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A Peer Reviewed Journal for SOF Medical Professionals

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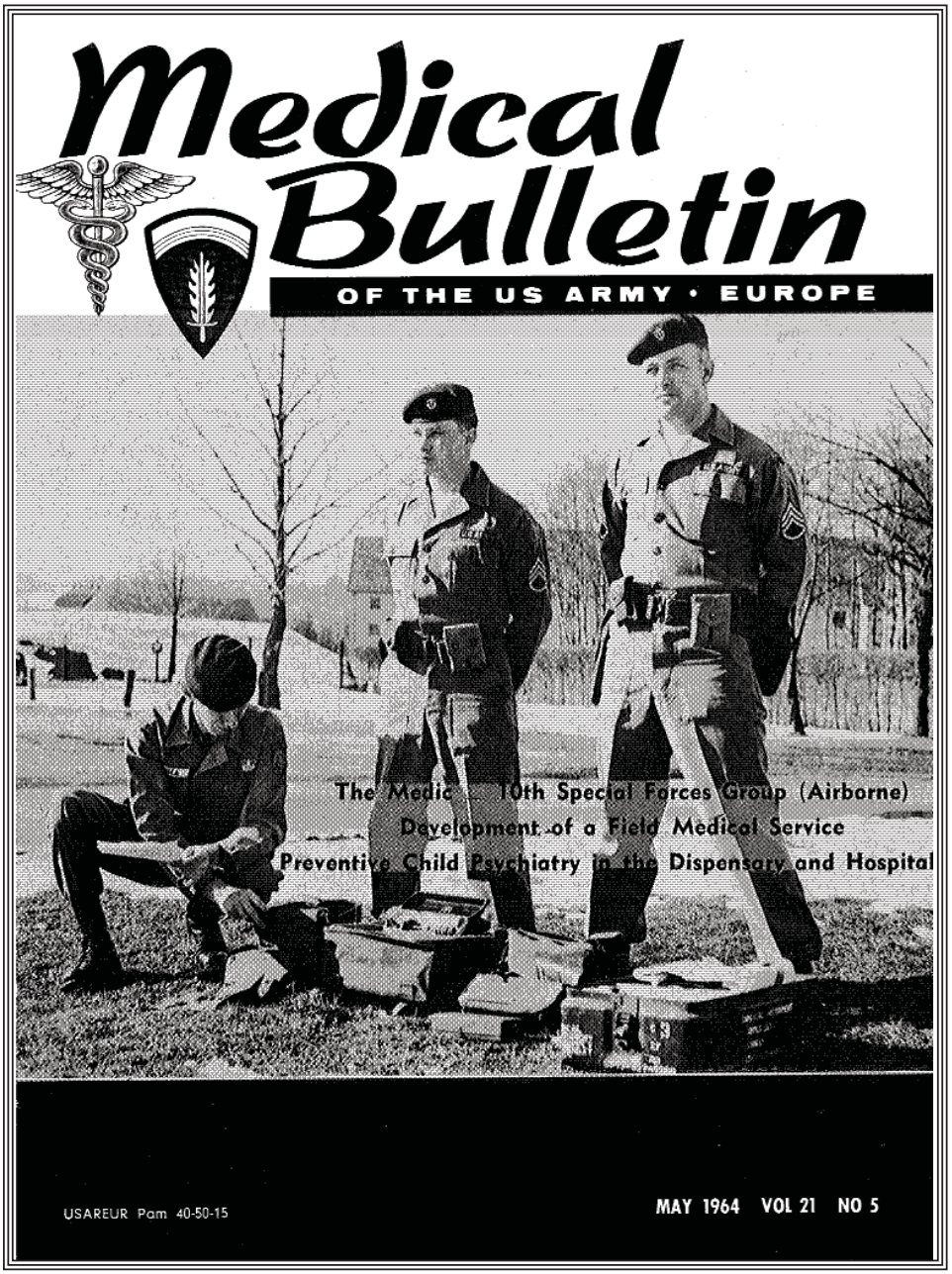

UNCONVENTIONAL WARFARE
UNCONVENTIONAL MEDICINE

This edition's feature articles are:

- **Arterial Gas Embolism: A Case Report for Undersea and Diving Medical Officers**
- **Basketball-related Sports Injuries and Their Impact on Medical Supplies and Operational Readiness at a Forward Operating Base in Afghanistan**
- **Theater Command Surgeon: An Evolving Leadership Role For Special Operations Medicine -- Invited Commentary**

Dedicated to the Indomitable Spirit & Sacrifices of the SOF Medic

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COVER

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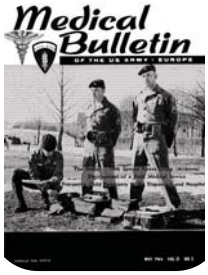
Cover of the Medical Bulletin May 1964, Vol 21, No 5. that contains the article **The Medic - 10th Special Forces Group (Airborne) by Major Einar Himma, MC.** Please see article in the Medical History section of this JSOM.



From the Editor

The Journal of Special Operations Medicine (JSOM) is an authorized official military quarterly publication of the United States Special Operations Command (USSOCOM), MacDill Air Force Base, Florida. The JSOM is not a publication of the Special Operations Medical Association (SOMA). Our mission is to promote the professional development of Special Operations medical personnel by providing a forum for the examination of the latest advancements in medicine and the history of unconventional warfare medicine.

