional results were obtained in 40.20/o of injured people, with the breaks of one tibia - in 30.70/o of injured people, whereas with breaks of both bones of shin good issues were observed only in 4.50/o of injured people.

A great effect on the issue of the bullet breaks of the bones of shin had the associated injuries; so, a good issue with the bullet breaks of the bones of shin without the associated injuries it was observed in 28.40/o of injured people, and with the breaks of the bones of shin with the associated injuries - in 18.80/o.

Among the unsatisfactory issues, first of all, necessary to note the contractures which were noted in 21.70/o of injured people as basic issue, and, furthermore, contracture in combination with other issues in 8.70/o. Most of all were complicated by contracture large-splintered breaks (66.90/o). Is noted also the preponderance of contractures in the issues in injured people at the age of more than 40 years.

In this case it is necessary to indicate that 13.20/o of contractures from a number of developing with the bullet breaks bones of shin (46.70/o) were cured as far back as of the stay of injured people in the hospitals, in 13.60/o of injured people the degree of contracture decreased also in 19.90/o of injured people the contracture remained without the changes. Those remaining with the extraction of the injured people by those not removed of contracture in a considerable quantity subsequently either decreased or they

disappeared completely. Despite the fact that the presence of contractures made it necessary to relate data of injured people with the extraction into the group with the unsatisfactory issue, this complication for the most part did not limit the ability to work of injured people.

The consequences of the damage of nerves with the bullet breaks of the bones of shin as final issue composed 8.30/o. During the damages to fibular bone the damages of nerves composed as issue 16.10/o, while during the damages to tibial - 7.60/o. The preponderance of this failure with the injuries of fibular bone is explained by the intimal adjoining of nerve to the head of fibular bone.

A considerable number of injured people (41.80/o) with the bullet break of the bones of shin had a complication of osteomyelitis, but as basic issue this complication is noted only in 13.40/o of injured people. In all it is discharged with osteomyelitis 22.20/o, including those injured people whose osteomyelitis was the associated issue.

Discharged from hospitals injured people with the presence of osteomyelitis for the most part had osteomyelitic process remission state and did not need surgical treatment, although the x-ray

examination could still establish/install inflammatory process in the bone.

A great number of cases of osteomyelitis as issue was observed in injured people with the break of tibia (18.90/o), whereas with break of both bones of shin osteomyelitis in the final result of the treatment was observed only in 12.20/o of injured people, which is explained by the considerable number of amputations (48.70/o) among the issues with injuries of both bones of shin.

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The same relates also to the distribution of the remaining issues of bullet breaks of both bones of shin; because of the large number of produced with them amputations a number of the failures (contracture, ankylosis, osteomyelitis, pseudoarthrosis) became either identical or even it was lowered in comparison with the breaks of one bone of shin.

Pseudarthrosis as basic issue it was observed in 1.90/o of injured people with the bullet break of the bones of shin. In all pseudoarthrosis was noted in 2.50/o of injured people with the break of the bones of shin, since part (0.60/o) of pseudoarthroses entered into the combined issues. Bullet breaks of both bones of distance in

issues 2.30/o of false joints. Most of all of complications pseudoarthrosis was after the crushed breaks (16.80/o with respect to a total quantity of these breaks). A great quantity of false joints of shin is noted in the injured, subjected to radical processing scrap of bone (21.00/o) and to removal/distance of bone scrap (7.00/o). With other means of processing it was observed from 2.6 to 5.20/o of false joints.

Stumps after amputation as issue with the bullet breaks of the bones of shin are noted in 18.00/o of injured people. A number of amputations, produced during the primary processing of the bullet breaks of the bones of shin, is almost equal with a number of amputations, made after it in all stages from different readings. The number of amputations of shin in the issues each year of war was raised with 13.4 (in the first year) to 21.50/o (in the fourth year). This was connected mainly with the expansion of readings to the amputation in view of the failure of conservative ones with the method of treatment with some heavy complications, and also with an increase in the years of the war of a number of fragmentation and associated injuries and number of crushed breaks.

Strains as the basic issue of the bullet breaks of the bones of shin were observed only in 0.60/o of injured people, whereas in combination with other issues - with the contractures, osteomyelitis,

consequences of the damages of nerves - in 16.40/o. Skeletal/skeleton stretching was applied only in 2.80/o of injured people with the strain of shin after bullet break, which indicates the insufficient use/application of this method of treatment. There is no doubt that the in proper time applied skeletal traction with the bullet breaks of the bones of shin would help to remove in many injured people the displacement of scrap and shortening. in the presence strains 20.40/o of bullet breaks of the bones of shin healed with the shortening of extremity; of them into 17.40/o of cases (with respect to a total quantity of shortenings) the shortening of extremity was more than 6 cm.

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The duration of the hospital treatment of the bullet breaks of the bones of shin on the average was equal to 5.6 months, moreover with breaks of both bones it amount on the average to on 6.3 months, with the breaks of the tibia - 5.5 months and fibular bone - 5.1 months. The breaks of the bones of the shins, complicated by osteomyelitis, treated in the hospital on the average of 6.3 months.

Analyzing the clinical issues of the bullet breaks of the bones of shin on the years of war, it is possible to note certain reduction in the good issues: 25.30/o in the first year, 30.70/o - for the

second, 25.30/o - for the third and 20.40/o - for the fourth.

Also increased the percentage of amputations from 13.4 to 21.5. Simultaneously with this decreased a number of cases of osteomyelitis (from 16.2 to 12.20/o) and lethal outcomes. If we take the lethality of the first year of war for unity, then in the second year it will compose 1.3, in the third year - 0.9 and for the fourth - 0.8.

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From the aggravating in last year of war moments/torques it is necessary to note an increase of the quantity of associated injuries with 16.30/o in the first year to 27.80/o in last year of war. In exactly the same manner increased a quantity of fragmentation injuries of shin - with 50.50/o in the first year to 59.30/o in last year of war and finally increased a number of crushed breaks - from 19.9 to 24.20/o.

According to the data of the deepened development of the histories of disease/sickness/illness/malady, in injured people, who had, besides the break of the bones of shin, the still and associated injuries, the lethality was 2 1/2 times higher than in the not had associated injuries.

In spite of the presence of the burdening moments/torques, lethality and quantity of the complications of osteomyelitis with the bullet breaks of bones shins in recent years of war were lowered, decreased the number of pseudoarthroses (from 2.8 to 1.90/o) and combinations of several failures (from 5.5 to 3.30/o).

These positive results, it is doubtless, must be related due to an improvement in the quality of a medical service, increase in the surgical activity, including in the relation to amputations, approximation/approach of surgical aid to line of breakage and introduction of the specialized aid which contributed to an improvement in the most important indicators in the issues of treatment. However, the presence of an an even more considerable quantity of contractures, osteomyelitis, strains, ankylosis and pseudoarthroses shows that yet not all possibilities were used for an increase in the quantity of good issues.

Closed breaks of the bones of extremities.

The closed breaks of the bones of extremities appeared more frequently from the action of explosion wave with the break of aircraft bomb or artillery shell, from the direct shock by the fragments of the projectile and other objects/subjects, which obtained forward motion with shell burst, with the air catastrophes,

and also from the accidents during the utilization of powerful/thick technology and motor transport.

The closed breaks of shoulder were most frequently cross under the straight/direct influence of violence or oblique and spiral from the excessive effort/force with the use of manual garnets.

The first transport immobilization with the aid of Craner's splint was conducted with the closed breaks of shoulder in 70.7o/o of victims during the first day. Therapeutic gypsun immobilization was laid in 55.9o/o of victims during the first five days.

During the treatment of the closed breaks of the shoulder which in essence was conducted in the special discharge gypsun bandage, extensively was used therapeutic gymnastics and physiotherapy.

The average duration of the treatment of the closed breaks of shoulder during the war did not differ from the periods of their treatment in peacetime.

The closed breaks of thigh were accompanied in 37.0o/o of victims by the trauma of other divisions of body and in 19.0o/o - by complications from the side of internal organs/controls, which differs the closed breaks of wartime from the closed breaks of

peacetime and testifies about the more considerable severity of the first.

The closed breaks of thigh underwent transport immobilization by the standard Diedrich's and Thomas-Vinogradov splints in 2/3 victims.

As the therapeutic immobilization was applied most frequently anechoic gypsum bandage. The average duration of immobilization was 74 days, and the general/common/total duration of stationary treatment on the average was equal to 142 days.

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In spite of early diagnosis and early use/application of transport and therapeutic immobilization with the closed breaks of thigh, as a result of different factors, connected with the military circumstances, a precise adaptation of scrap it was not achieved/reached in 89.50/o of victims. In view of this in such victims were observed the shortenings, which achieved in 13.00/o of injured people the considerable degree (more than 6 cm). The normal length of extremity was preserved in 10.50/o of victims. More than in the half injured people was noted the limitation of mobility in the joints of extremity.

The large part of the strains and shortenings depended on the severity of damages and on the associated damages of other parts of the body and complications from the side of internal organs/controls. However, in some victims it is possible to note late roentgenological examination/inspection and are later the insufficient use/application of reposition of scrap and defects in the transport and therapeutic immobilization. The large part of these defects depended on specific war time, impossibility of use/application in early periods, also, in the foremost stages of skeletal/skeleton stretching, since with the closed breaks of thigh by one-time setting it was not always possible to achieve the elimination of the displacement of scrap.

The closed breaks of the bones of shin and forearm in the predominant majority of victims were treated by anechoic gypsum bandage. In this case in victims with the break of the ankles/malleoli, and also with the break of one bone of forearm greatly frequently terminated the treatment in the army and front region and besides within the same periods and in peacetime.

In the treatment of the closed breaks of the bones of extremities and in the warning/prevention difficulties of movement of joints played large role the timely and systematic use/application of therapeutic gymnastics and physiotherapy.

For warning/preventing of strains and shortening of extremities during the treatment of the closed breaks under military conditions, as showed the experiment/experience of the Great Patriotic War, it is necessary to lay in the army region by these suffered anechoic gypsum bandage, then within possibly the earlier periods to evacuate of them depthward the countries in order to subject to treatment by skeletal/skeleton stretching those then then, in which with the application of anechoic gypsum dressing in the army region it was impossible to achieve the correct position of scrap.

After the application of anechoic gypsum dressing with the closed breaks of long tubular bones is necessary careful observation for warning/preventing the developement of edema, compression and numbness of extremity (in particular with the breaks of the bones of shin) .

Complications with the breaks of the bones of extremities.

Shock with the bullet breaks of the bones of extremities composed 28.30/o among all complications of shock, which were being observed with the injury during the Great Patriotic War. Most frequently the complications of shock were encountered with the bullet breaks of thigh - 7.70/o, less frequent - with the bullet breaks of the bones of shin (5.30/o) and shoulder (2.50/o) and it is

very rare with the breaks of the bones of forearm (0.90/o); numerals were given with respect to a total number of injured people with the break of the bones of each segment.

The development of shock was most frequently caused by injuries with the extensive deccaposition of bones and soft tissues which created the flow of the excessively intensive impulses/momenta/pulses from the place of injury they caused overstimulation and suppression of cerebral cortex.

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Especially rapidly were developed these nervous reflex disorders against the background of massive blood loss or intoxication during the violently developing anaerobic and aerobic general/common/total infection, intensive coolings and fatty embolisms.