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Distribution: This publication is targeted to SOF medical personnel. There are several ways for you to obtain the Journal of Special Operations Medicine (JSOM). 1) USSOCOM-SG distributes the JSOM to all our SOF units and our active editorial consultants. 2) SOMA members receive the JSOM as part of membership. Please note, if you are a SOMA member and are not receiving the subscription, you can contact SOMA through www.somaonline.org or contact MSG Russell Justice at justicer@soc.mil. SOMA provides a very valuable means of obtaining SOF related CME, as well as an annual gathering of SOF medical folks to share current issues. 3) For JSOM readers who do not fall into either of the above mentioned categories, the JSOM is available through paid subscription from the Superintendent of Documents, U.S. Government Printing Office (GPO), for only $30 a year. Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954. GPO order desk-telephone (202) 512-1800; fax (202) 512-2250; or visit http://bookstore.gpo.gov/subscriptions/alphabet.html. You may also use this link to send a email message to the GPO Order Desk—orders@gpo.gov. 4) The JSOM is online through the Joint Special Operations University's new SOF Medical Gateway; it is available to all DoD employees at https://jsou.socom.mil/medical/. On the left you will have several tabs; you must first "log-in" using your SS#, DOB, and name; then go to "publications." Scroll down until you get to the JSOM and click on the picture. From this site, you can link straight to the Government Printing Office to subscribe to the JSOM. We are working with the JSOU to have a SOCOM-SG medical site; we will keep you posted as that progresses. 5) The JSOM can also be emailed in PDF format; if you would like to be added to the PDF list please send your request to JSOM@socom.mil.

Do your CMEs!!!! Remember, our continuing education is for all SF medics, PJs, and SEAL corpsmen. In coordination with the Uniformed Services University of Health Sciences (USUHS), we offer CME/CNE to physicians, PAs, and nurses.

The JSOM remains the tool that spans all the SOF services and shares medical information and experiences unique to this community. The JSOM continues to survive because of the generous and time-consuming contributions sent in by physicians and SOF medics, both current and retired, as well as researchers. We need your help! Get published in a peer-review journal NOW! See General Rules of Submission in the back of this journal. We are always looking for SOF-related articles from current and/or former SOF medical veterans. We need you to submit articles that deal with trauma, orthopedic injuries, infectious disease processes, and/or environment and wilderness medicine. More than anything, we need you to write CME articles. Help keep each other current in your re-licensure requirements. Don't forget to send photos to accompany the articles or alone to be included in the photo gallery associated with medical guys and/or training. If you have contributions great or small… send them our way. Our e-mail is: JSOM@socom.mil.

Enjoy this edition of the journal, send us your feedback, and get those article submissions in to us now!

Maj Michelle DuGuay Landers

Meet Your JSOM Staff

EXECUTIVE EDITOR
Warner Dahlgren Farr, MD
warner.farr@socom.mil

Colonel "Rocky" Farr was the distinguished honor graduate of his Special Forces 18D class in 1968. He served as a recon team member with the 5th SFG(A) in SOG-Studies and Observations Group. He attended the DLI (German) and joined Detachment A, Berlin Brigade, an early special mission unit. He became the SF instructor at the ROTC Detachment, Northeast LA University and completed his BS. As a SFC, he taught in the 18D course and was selected for MSG. COL Farr was accepted to the Uniformed Services University of the Health Sciences and while a medical student, he was the medical platoon leader for the 11th SFG(A). He received his MD in l983 and has completed residencies in aerospace medicine, and anatomic and clinical pathology. He commanded Company F (ABN), 3rd BN, Academy BDE, Academy of Health Sciences as Course Director of the Special Operations Medical Sergeant's Course; and advisor to the 12th SFG(A). He was Chief, Department of Pathology, Blanchfield Army Community Hospital, and Flight Surgeon, 50th Medical Company (Air Ambulance), 101st ABN Division (Air Assault). COL Farr was the Division Surgeon of the 10th Mountain Division (Light Infantry) until becoming Deputy Commander of the U.S. Army Aeromedical Center. He attended the Air War College before becoming the Deputy Chief of Staff, Surgeon, U.S. Army Special Operations Command; Command Surgeon, U.S. Army Special Forces Command; and Command Surgeon, U.S. Army Civil Affairs and Psychological Operations Command. He became the Command Surgeon of the U.S. Special Operations Command in Tampa, FL in July 2006. He has numerous operational tours to include Bosnia, Kosovo, Kuwait, Vietnam, Cambodia, and Afghanistan.

MANAGING EDITOR
Michelle DuGuay Landers, RN
duguaym@socom.mil

Maj Landers joined the Army Reserve in 1987 and served as a nurse in a Combat Support Hospital unit for three years before switching services in 1990 to become an Air Force C-130 Flight Nurse. She is currently an IMA reservist attached to the SOCOM/SG office where she is in charge of management, production and publication of the JSOM. Maj Landers has a Bachelors in Nursing and a Masters in Business Administration/Management. Her 20 year nursing career includes being a flight nurse in both the military and private sector, 15 years of clinical experience in emergency and critical care nursing as well as being an EMT and a legal nurse consultant. She also served as the military liaison to her Disaster Medical Assistance Team (DMAT). Prior to the SG office, Maj Landers' experience at USSOCOM includes an assignment in the Center for Force Structure, Resources, Requirements, and Strategic Assessments.

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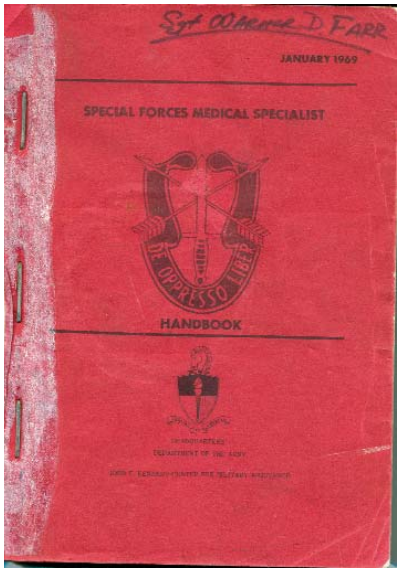
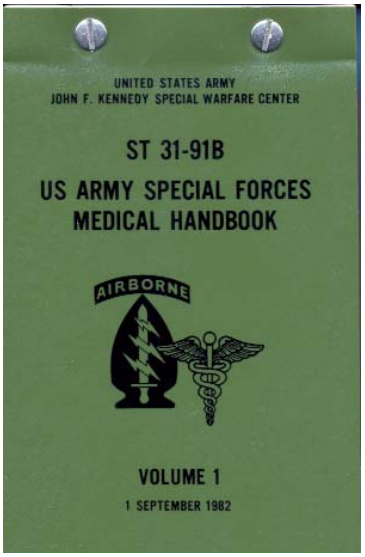
From the Surgeon