As the preventive measures against the shock with the breaks of the bones of extremities proved to be most effective: the early imposition of transport immobilization, the novocaine blockade of the place of break and early primary surgical treatment under narcosis or local anesthesia with the subsequent most ideal transport or therapeutic immobilization and the blood transfusion.

The enumerated measures to a considerable extent contributed to a reduction in the complications of the shock of injured people with the bullet break of the bones of extremities during the Great Patriotic War.

For the treatment of the already developing with the breaks shock proved to be most effective the complex therapy, directed for the purpose of action on entire organism, on the fight with oxygen starvation, disorder of respiration, blood circulation and metabolism, and also to the fight with the reducing the general/common/total resistivity of organism factors - by blood loss, infection, intoxication, supercooling/chilling, etc.

Anaerobic infection most frequently was encountered with the injuries of extremities and composed 94.00/o of all complications of anaerobic infection, moreover their predominant quantity was observed with the bullet breaks of the bones of extremities. Thus, with the bullet breaks of thigh anaerobic infection was noted 14 times, the bones of shin 6 times, shoulder - 12 times also of the bones of forearm 7 times more frequently than with the injuries of some soft tissues alone of the corresponding segments. On the lower extremities with the bullet breaks anaerobic infection was encountered $3\frac{1}{2}$ times more frequently than on the upper extremities.

The frequency of the complications of the gas infection of bullet breaks was not connected with the season, but it depended, first of all, on the severity of the damage of bones and soft tissues and in particular from the damage of main-line vessels.

With the fragmentation injuries the complication of anaerobic infection was observed $2\frac{1}{2}$ times more frequently than with the bullet ones. Other conditions being equal, anaerobic infection appeared more frequent afterward late or it is incomplete the produced primary surgical processing.

The operational method of the treatment of anaerobic infection with the breaks was basic, moreover among the operations/processes predominated amputations.

The high value in the treatment of anaerobic infection with the bullet breaks of the bones of extremities had the serotherapy which, according to some data, lowered lethality approximately doubly. Also exerted the doubtless positive effect and the use/application of bacteriophages.

Tetanus was encountered with the bullet breaks in 0.130/o of injured people. 75.00/o of the injured people, who sickened by tetanus, obtained the preventive introduction of serum, and

nevertheless in them developed tetanus, which in the larger part of the injured people is explained by the retardation of primary surgical processing or by the presence in wound of the uneliminated/unremoved foreign bodies.

The treatment of the injured people, who sickened by tetanus, was surgical with the introduction of the large doses of antitetanus serum. Despite the fact that the lethality of the injured people, who sickened by tetanus, remained high, nevertheless it toward the end of the war in comparison with the first year decreased 5 times.

Sepsis met as the complication of the bullet breaks of thigh in 9.50/o, the bones of shin - in 2.20/o, shoulder - in 1.10/o and the bones of forearm - in 0.20/o with respect to a number of all injured people the break of this segment.

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The frequency of the complications of sepsis influenced, first of all, the character/nature and the severity of the damages to bone and of the soft tissues, the level of break and implication in inflammatory process of one of adjacent joints, and also presence foreign bodies and fragments of bone in the soft tissues. other conditions being equal, the development of sepsis sometimes depended

on late or incompletely produced primary surgical processing, abandonment in the wound of foreign bodies, fragments of projectile and deprived of nourishment scrap of bone.

Most effective with the bullet breaks of thigh was the operational method of the treatment of sepsis. From the operations/processes with the sepsis most frequently was applied the amputation. from the medicinal/medicamentous substances in the treatment of sepsis were applied sulfanilamide preparations vnutr6 and it is intravenous, but noticeable results they are not distance. The best effect is noted with penicillinotherapy, which was applied in last year of war, but in the sufficiently restricted number of injured people.

In the majority of injured people with the septic complication of break were applied successfully the repeated blood transfusions on 200-250 ml. On the average to each injured person with the sepsis it was made from 3 to 3.8 blood transfusions.

The large part of the injured people with the break of thigh, complicated by sepsis, was treated by immobilization by gypsum bandage, and in 10.50/o of injured people was only applied skeletal/skeleton stretching.

Sepsis was heaviest complication of the bullet breaks of the bones of extremities. Lethality with the bullet breaks of thigh, complicated by sepsis, was 3.9 times higher than with the simple breaks of thigh; with the breaks of the bones of shin, complicated by sepsis, lethality was 7.5 times higher than with those uncomplicated.

Lethality from sepsis with the bullet breaks within the period of war gradually descended, but the number of amputations grew on. Among the survived injured people with the bullet break of thigh, complicated by sepsis, the amputations were produced in 68.30/o, with the breaks of the bones of shin - in 79.30/o, shoulder - in 50.00/o and the bones of forearm - in 73.70/o of injured people.

Osteomyelitis was one of the most frequent complications of the bullet breaks of the bones of extremities (thigh - 31.10/o, shin - 41.80/o, shoulder - 39.30/o, forearm - 25.20/o).

The onset of osteomyelitis with the bullet breaks of the bones of extremities depended, first of all, on severity and character/nature of wound of bone and soft tissues, fairly often bullet osteomyelitis coincided with the jamming of foreign bodies in the wound cavity. With the complicated by osteomyelitis breaks of the bones of extremities most frequently was applied the immobilization of anechoic gypsum bandage and with osteomyelitis thighs sometimes

only put to use skeletal/skeleton stretching.

In the frequency osteomyelitis corresponded to the most complex means of primary surgical processing, i.e., to the removal/distance of bone scrap and to processing bone scrap, which is explained by the heavier character/nature of injuries.

In the years of war, in spite of an increase in the frequency of the complications of osteomyelitis was noted a reduction in the quantity of cases of osteomyelitis in the issues after bullet breaks, which is explained by the more frequent use/application of radical methods of the surgical treatment of bullet osteomyelitis.

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In this case it is necessary to note that an attempt at warning/prevention of osteomyelitis by the expansion of the radicality of operational intervention up to the full/total/complete removal/distance of all bone fragments both connected, and not connected with the periosteum, with the addition of the cross resection of basic scrap during the primary surgical processing did not give decrease of the quantity of the complications of osteomyelitis in comparison with the usual economical surgical processing in the form of the removal/distance of clearly nonvital

tissues and only some bone scrap, deprived of connection/communication with the periosteum.

The experiment/experience of the Great Patriotic War showed that in the majority of injured people many bone fragments get accustomed to and proceed with the formation of the callus. Conducting the full/total/complete removal/distance of all bone scrap in a moment during the primary processing must not be conducted, since it cannot be determined, what bone scrap, connected with the periosteum, are nonvital, but at the same time one should remember about the possibility of the secondary necrosis of bone scrap. Therefore even radical primary surgical processing did not in any way eliminate the need for repeated interventions in the presence of the corresponding readings for the removal/distance of the subjected to secondary necrosis scrap.

Only by the way of permanent and systematic observation of the general state of injured person and by local changes it was possible to evaluate the course of the process of the healing of bone wound and to place readings to repeated surgical intervention.

This expectant active tactics in the ratios of the bullet breaks led during the Great Patriotic War to a gradual reduction in the quantity of cases of osteomyelitis in the basic issues of the breaks

of the bones of the extremities: with the breaks of shoulder from 9.6 to 5.60/o of, those of the bones of forearm - from 4.1 to 2.80/o, thighs - from 7.4 to 4.30/o and the bones of shin - from 16.2 to 12.20/o. Decreased also the duration of the treatment, for example, of osteomyelitis of the bones of forearm from 5.1 months (1941) to 4.5 months (1945), and were improved clinical issues.

Osteomyelitis of the bones of extremities considerably increased the periods of the stay in the hospital of injured people with the bullet break. Thus, with the bullet breaks of thigh, which were being accompanied by osteomyelitis, the duration of treatment on the average was more on 48 days, with the breaks of the bones of shin - on 39 days, shoulder - on 45 days also of the bones of forearm on 48 days more than with the breaks of the bones of the corresponding segments, which flowed/occurred/lasted without the complication of osteomyelitis.

The treatment of osteomyelitis, which complicated the bullet breaks of the bones of extremities, consisted in the removal/distance of free bone fragments and sequestrations, in the saving of the exposed from the periosteum basic bone scrap. This procedure of the treatment of bullet osteomyelitis gave the best clinical issues, lowered a quantity of amputations and fatal results.

The scraping out of fistulas and sequestral cavity without their radical disclosure/expansion gave no positive result with chronic osteomyelitis with the formation of fistulas, but it was sometimes accompanied by considerable hemorrhage.

Too radical a method of the treatment of osteomyelitis - the so-called subperiosteal cross resection of bone - justified itself with heavily flowed/occurred/lasted osteomyelitis and sepsis, when resection was the latter/last operation/process, capable of preserving extremity; in this case false joints were obtained more frequently than during the treatment by less radical surgery.

Subperiosteal resection gave good results with osteomyelitis of fibular bone, since even with the subsequent formation of the large defect of bone statics and function of extremity were not disturbed.

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Has very high value a question about the periods of surgical intervention with bullet osteomyelitis. It is must whether compulsory to wait until the final formation of the callus? It is first of all necessary to note that the presence of osteomyelitis detained the formation of the callus with the bullet breaks and contributed to the development of contracture, ankylosis, pseudoarthrosis, strain and

shortening, and also influenced the not general state of organism.

The experiment/experience of the Great Patriotic War also showed that the further was moved aside the moment/torque of surgical intervention, the worse were the results, for example, after the operation/process apropos of osteomyelitis of shoulder, produced during the periods up to two months after injury, it was discharged with fistula 21.00/o of injured people, and after 3 months - 50.00/o.

The histological studies of the removed on the operation/process sections of the bone, which was being coalesced in the presence of osteomyelitis, established/installed, that the callus, which was being formed around the osteomyelitic focus, is inferior and contains the inside separate necrotic and inflammatory sections which subsequently served as the source of outbreaks and aggravations of infection. Therefore in the relation to bullet osteomyelitis proved to be more effective the tactics of early interventions before the formation of durable callus.

Table 405 depicts the direct results of the treatment of bullet osteomyelitis.

Use/application of antibiotics during the treatment of bullet breaks gives the possibility to considerably lower a quantity of the

complications of osteomyelitis and to attain the recovery of osteomyelitis within the shorter period and with the best results.

Pseudoarthrosis during the Great Patriotic War comprised with the bullet breaks of shoulder 5.10/o, forearm - 3.90/o, thighs - 0.60/o and shins - 2.50/o. In a number of all pseudoarthroses of long tubular bones pseudoarthroses of shoulder composed 30.20/o, the bones of forearm - 42.20/o, thighs - 5.30/o and the bones of shin - 22.30/o. The formation of pseudoarthrosis was connected, first of all, with the severity of injury, the pathological anatomy of break and the character/nature of the required primary surgical processing. Thus, pseudoarthroses with the crushed breaks were observed on the shoulder into 23.50/o, on the forearm - into 20.60/o, on the thigh - into 3.60/o and on the shin - in 16.8% (with respect to a total quantity of crushed breaks of each segment).

On the frequency of the formation of pseudoarthroses had an effect also the character/nature of primary surgical processing and repeated surgical interventions, which were being applied for the treatment of bullet osteomyelitis.

Table 405. Direct results of the treatment of bullet osteomyelitis of the bones of extremities (in the percentages).