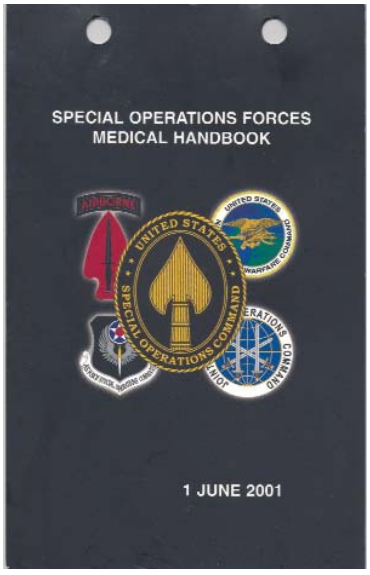
WARNER D. "Rocky" FARR
COLONEL, U.S. ARMY
Command Surgeon
HQ USSOCOM



Well, I have been at the United States Special Operations Command (USSOCOM) and in Tampa / MacDill Air Force Base, Florida, long enough to find the bathrooms and get a badge that gets me into most doors of the large secret maze. I even have a designated parking spot, which only takes two different ID cards to access! Other than an occasional hurricane, life is good. The office staff is working on several, actually MANY, issues. Some of them currently on the plate, in no particular order, I will talk about in this column. My POC is warner.farr@socom.mil.



We are in the early stages of the Special Operations Forces Medical Handbook revision 1, and I hope to field the new edition within two years. Any budding authors should contact Mr. Bob Clayton robert.clayton.ctr@socom.mil and he can direct you to the appropriate individuals. The covers of the three editions published so far (minus the bootleg civilianized ones that you have to buy commercially) are pictured here. The first one (red cover) was published in January 1969. The second one (green cover) was published 1 September 1982. The third one (black cover) was published 1 June 2001. Therefore, it took thirteen years to publish the second edition, then nineteen years for the third edition; if I meet my deadline, the next interval will be only seven years! I am soliciting advice on the color for the cover. It has to be something we have not used before. The big issue is to what audience we should target this thing? Medic? PA? Doctor? Consultant? Rocket scientist? Another question: How large IS pocket size? I await your thoughts on these weighty issues.



We need to continually strengthen the medic certification program: the card, the test, the sustainment training, the retesting, the curriculum evaluation board, etc. Captain Steve Briggs briggss@socom.mil, has done a super job in setting all that up. I now have to try to get it funded on a continuing basis by the command. Everyone needs to continue to go through sustainment training every two years as published. If you think we owe you a card, email Staff Sergeant De Erica Robinson at robinsond@socom.mil. We conducted a curriculum evaluation board meeting in September. They do a great job in a time of uncertainty, and I appreciate their unsung and unpaid efforts.

We have brand new challenges with the arrival of the Navy medics assigned to MARSOC. The MARSOC Surgeon, Captain Steve McCartney, is decisively engaged. The Joint Special Operations Medical Training Center is at near capacity already, so we have some work to do. Master Chief Glenn Mercer glenn.mercer@socom.mil, has been engaged with great results, as had Lieutenant (USN) Shawn Wood woods@socom.mil, from my office. Another challenge I accepted is to get the graduates of the Pararescue School tested and carded.

The Biomedical Initiatives Steering Committee (BISC) still, always, needs research ideas to evaluate for possible funding. Please refer anyone who approaches any unit to propose performing some research, testing, evaluation, et cetera, to either the component command's section who does that (at USASOC it's the G-8) or to Mr. Bob Clayton robert.clayton.ctr@socom.mil in my office. In this time of high operational and personnel tempo, our units are too busy to deal with all these bright ideas — so send them to us! We had a very successful BISC meeting just before the ATACCC conference in August. Since many of the players on the BISC changed, we conducted a great session of "BISC 101" to bring everybody up to speed. I try to highlight some of the BISC research by publishing excerpts from the BISC reports in the journal. We will hold a meeting in November that will be a BISC, a component surgeons meeting, and a Department of Defense level Human Use meeting. Human Use issues, rules, and regulations have gotten tighter, resulting in one more reason NOT to do any research on our unit personnel without calling this office.

For some of the great ideas that have been researched and developed by the BISC, I am trying to get these transitioned into acquisition programs to actually *buy stuff,* so that we will not always have to wait on the Services and/or the Service surgeons general to buy it for us. Our flash-to-bang time on new medical equipment is much shorter than the Services and we need to be able to put the right equipment into the right hands more quickly to save lives. Lieutenant Colonel Jose Baez, jose.baez@socom.mil, runs that effort for me. Mostly we fund new items from BISC money through the Institute of Surgical Research's (ISR) traveling Tactical Combat Casualty Care (TC3) training team. The TC3 is still a requirement, still available, and still busy. Please do realize that internal programs are authorized, as in "run it yourself." Since nearly everyone has seen the team at least once, I am ratcheting down the equipment side, meaning that they will bring less cool stuff since you should already have it and/or know how to order it through the normal supply channels. My POC is "Mr." Greydanus at dominique.j.greydanus@us.army.mil. The new edition of the Prehospital Trauma Life Support (PHTLS) book should be out soon. Some of the recent changes in TC3/PHTLS include the shift from gatafloxicin to moxifloxin and the newer formulations of QuikClot® as a choice after tourniquets and haemostatic dressings. The TC3 plans a full review of haemostatic agents in the near future.

We now have a command veterinarian, Lieutenant Colonel Bob Vogelsang, robert.vogelsang@socom.mil. For those components without a veterinary officer (read: NAVSPECWARCOM, AFSOC, and MARSOC), he is a useful asset for everything from LTT, to pack animals, to military working dogs, to zoonotic diseases. The Army veterinary officers mostly know him, as he has served in 3rd Special Forces Group (Airborne). LTT is very vital to our training and Bob is here to both facilitate and safeguard.