(1) Локализация огнестрельного остеомиелита	(2) Полное излечение	(3) Выписаны без свищей	(4) Выписаны со свищом	(5) Всего
(6) Плечо	54,3	26,3	19,4	100,0
(7) Предплечье	65,4	22,1	12,5	100,0
(8) Бедро	52,3	32,0	15,7	100,0
(9) Голень	53,2	16,8	30,0	100,0

Key: (1). Localization of bullet osteomyelitis. (2).

Full/total/complete recovery. (3). They are discharged without fistulas. (4). They are discharged with fistula. (5). In all. (6). Shoulder. (7). Forearm. (8). Thigh. (9). Shin.

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Thus, pseudoarthroses of thigh more frequently were encountered (5.00/o) after the radical processing of bone scrap. After the subperiosteal resection of the diaphysis of thigh with bullet osteomyelitis (according to Ya. M. Bruskin) the frequency of pseudoarthroses understood 14.50/o. After processing of basic scrap pseudoarthroses were encountered with the bullet breaks of the bones of shin into 21.00/o, the breaks of shoulder - into 34.60/o and of the bones of forearm - into 16.70/o.

To the formation of pseudoarthroses contributed also prolonged

festering by complication of osteomyelitis. The large part of the injured people with pseudoarthrosis of long tubular bones had a complication of osteomyelitis. Had the value and timely setting and correct position of scrap of bones with the therapeutic immobilization.

After treatment by skeletal/skeleton stretching pseudoarthroses were observed in 1.90/o of injured people with the bullet break of thigh, while after treatment by anechoic gypsum bandage - in 0.50/o. This must be set in connection/communication with the more severe complications of bullet breaks, which served as reading to the treatment by stretching.

During the treatment of pseudoarthroses it is very important to prepare the patient: to make a blood transfusion, to assign that strengthening overall to diet and vitamins, and to also produce preliminary operations/processes - carving Rubtsov, plastic occlusion of ulcers, transplantation of tendons with multiple failure of nerves on the shoulder or the forearm.

With the treatment of pseudoarthrosis on the thigh and the shoulder proved to be the best method of the formation of "Russian lock" according to N. V. Sklifosovskiy. In injured people with the considerable defect of bone on the shoulder and the forearm best was

the method of intraextramedullar transplant. With pseudoarthroses of the bones of shin with the defect, which does not exceed 6-8 cm, best was the method of the slipping (movable) autotransplant. With the presence of ulcers either powerful/thick soldered with the bone Rubtsov on the front face of shin was required preliminary skin plastic surgery by feather graft/flap according to V. P. Filatov or Italian method.

With the integrity of fibular and the large defect of the tibia a good effect gave the operation/process Ghana in the modification of M. S. Zhukhovitskiy with the additional spacer from the healthy/sound tibia.

With pseudoarthroses of the separate bones of forearm greatly frequently was observed simultaneously the dislocation of the head of radial or ulna.

With the large defects of radial bone a good result gave substitution of defect by the remaining undamaged/uninjured ulna, connected with the extremal end of the radial bone according to the type of "Russian lock". With the defects of the ulna and the dislocation of head radial good effect gave analogous operation/process in the proximal division of forearm with the substitution of the defect of the ulna in upper and middle third by

radial bone, connected with the proximal division of the ulna.

The period of operational intervention apropos of pseudoarthrosis, according to the experiment/experience of the Great Patriotic War, must be increased prior to one years in view of the fact that earlier intervention frequently caused after the occlusion of wound the outbreak of wound infection, although used into the postwar period of penicillinotherapy widely made it possible to resort to surgical intervention and when in wound the causative agents of infection are present,.

The successful surgical treatment of pseudoarthrosis of thigh was noted in 58.00/o of injured people, bones of shin - in 73.00/o, shoulder - in 76.20/o and the bones of forearm - in 68.00/o.

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Contractures were the most frequent complication of the bullet breaks of the bones of extremities and were observed on the average in 56.60/o of injured people with the bullet break of the bones of extremities. The majority of contractures was connected with character/nature and localization of injury. The extensive damages of skin, bone, muscles, nerves, tendons, close to the joint injuries, to a greater or lesser extent disturbed the motor function of extremity.

different complications also contributed to the development of contractures; so, with pseudoarthroses the contractures developed in 49.50/o of injured people, with osteomyelitis - in 58.00/o and during the combination of poor issues - in 75.40/o of injured people.

The ankylosis, which are actually the maximum degree of contractures, were encountered on the average in 3.80/o of injured people: after the injuries of shoulder - in 3.70/o, forearm - in 3.40/o, thighs - in 7.00/o and shins - in 2.50/o of injured people.

Prophylaxis of contractures consisted in the elimination of pains, the fight with the infection, the reposition of scrap, correct and timely transport and therapeutic immobilization, the early occlusion of wounds, the removal/distance of the foreign bodies, which impede motion in the joints, imparting to extremity of the elevated position for warning/preventing edema, in the use/application of early active contractions/abbreviations of muscles, early motions of the separate segments of extremities and early physiotherapy.

However, the frequent complication of breaks of contractures testifies about the insufficient utilization of the preventive measures indicated.

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In the treatment of contractures were applied small in the value the continuously acting correcting forces and strengthening of antagonists' muscles. With strong resistance of Rubtsovs of the tissues, which impede the reduction of the normal volume of motions, is shown operational dissection or their carving.

High value in prophylaxis and treatment of contractures had the physiotherapy, which contributed to the fastest resorption of inflammatory infiltrate, to the decrease of pains and to the elimination of spastic phenomena. However, the basic method of treatment and prophylaxis of contractures were therapeutic gymnastics, massage, mechano- and ergotherapy. The results of the treatment of contractures after the bullet breaks of the bones of extremities are represented in Table 270 (pg. 426).

Strains, shortenings and incorrectly grown together breaks were the insignificant percentage of clinical issues (as independent issue) after the bullet breaks of the bones of extremities (after the injuries of shoulder - 0.40/o, forearm - 1.10/o, thigh - 1.70/o and shin - 0.60/o).

However, in a considerably larger quantity strains and shortenings were encountered in combination with other unfavorable terminations. Thus, on the shoulder strain and shortening accompanied

other basic issues in 17.7o/o of injured people. With the basic issue of the breaks of the shoulder of the "consequence of the damage of nerves" - the strain was observed in 12.5o/o of injured people, with the basic issue "contracture" the strain was noted in 19.5o/o, with osteomyelitis - in 24.7o/o, false joints - in 30.3o/o, ankylosis - in 31.7o/o and in a number of different combinations of issues - in 38.8o/o of injured people. On the forearm the strain accompanied other issues in 15.3o/o all of those recovered. In 50.4o/o of incorrectly grown together breaks of the bones of forearm was observed osteomyelitis, into 39.6o/o - contracture.

With the incorrectly grown together breaks of bones elbows in 74.3o/o of injured people was noted osteomyelitis, in 77.1o/o - contracture, in 5.7o/o - ankylosis, in 8.4o/o - damage of large vessels, in 11.4o/o - damage of nerves and in 6.4o/o of injured people - damage of joints.

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The shortening of shoulder was observed in 26.2o/o of injured people; the distribution of injured people according to the degree of the shortening of shoulder was the following: shortening to 2 cm was in 28.3o/o, on 3-5 cm - in 62.3o/o, on 6 cm and greater - in 9.4o/o of injured people.

The shortening of forearm in the limits from 2 to 5 cm was noted in 4.40/o of injured people. The synostosis between the bones of forearm was observed in 2.80/o of injured people.

The shortening of thigh in the limits to 3 cm was in 33.20/o of injured people and from 4 to 6 cm - in 50.40/o, i.e., the easily compensated shortenings of thigh were in 83.60/o of injured people, then so in the first world war (according to the data of Tuffie) such degrees of shortening were obtained only in 26.50/o of injured people.

The basic reason for strains and shortenings with the bullet breaks of the bones of extremities were the heavy anatomical damages of tissues and severe complications infection, and also defects in the treatment: the disturbance/breakdown of the rules of reposition, the absence of systematic roentgenological check in the process of treatment, defects in conducting of therapeutic immobilization, absence of the late reposition of scrap and redressment (or refracture) with the already formed callus with the incorrect position of scrap. In some injured people with the break the thighs and the bones of the shin of strain could be removed by the timely use/application of skeletal/skeleton stretching.

Experiment/experience showed that with the bullet breaks is observed the "local stupor" of muscles only during the first days after injury, and subsequently course as a result of the contraction/abbreviation of muscles is developed the typical displacement of scrap which must be removed either one-time setting on the apparatuses, or by prolonged skeletal/skeleton stretching. The nonobservance of this rule led to the incorrect coalescence of breaks. In some injured people the displacement of scrap was developed in view of the too early transition from the skeletal/skeleton stretching to the gypsum immobilization, and also due to the early load of extremity without the gypsum bandage and the fixation apparatuses, without taking into account the individual characteristics of organism and periods of the ossification of bone.

Sometimes the displacement of scrap was developed in the anechoic gypsum bandage as a result of the atrophy of soft tissues with the long conducted immobilization.

In the majority of injured people the incorrect coalescence of break was not corrected by timely redressment due to the fear cause the aggravation of infection. As showed the experiment/experience of the Great Patriotic War it is earlier and cautious setting of basic scrap (for example, via skeletal/skeleton stretching) not only did not make the course worse of wound, but it considerably improved it

and contributed to the fastest healing of wound, removing the compression of tissues by the displaced scrap and improving the blood supply of tissues. In exactly the same manner and late setting of scrap and even refracture, which were being extensively used in recent years of war in the back evacuation hospitals, gave considerable improvement and considerably accelerated the process of the healing of wound.

For warning/preventing of strains and shortenings, as showed the experiment/experience of the Great Patriotic War, must be carried out in the army region the most fully and systematic specialized treatment of the breaks of the bones of all segments of extremities.

Main attention must be given to setting of basic break, to roentgenological check and to retention of break in the correct position both during the first days after injury and subsequently course. It is necessary to systematically put to use equipment for setting of break and, when it is not possible to attain one-time setting, it is necessary to apply prolonged skeletal/skeleton stretching.

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Among the breaks of shoulder with the damage of nerves most

frequently was observed the damage of radial nerve (48.80/o) and the combined damage of several nerves (28.00/o).

Among the bullet breaks of thigh with the damage of nerves most frequently was noted the damage of sciatic nerve (54.40/o). The recognition of the damages of nerves with the bullet breaks was hindered/hampered as a result of the severity of the associated damages and use/application of immobilization. The special measures, directed toward the treatment of the damages of nerves with the bullet breaks of the bones of extremities in the early stages of the course of wound process, it was not conducted, with exception of the immobilization, which warns the development of contractures.

Operations/processes apropos of the damage of nerves were conducted mainly only after the healing of wound and fracture and they consisted in the release of nerves from Rubtsov or in the carving of neuromas and the imposition of nerve suture. The periods of duration after the healing of wound for surgical intervention on the nerve considerably were shortened, in particular with the introduction to the practice of penicillin. The reduction of the function of nerves with the bullet breaks in the group of direct results was noted only during the light and partial damages.

The damage of nerves with the breaks of shoulder up to the

moment/torque of extraction was eliminated in 4.60/o of injured people, it remained expressed in moderate degree in 57.90/o and to the sharp degree - in 37.50/o; with the breaks of the bones of forearm the damage of nerves to the day of extraction was eliminated in 12.30/o of injured people, it remained expressed to the moderate degree in 56.90/o and to the sharp degree - in 30.80/o, etc.