The *Journal of Special Operations Medicine* is clearly a focus of mine and I want to again ask the NCOs to step up and write articles. I will always push back an officer-written article for an NCO-written article if space becomes an issue. That being said, I want articles from everyone! Everyone who speaks at the Special Operations Medical Association (SOMA) meeting should submit an article for publication. Do not say that you cannot write — it has never held me back! Please contact Major Michelle DuGuay-Landers for information and help duguaym@socom.mil.

Speaking of SOMA, Major DuGuay-Landers has worked diligently to get this issue on the street before the SOMA meeting, which is in late November, a week earlier than usual. I have been e-mailing the now deployed program chair, Lieutenant Colonel Bob Harrington, who did a great job last year and is determined to ratchet it up a notch this year. See you there!

My Medical Plans and Operations cell, the iron majors of the office, are doing some interesting things in medical intelligence with a medical information source called ARGUS. Contact either Major Chris Coley coleyc@socom.mil our medical planner or Major Mike Salamy salamym@socom.mil, our environmental science officer.

Overall, the transition to Tampa was easy. I found a good office and already have some things to keep me busy. In addition, I am busy trying hard to stay out of the component surgeons lanes on Service responsibilities! My replacement at U.S. Army Special Operations Command, Colonel Joe Caravehlo, an old friend and medical school classmate, and I had a chance to talk at the August BISC and ATACC meetings, as I did with the new Naval Special Warfare Command Surgeon, Captain Jay Sourbeer. I met the new Air Force Special Operations Command Surgeon, Colonel Tim Jex, at the June BISC meeting. The new Marine Special Operations Command Surgeon, Captain Steve McCartney, spent all day here in town with us today. So I have now, as of today, met all the new players.

We all know that it will be a long war, a war that will shift from DA to UW, and a war where the money faucet will ratchet down. Let us all try hard to get the right stuff into the right place at the right time as efficiently as possible.

ENLISTED CORNER

Senior Enlisted Medical Advisor (SEMA)
HMCM Glenn Mercer

I start with the most significant events that occurred since our last journal entry. First is the addition of Tactical Combat Casualty Care (TC3) training and equipment to the Special Operations Acquisition and Logistics Center (SOAL) master projects menu. Previous to this, the program funding came from repetitive Unfunded Requests that never had a predictable frequency to them. This uncertainty made it inherently difficult for the trainers and trainees to accomplish the mission directed by the Commander.

As of September, the SOF Warrior, Program Executive Office (PEO) has an active and forward moving TC3 program that will provide the oversight and terminal funding for training into the strategic future. The fact that this is the first Surgeons Office "program" ever placed into the SOAL center is significant. It is the hard, but correct way to do business and assures that good ideas turn into programs, as opposed to just becoming vapor trails. The man behind the curtain on this effort was LTC Baez, a recent addition to our office with a command level knowledge of acquisitions which is already paying dividends.

Second, is the synchronization of all the elements of our training department into one master program, which is known as the Command Certification Program. This provides economy of movement for our training departments and makes it just and simple for the Acquisition Directors (ADs) to fund our mission. This area is covered in depth in this issue on the metrics; however, for medics this program means one stop shopping when it comes to the Advanced Tactical Practitioner (ATP) testing, administration, and recertification metrics.

Beta testing of the ATP exam is progressing. To date, six classes have received the test with some predictable results and some unexpected. Having seen the scoring data and feedback, I would say that it is too early to pick out trends or incompatibilities. Within the next few months we will have an accurate snapshot of what is a core competency issue versus a poor question versus a failed teaching point. I just recently attended a Curriculum and Evaluation Board (CEB) meeting and can vouch that the Board members have your interests and fairness at the forefront of their discussions. Thanks to the medics who so willingly took the first sequence of tests and provided candid feedback.

One of my favorite sayings is that to be effective, we must be able to have "trust, candor, and reciprocity" within the ranks and between the pay-grades. Without it, we tend to mix business with courtesy and a dose of leverage. When an unvarnished discussion is necessary we must not hesitate to have it. Having made my introductory remarks in the last column, I will reserve this space for business related events that directly deal with our enlisted personnel.

The first issue is the ambiguous state of EMT-P in the force. I was present the day the Force affiliated with the National Registry and have watched that process evolve into what is now titled the ATP. Personally, I see no reason to abandon ground we have already gained. The black market on maintaining Registry certification is that those who have attained it and kept it afloat still want it in their wallets. That being the case, it presents some simple choices. At this point no one has ordered any organization to stand down from keeping this "mechanism" alive, so the operative issue is compliance with the Surgeon's certification program. The ATP concept is not going away. It may change in scope and scale in the future, but it is the mechanism we collectively use now. It is a mechanism -- no more, no less. As an EMT-P card holder I see the potentials for the medic to have both, but I no longer see the potential for the National Registry to continue to be the sole certification agency for USSOCOM medics. I do see the potential for the student candidate to take only one test and

this is what I am advocating right now. The Joint Special Operations Medical Training Center (JSOMTC) has recently refreshed its Committee on Accreditation of Educational Programs (CoAEMSP) accredidation; so having a registered, approved institution is no longer a challenge to a potential unified testing process. This issue will be discussed at the Joint Medical Enlisted Advisory Committee (JMEAC) business for the late November 2006 meeting so if you have some heated opinions about this topic, get it to your senior enlisted advisior (SEA) in time for the meeting.

In conclusion, I am starting a Human Performance (HP) Forum in this issue of the JSOM (see page 91) and intend for it to continue into the future. The purpose of this forum is to inform and resolve potential future hot button issues that are coming from all points on the compass in regard to the vision of SOF Human Performance. Additionally, there will probably be an HP Forum at the SOMA this year hosted by SGM Hill about mid-week. I would expect it to draw a large audience and encourage all readers to attend.

The *Humans are More Important Than Hardware* initial concept document is moving along at an accelerated pace. Presently we are working on the "right" mutually supported principles that should be captured in the text. It is challenging, but also worthwhile.

USASOC

Joe Caravalho, MD
COL, USA
Command Surgeon

I am very pleased to be back in ARSOF as the fifth Surgeon in USASOC's 20-year history. I greatly appreciate this venue afforded me by the Journal of Special Operations Medicine (JSOM) to write to SOF and other interested medical personnel. In this, my first JSOM submission, I introduce myself and share with you my thoughts as the Army Service Component SOF Surgeon and Consultant to the Army Surgeon General for Special Operations Medicine.

It is an absolute privilege and honor for me to follow the exceptional officers who preceded me in this position. Allow me to quickly review the surgeons who served before me.

COL Rocky Farr served as the USASOC Surgeon from 1999 to April 2006. He was instrumental in the medical response to ARSOF's prosecution of our nation's global war on terrorism. Through deft personnel management, COL Farr mobilized a number of officers and NCOs to augment the Surgeon's Office and to place critically needed healthcare providers into both the Iraq and Afghanistan theaters of operation.

COL Dick Tenglin served as the ASOC Surgeon from 1995 to 1999. Under his tenure, 91WW1s, the Special Operations Combat Medic, was developed. His work formalized the Army's recognition of our Ranger, Special Operations Aviation, and Civil Affairs medical NCOs in the form of the "W1" Additional Skill Identifier (ASI).

COL Bill Fox served from 1994 to 1995; his tour as the second USASOC Surgeon was shortened by his selection to attend the Army War College in 1995. As you know, COL Fox went on to become a BG in the AMEDD and command the 44th Medical Command and the Great Plains Medical Command before his retirement in 2004. The Special Operations Medical Indoctrination Course (SOMIC) was established during COL Fox's tenure.

Our first USASOC Surgeon was COL Al Meyers. Formerly the 1st Special Operations Command Surgeon, COL Meyers assumed the position as our first Command Surgeon when USASOC was established in 1989.

Since we bring to the table a sum of our past experiences, allow me to tell you a bit about myself as an Army Medical Corps officer. I've been extremely fortunate to have been able to bounce back and forth between operational and clinical medical assignments. From the operational side of the house, I served tours in both ARSOF and conventional TOE units. Within ARSOF, I served as the 1/1 Special Forces Battalion Surgeon, JSOC physician augmentee, and 75th Ranger Regimental Surgeon. From a conventional TOE perspective, and just prior to taking this position, I commanded the 28th Combat Support Hospital, during one year of which I simultaneously served as the 44th MEDCOM (Rear) (Provisional) Commander.

From a clinical standpoint, I trained in Internal Medicine, Nuclear Medicine, and Cardiovascular Diseases, having served clinical positions at Tripler Army Medical Center (AMC) in Honolulu, HI; William Beaumont AMC in El Paso, TX; Martin Army Community Hospital at Fort Benning, GA; and Walter Reed AMC in Washington, D.C. Finally, from 2003 to 2004, I served in an administrative medical role at Fort Bragg as Womack AMC's Deputy Commander for Clinical Services.

As is human nature, my personal and professional experiences over the years have shaped my thoughts on the Army, ARSOF, and the Army Medical Department (AMEDD). Although each of the previous USASOC Surgeons and I share a total dedication for ARSOF, you can expect minor personality-driven changes under my tenure here.

The USASOC Surgeon's Office has the mission to provide medical input and oversight to organize, train, educate, man, equip, fund, administer, mobilize, deploy, and sustain ARSOF to successfully conduct worldwide Special Operations, across the range of military operations, in support of regional combatant commanders, American ambassadors, and other agencies as directed.

My vision for ARSOF medicine is to provide premier Special Operations medical personnel, fully capable of providing ready, relevant, and reliable service to ARSOF as they conduct successful missions throughout the spectrum of military operations in support of the strategic objectives of the United States.

As such, my goal is to provide responsive support to the major subordinate command unit Surgeons and associated medical professionals while vigilantly addressing each of our identified priorities. I've established the following priorities among my staff: (1) organizational structure; (2) program resourcing; (3) new requirements and capabilities; (4) training; (5) publication and policy review; (6) force health protection and medical intelligence; (7) deployment support; (8) assignments; (9) strategic planning; and (10) garrison healthcare.

In addition to these stated goals, I have a collateral charter as the consultant to the Surgeon General for Special Operations medicine. My main goal in this regard is to leverage AMEDD support to ARSOF medicine whenever and wherever possible. This can be accomplished only through a campaign of collegial and open dialogue among ARSOF, conventional TOE, and TDA AMEDD personnel. I'm convinced that this represents a burgeoning area of growth with benefits available to both ARSOF and the AMEDD.

My staff has duly impressed me with their technical expertise, work ethic, and thorough dedication to ARSOF medicine and to the medical personnel within USASOC. There are too many outstanding personnel to highlight in this forum, but I want to highlight the staff leadership who help me in my job as USASOC Surgeon.

I am very happy to have MSG Sam Rodriguez as my Senior Enlisted Medical Advisor. He is well versed on all aspects of NCO assignments, training, and validation. MSG Rodriguez has been on board in the USASOC Surgeon's Office for a number of years now, and he brings a wealth of knowledge with him.

I have two deputies: Mr. Terry Phelps as my Deputy Director and LTC Rocky Rockhill as my Deputy Surgeon. Terry has responsibility for policy, plans, programming, and new requirements. Rocky is responsible for medical planning, logistics, training, force health protection, and medical intelligence. Together, they bring together a great team of dedicated officers, NCOs and Department of Army civilians, whose sole mission is to support SOF warfighters and those entrusted with all aspects of their healthcare.