On the average the damage of nerves with all breaks of the bones of extremities to the day of extraction was eliminated in 9.20/o of injured people, it remained expressed to the moderate degree - in 57.50/o and to the sharp degree - in 33.30/o of injured people.

The consequences of the damages of nerves with the bullet breaks, besides the sensitive and motor disorders, were connected with the presence of contractures and limitations of the motions whose significant part must be referred due to the damages to bone, the muscles, the tendons and the skin.

The injuries of large vessels comprised in average/mean 10.00/o with respect to all bullet breaks of the bones of extremities.

With the combined injuries (vessel and bone) the amputation during the primary processing was made in 41.90/o of injured people (with the break of shoulder - in 49.50/o, the bones of forearm - in

32.0o/o, thigh - in 23.5o/o and the bones of shin - in 48.5o/o).

During the primary surgical processing the dressing of vessel in the wound was conducted in 19.3o/o of injured people (on the shoulder - in 12.8o/o, the forearm - in 31.5o/o, the thigh - in 14.4o/o and the shin - in 17.0o/o).

A sufficiently considerable number of injuries of vessels (33.9o/o) combined with the bullet break of bone, was not identified both during the primary processing and in the absence of no its, and interventions apropos of them it was undertaken.

The damage of large vessels with the breaks of the bones of extremities was most frequently connected with the considerable blood loss, the disturbance/breakdown of blood circulation and a decrease in the general/common/total resistivity of organism, which contributed to the development of heavy complications in injured people.

From the early complications in the first place will cost the shock, which was observed during the damages of vessels and bones of extremities on the average in 16.7o/o of injured people (with the injuries of thigh - in 26.2o/o).

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With the bullet breaks of thigh, combined with the damage of vessels, the shock was encountered 4.2 times more frequently than without the injury of vessels, with the bullet breaks of the bones of forearm - 13 times more frequently than without the injury of vessels.

Gas infection with the breaks of the bones of shin with the damage of vessels was observed approximately 2 times more frequently than with the breaks without the damage of vessels.

Sepsis appeared with the bullet breaks of thigh in the exsanguinated injured people more than 2 times more frequently, with the breaks of the bones of shin 3 times, with the breaks of shoulder 4 times and with the breaks of the bones of forearm 7 times more frequently than with the breaks of the corresponding bones, but without the damage of vessels. All this bears out the fact that the blood loss with the injuries of vessels considerably disturbs hemodynamics, decreases the general/common/total resistivity of organism, connected with controlling all vital processes nervous system.

Aneurism it was formed in 1.00/o of all injured people with

unamputated extremity. Amputations with the breaks with the damage of vessels were conducted on the average 10 times more frequently than without the damage of vessels.

The blood transfusions were conducted with the injuries of vessels almost 3 times more frequently than with the breaks without the injury of vessels.

Clinical issues in injured people with the bullet break and the damage of vessels were considerably more badly than in injured people without the damage of vessels. In injured people with the bullet break of thigh and damage of vessels a small quantity of complications and the smallest lethality were obtained after amputation during the primary processing: the injured people, in whom was produced the dressing of the femoral vessels, and in which was preserved extremity, they were a comparatively small percentage among those recovered.

In a number of unfavorable factors, which adversely affected the issues the injured people have with the damage of vessels and the break of bone, are noted: tight tamponade of wound, the insufficient immobilization of extremity, the prolonged stay of tourniquet and short-time hospitalization.

Taking into account the severity of damages and hemodynamic disorders in injured people with the bullet break and the injury of vessels, it is necessary to conduct the earliest possible primary surgical processing and the ideal immobilization by skeletal/skeleton stretching or gypsum bandage. The latter has unfavorable side in the fact that impedes observation of the state of wound (possibility of secondary hemorrhages) and by the viability of extremity.

In injured people with the especially favorable injury of vessels is shown the imposition of vascular suture with the utilization of antibiotics.

The dressing of vein according to V. A. Oppel' did not always improve blood circulation, in particular in the presence of infection, when hemostasis in the veins contributed to the development of thrombosis and septic phenomena.

Best proved to be the dressing of vessels in the wound, the giving possibility to bandage both ends of the injured vessel, whereas dressing on extent did not very frequently give effect.

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For improvement of blood circulation in the extremity it is

necessary to take being all-inclusive measures for the elevation of blood pressure - transfusion of blood and blood-substituting fluids/liquids, blockade of sympathetic ganglia which contributes to the expansion of collaterals, to the elimination of angiospasm (after dressing) and to improvement in the blood supply of extremity; furthermore, it is necessary to produce circular block/module/unit according to A. V. Vivnyovskiy, cutting and carving of the section of the artery between the ligatures and introduction of 1.0o/o novocaine to a quantity of 10 ml in the peripheral cut of artery with the subsequent infusion of the blood into the peripheral end of the bandaged artery.

During the Great Patriotic War successfully was applied after the dressing of large vessel the method of the prolonged drop blood transfusion in the peripheral cut of the damaged artery (L. Ya. Leyfer, B. V. Ognev).

By the measures indicated it was possible for the second half war to considerably improve results with this heaviest form of the bullet breaks of the bones of extremities, combined with the injury of vessels. For example, during the first years of war with the breaks of shoulder was possible to preserve extremity somewhat more than in 1/3 injured people, and in recent years of the war of this it was possible to achieve almost in 2/3 injured people.

The bullet breaks of the bones of extremities were the heaviest injuries, which were being accompanied in all wars by severe complications, high lethality and unsatisfactory issues of treatment. The breaks of the bones of extremities greatly frequently were accompanied by the damage of vessels, nerves, muscles, tendons and joints. Under the vast destructive force of modern projectiles, bombs and even bullets the damages of the bones of extremities sometimes are so considerable that for the rescuing of the life of injured person the only method of treatment can be the amputation of extremity.