In closing, let me reiterate how grateful I am to rejoin the great officers, NCOs, enlisted Soldiers and civilians who make up ARSOF. I want to welcome those medical officers and other healthcare personnel who, like me, have recently joined the ARSOF team. I look forward to working with COL Farr and his staff at USSOCOM. I am also prepared to work closely with our sister service component SOF Surgeons to accomplish our common tasks to create a fully capable, reliable, and interdependent medical force.

During my tenure as USASOC Surgeon, I hope to meet as many of the ARSOF medical force as possible. Within the next several months, I expect to get out to each of the major subordinate commands. I've met a number of you at recent USSOCOM and USASOC meetings and I'm sure there will be ample opportunity for our paths to cross in the near future. Please stop by to say hello or contact me by email to discuss any pressing issues that may affect you or your unit. Until then, best wishes to you and to the great Americans you support as part of our ARSOF medical force.

COMPONENT SURGEON

AFSOC

Timothy Jex, MD
Col, USAF
Command Surgeon

I just returned today from an outstanding technology demonstration provided to AF/SG by Col Coatsworth and the AFSOC Medical Modernization Division (SGR). We are getting close to fielding some remarkable capabilities in the area of remote casualty identification and monitoring. For those of you who know Col Coatsworth, he's overflowing with ideas for future technology applications that most of us can't even comprehend, but I want to emphasize the importance of gathering inputs from you in the field regarding what your needs are for improved capabilities. Please take the time during missions, deployments, training, whatever, to consider what equipment, technology, processes, or even policies would improve your ability to accomplish your mission. Shoot us an email and let us know what you're thinking; it doesn't have to be anything formal. You have the opportunity to help make huge advances in casualty care a reality.

Another exciting development is the advanced training we've begun this year in our new Tactical Operations Medical Skills (TOMS) Lab. We developed the TOMS lab to provide a facility to house and train Special Operations Surgical Teams (SOST) and Special Operations Critical Evacuation Teams (SOCCET), and the tactical training mission for other AFSOC enlisted technicians, pararescuemen (PJs), nurses, flight surgeons, general/orthopedic surgeons, flight surgeons, and physician assistants. The lab is outfitted with two Human Patient Simulators (HPS) with incredible capabilities to simulate realistic physiological responses to medical interventions. The TOMS lab has environmental control units to allow rapid temperature changes from extreme heat to extreme cold or vice versa. It also supports operations with low light or night vision goggles, and it has a sound systems to add intense background noise as may be experienced in operational missions. All of this will better prepare AFSOC medics for their operational roles. Additionally, other Hurlburt or AFSOC assigned medics may have the opportunity to practice ACLS/ATLS on these HPS mannequins. In the near future, AFSOC/SG envisions opening up this training facility to our overseas units and to any Army SOF medics who are transitioning through Hurlburt for other training. The AFSOC/SG staff also provided two CASEVAC courses this year to our SOF and CSAR medics, which included medical academics and hands on experience in the TOMS lab and in static aircraft training, as well as training missions on MC-130E Talon 1 aircraft from Duke Field.

As I've started to visit units and seen the reports from our deployed medics, I'm just amazed at the diversity of ops you're involved in and the quality of support you provide. In the past quarter, AFSOC medics have been actively deployed around the world. The 352nd Special Operations Group (SOG) medics supported a humanitarian non-combatant evacuation (NEO) in CENTCOM, helping to airlift over 500 personnel to safety. The 353rd SOG supported operations in Pacific Command (PACOM) supported a multi-national force for over 30 days. The 16th SOW had medics supporting missions in Operation Iraqi Freedom, PACOM, and Operation Enduring Freedom. In total during this past quarter SOF medics were deployed for over 1,000 man-days, providing CASEVAC coverage, combat aviation medical advice, emergency surgical and critical care procedures, and command and control for medical operations in support of SOF operations.

I hope all of you appreciate how critical all of these operations are to the fight. You are making a real and lasting impact, and I thank you for the truly great things you are accomplishing. God bless you and keep you safe.

COMPONENT SURGEON NAVSPECWARCOM

Jay Sourbeer, MD
CAPT, USN
Command Surgeon

Doc Woods told me duty at WARCOM is a great privilege. Reflecting upon my first two months here, I am inclined to agree. I came from a very enjoyable duty in Washington, and I actually liked living there, but it is pretty hard to compete with Coronado when it comes to making the family happy. The drive from DC was a good family trip; we did a last swing of the East to see relatives and made a memorable family event of the summer, starting with fireworks at the White House and ending up surfing with my wife and the boys. The usual move-in stuff was at times frustrating, but after 25 years of moving and several overseas tours, this was not really tough; it was stateside and change is just part of the blessings of a military career.

Working at SPECWAR is the great part. I have loved my recent duties, but this place is outstanding. Checking aboard, there are high expectations and the basic command policy is unequivocal, to do the right thing. The mission of supporting SEALS at the tip of the spear is strongly appreciated. Having a high goal and a sense of purpose are great, but to make it all move forward we have exceptionally effective personnel on our Force Medical team. There is a lot of information to ingest; drinking from the metaphorical fire hose of knowledge, but it is progressing well. I appreciate all the assistance of all of our components and the joint forces. As Doc Woods strongly advocated, I hope to build strong working relationships by getting out to the components when feasible. The challenges we face are an opportunity to do good things in a complex period of change.

I obtained bachelor degrees in chemistry and economics in 1981 from Duke University and joined the Navy in 1981 via the Armed Forces Health Professions Scholarship Program. I completed my Medical Doctorate in June 1985 at Jefferson Medical College in Philadelphia.

Following a family practice internship year at Naval Hospital Charleston SC, I served two years as a General Medical Officer attached to the Third Marine Division, with assignment to the Emergency Department of the Naval Hospital Okinawa. After completing the third year of a family practice residency at Camp Pendleton, CA, I served as Emergency Department Head of Branch Naval Hospital Sigonella for two years. I then served as Family Practice Staff at Naval Hospital Rota, Spain before attending the Naval Undersea Medical Institute in Groton, Connecticut and Panama City, FL. Upon graduating as an Undersea Medicine Officer, I served as Senior Medical Officer on the USS MCKEE (AS-41). My following tour at COMSUBDEVGRU ONE allowed me to qualify as Saturation Diving Medical Officer, fleeting up to Senior Medical Officer of COMSUBDEVRON-5. I then served as Exchange Officer to the Royal Navy at the Institute of Naval Medicine in Alverstoke, the United Kingdom. In this capacity, I represented the United States in the 2003 Royal Navy/Royal Marine Everest Expedition on the 50th anniversary of the original ascent. Prior to the current assignment at Naval Special Warfare Command, I served three years in Washington, DC as White House Physician.

We live in an interesting time; I am looking forward to the challenge.

COMPONENT SURGEON

MARSOC

Stephen F. McCartney, MD
CAPT, USMC
Command Surgeon

I am pleased to introduce myself as the Command Surgeon for U.S. Marine Corps Forces Special Operations Command (MARSOC) here in Camp LeJeune, North Carolina.

I arrived fresh from a great three year tour with III Marine Expeditionary Force (MEF), part of FMF-PAC in Okinawa, Japan, where I served as the III MEF Surgeon. Our challenges were great being the only permanently forward deployed USMC Force on an island 65 miles long and 17 miles wide at the largest. The tour included responses to Asian tsunamis, Pakistani earthquakes, and Philippine mudslides, with augmentee support for GWOT adding to an already aggressive OP TEMPO with Japanese, Thai, ROK and Philippines forces.

This is my first contribution to the JSOM and I promise that it will be the beginning of a good relationship. This week I had the pleasure of visiting the HQ USSOCOM and met with Colonel Farr and many of his core staff. I appreciated their gracious hospitality and feel that our interactions and camaraderie within SOCOM will be the same as time passes. I look forward to meeting you all.

The USMC have conducted Special Operations missions for many years depending how far back you want to look, and doing it well. The October 2005 SECDEF marching orders were clear. That being, to stand up a distinct SOF component, subordinate to USSOCOM, and unique to the USMC which can effectively train, equip, organize, and deploy task organized Special Operations Forces for worldwide missions in support of combatant commanders.

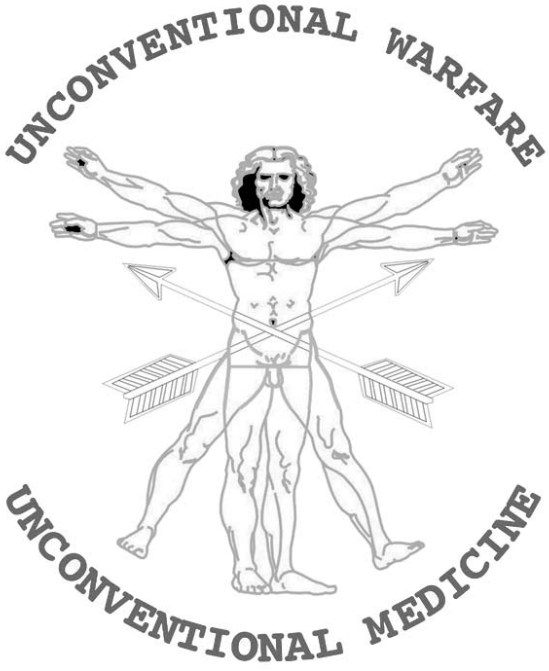
Our size and proportion to total SOCOM forces is small. Our end state Table of Organization (T/0) is 2,515 Marines along with 191 USN personnel being assigned. The vast majority of USN will be medical. The smaller piece will be our professional and committed dive personnel.

While our activities within SOF are well articulated in other articles written thus far, basically we fored two Marine Special Operations Battalions (1st and 2nd MSOB), which will reside at Camp Pendleton and Camp LeJeune, respectively. We have responsibility for the expanded role of establishing 24 Foreign Military Training Units (FMTU) which will support Foreign Internal Defense (FID) and eventual unconventional warfare (UW) missions. We assigned the SOF training mission to our Marine Special Operations School (MSOS) here in Camp LeJeune. Finally, the many support elements, licensed clinical professional staff, and the other enablers will reside in the Marine Special Operations Support Group (MSOSG). MARSOC Health Services Support (HSS) will reside within the Command Element here at Camp LeJeune.

Our MARSOC medical role will be, to say the least, *challenging*. As most of you know, USMC forces derive their medical support from "Big Navy." With GWOT and the needs of the FMF and surface Navy

unchanged and increasing as well. MARSOC Health Services Support will face challenges the other Services left behind in the rear view mirror. The screening, selection, training, and sourcing of medical personnel who meet our unique MARSOC SOF needs will be a subject I will be sharing with you all in various venues in the months and years to come. My approach to these taskings is all Irish and vintage McCartney: "Nothing is impossible, it is just a matter of how much you want to suffer for it" and "let our perceived weaknesses be our ultimate strengths." Or, better said, let us think out of the box, share advice with colleagues, and be innovative.

I look forward to working with you in our commonly shared missions and interests. Collaboration at SOMA, BISC, and other venues will be a pleasure, I am sure. I hope my twenty-two years of trauma and vascular surgery may occasionally bring a different look at the problems and issues we communally address. I will do my best to periodically contribute pertinent knowledge and viewpoints to the legacy of this most valued peer reviewed journal. My staff and I here at Camp LeJeune, as well as myself, are at your service and we are pleased to be plank owners at MARSOC and be a part of the USSOCOM team.