Nevertheless, summing up the results to immense experiment/experience in the treatment of bullet breaks, acquired during the Great Patriotic War, it is necessary to note great achievements, also, in this extremely difficult region of military field surgery.

First of all high value had the specialization of surgical aid with the bullet breaks, carried out from the army ones to the back hospitals.

Because of the liberation/excretion of this heaviest group of

injured people and their concentration in specially equipped for this purpose hospitals, because of the care by their specialists - orthopedists, roentgenologists and surgeons, who master completely the procedure of the treatment of breaks, it became possible to imp a heavy demands on the procedure of the treatment of this contingent of injured people, to improve and to develop the procedure of treatment and to be achieved good results.

In depression and expansion of the specialized aid are opened/disclosed the wide prospects for the treatment of bullet breaks.

Large value in obtaining of achievements had the organization of the specialized aid in the army hospitals and the delivery/procurement of injured people into the specialized hospitals into the first days and hours after injury.

Especially advantageous proved to be the conditions when injured people with the break of the bones of extremities underwent early primary surgical processing in the specialized hospitals without their delay for the processing on DMP. Were shortened the periods of delivery/procurement, dropped out excess stage and were created possibilities for the being all-inclusive single surgical processing of break with the direct subsequent imposition of therapeutic

immobilization.

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To success to a considerable extent contributed the use/application of contemporary equipment for diagnosis and treatment of the bullet breaks of the bones of extremities. The experiment/experience of the Great Patriotic War showed that for the correct and effective treatment were necessary X-ray- photographs of the region of the break in two projections, and subsequently the systematic roentgenological checking of the position of scrap. Without the x-ray examination cannot be effective primary surgical processing. in the absence of the x-ray examination by injured person are conducted excess operations/processes, are missed periods for the timely and being all-inclusive operation/process.

In the treatment of bullet breaks large role played the orthopedic tables which provided excellent operational access during the primary surgical processing and correct position of break of bones during the imposition of therapeutic immobilization.

Without the orthopedic tables is impossible the production on a mass scale of the being all-inclusive surgical processing of the bullet break and the imposition of therapeutic immobilization by

injured person with the break of the bones of extremities.

With the breaks of bones with the formation of multiple fragments (chalk, large-splintered and crushed) it is necessary to cut all over not only the contused and nonvital soft tissues and the exposed from the periosteum ends of the basic scrap of bone, but also to drive out the free at the wound foreign bodies and the isolated from the soft tissues fragments of bone; however the fragments, which preserved connection/communication with the soft tissues, must be packed not place and are preserved for the subsequent regeneration of bone. Had high value for the subsequent course of break the removal/distance of all fragments of bone, which are located in the soft tissues and being on there exist by foreign bodies, and also setting and retention of break in the correct position. Large positive role in this respect played orthopedic tables and superimposed with their utilization anechoic gypsum bandages.

The method of the treatment of bullet breaks by anechoic gypsum bandages during the Great Patriotic War occupied the leading place, but this does not mean that it completely displaced the method of skeletal/skeleton stretching, which with many breaks had its readings and considerable advantages before the anechoic gypsum bandage. Skillful combination of both methods gave of surgeon the possibility to individualize treatment and to select the best method depending on

medical readings and in connection with combat circumstances.

In the Great Patriotic War was revealed the value of early surgical and radical intervention with different sharp/acute and chronically elapsing complications. The existed earlier phobia of the disturbance/breakdown of granulating shaft with the septic complications and a delay of surgical intervention with bullet osteomyelitis before the formation of sequestral capsule proved to be invalid. The earlier carried out the revision of wound with the septic complication and are removed sequestrations with osteomyelitis, the better were obtained the results. It is established/installed, that the osteomyelitic process sharply retards the formation of corn and its consolidation, and the formed in the presence of osteomyelitic focus corn is defective, it is pierced by the suppurative foci, which give subsequently the outbreaks of the aggravation of osteomyelitic process.

Was revealed the value of a precise adaptation of scrap during the treatment of bullet breaks. Only in a precise adaptation and the correct position of scrap smoothest possible course of bullet break, and also obtaining good anatomical and functional results. The poor standing of scrap detains the process of coalescence and consolidation of corn.

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Repeated setting and even forcible refracture with the subsequent stretching accelerated the healing of fracture and improved anatomical and functional results.

In the considerable majority of injured people the foreign bodies with the bullet breaks of the bones of extremities created complications and delayed consolidation. By the best the course of the bullet breaks was when foreign body was driven out during the primary surgical processing.

with the bullet breaks multiple failure of large vessels and nerves considerably burdened the course of wound process. In the majority of such injured people it was necessary to resort to the amputation. However, the in proper time produced primary surgical processing with dressing of both ends of the damaged vessel, the subsequent measures, directed for the elevation of blood pressure (blood transfusion), the vasodilation of extremity (blockade, intra-arterial introduction of novocaine and blood transfusion to the peripheral end of the artery) and fight with the wound infection (antibiotics and sulfanilamides) contributed to the retention/preservation/maintaining extremity.

Surgical treatment of pseudoarthroses, strains and shortenings in the majority of injured people gave positive effect.

With the bullet breaks was decisive the complex treatment of injured person, which was being conducted from the positions of Acad./Academician's teaching. I. P. Pavlov about the completeness of organism, about his interrelations with the environment and about the role of central nervous system during physiological and pathological processes in the organism of injured person.

From this point of view, together with the surgical treatment, was applied with the great success the physiotherapy and therapeutic gymnastics. Physiotherapy and therapeutic gymnastics, acting locally and on entire organism, raised the resistivity of organism, mobilized its reserve forces and contributed to the fastest coalescence of break and to the reduction of functions. The experiment/experience of the Great Patriotic War showed that the physiotherapy and therapeutic gymnastics are the powerful/thick auxiliary methods of the treatment of the bullet breaks of the bones of extremities.

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