USSOCOM Biomedical Initiatives Steering Committee (BISC)

Mr. Bob Clayton, USSOCOM Medical R&D Coordinator

The United States Special Operations Command (USSOCOM) Biomedical Initiatives Steering Committee (BISC) conducted its fourth quarter meeting at St. Pete Beach, FL 10-11 August 2006. The meeting was held in conjunction with the Advanced Technology Applications for Combat Casualty Care (ATACCC) 2006 meeting. This meeting was of special meaning as we now, with the exception of JSOC and the JSOMTC, have a complete new group of Command Surgeons. First of all I would like to introduce the new BISC members:

COL Warner D. (Rocky) Farr, USSOCOM Command Surgeon and BISC Chairman
COL Joseph Caravalho, USASOC DCS/Surgeon
CAPT Jay Sourbeer, WARCOM Command Surgeon
Col Timothy Jex, AFSOC Command Surgeon
CAPT Stephen McCartney, MARSOC, Command Surgeon
LTC Robert Lutz, JSOC Command Surgeon
COL Kevin Keenan, Commander/Dean, JSOMTC

Mr. Dave Saren is still the program manager for Medical Technology (MEDTECH). He is assisted by Mr. Tom Hindes and myself. As I have stated before, the BISC was formed to support the medical research and development efforts for Special Operations. The Component Surgeons or their appointed representatives meet to focus on medical issues that impact on the mission, training, and performance of SOF.

Primary research areas are:

a. Combat Casualty Care
b. Performance Enhancements
c. Medical Informatics
d. Graduate Research Studies
e. Diving Related Studies

The BISC is regulated by USSOCOM Directive 40-1. The BISC uses Major Force Program-11 funds to support the MEDTECH program. The majority of the research is concentrated on studies that may provide an operational answer to SO peculiar needs. There are a lot of medical issues that are not SOF specific but because SOF is the "Tip of the Spear," the situation creates a SOF peculiar requirement. One of the methods that the BISC employs is to leverage minute amounts of funds against the Services Medical R&D community. This strategy not only accelerates the development of several programs that are important to our mission, but also provides a bigger return on our investment.

The following is a recap of BISC 101:

Each SOF Component has a BISC representative. The function of these representatives is to review their service requirements and to provide the BISC with Task Statements for research topics. A Task Statement is usually a two page description of the need, related background, and a desired solution. On average the BISC supports 10 to 12 Task Statements per Fiscal Year (FY). Once the Task Statements are written and accepted by the BISC, the USSOCOM MEDTECH Program Manager (PM) sends out requests for pre-proposals. Once the pre-proposals are received, they are reviewed, screened, and if applicable, presented to the BISC for review and approval. Once the BISC approves the pre-proposal, the PM requests that the organization submit a full proposal with any clarifications that the BISC may have noted. The full proposal is again reviewed and is then put before the BISC, which recommends a funding prioritization. The BISC accepts out-of-cycle Task Statements and unsolicited proposals. Depending on the topic, applicability and status of funding for these may be held for future selection.

The FY07 Research projects are as follows:

1. Intravenous Perflurocarbon and Recompression Therapy After the Onset of Severe Decompression Sickness
2. Altitude Decompression Sickness Risk Assessment
3. A Comparison of Flight Proficiency and Risk Taking Behavior in Aviators Given Dextroamphetamine or Modafinil During Extended Operations
4. The History of the Development of the SOF Medic from Vietnam to Present
5. Testing and Field Evaluations of the Welch-Allyn (WA) Propac LT for Use by SOF
6. SOF Medical Lessons Learned

Funding for the USSOCOM Medical Technology Development program has remained fairly constant over the past few years. A lot of effort has been put forth to support the needs of the Components. The BISC has been very supportive of funding those items that impact on the far forward medics and operators. In order to maintain a viable program the requirements or need of the force must come from the force. A new start project in FY07 will be the SOF Medical Lessons Learned; from this we may be able to ascertain and better support the needs of the medics. As not a lot of the information seems to percolate up, we will have to squeeze it out of you. I know the last thing you want to do after you return from a deployment is tell someone one what worked or did not work, but this is the best way to "fix it." Pitch in and make sure that your needs are met.

The Second Edition of the SOF Medical Handbook is now being put together. Ms. Gay Thompson worked on the First Edition as the Managing Editor and will be doing the same this time. Dr. Les Fenton, who recently retired from NAVSPECWARCOM, has been retained as the Senior Medical Editor. Rounding out the editorial staff are Brad Sullivan, Ed Kinsinger, and several other key participants from the Advanced Medical Test Support Center. I will be the production manager and the USSOCOM liaison. There are about 80 authors who have already signed up to assist in the next edition. There are still several key areas that need volunteer assistance. Some of those are 18D lab skills, 18D medical procedures, and nursing skills. If you have a desire to participate, please contact Gay Thompson at gay.thompson@us.army.mil or me at claytor@socom.mil. From what understand, both Gay and Brad will be at the Special Operations Medical Association Conference in November seeking information, volunteers, and promoting the handbook.

Marine Special Operations Command

LT Shawn Wood, USSOCOM Medical Planner

In March 2005 the Secretary of Defense requested a proposal to add a Marine Corps Component to the United States Special Operations Command (USSOCOM). In October 2005 he established the Marine Special Operations Command (MARSOC), and activated it in February 2006. Wasting no time, the MARSOC Commanding General, Major General Hejlik, immediately began to deploy many of his 2500 personnel. The MARSOC has five major subordinate units; these are the 1st Marine Special Operations Battalion (WEST), 2nd Marine Special Operations Battalion (EAST), Marine Special Operations School, Marine Special Operations Support Group, and Foreign Military Training Unit (FMTU). These battalions and support groups have their own companies. The MARSOC's core tasks are Direct Action, Special Reconnaissance, Foreign Internal Defense, Counterterrorism, Information Operations, and Unconventional Warfare.

To complete its Table of Organization (T/O) the Navy bought 191 Navy billets for MARSOC. These billets include personnel technicians, religious staff, Master Divers, maintenance technicians, Navy Gun Liaison Officer, and 169 medical personnel.

The medical billets include:

Enlisted--
8403 Fleet Marine Force Reconnaissance Independent Duty Corpsman
8427 Fleet Marine Force Reconnaissance Corpsman
8404 Field Medical Service Technician
8425 Surface Force Independent Duty Corpsman
8432 Preventive Medicine Technician
8466 Physical Therapy Technician
8485 Psychiatry Technician
8493 Medical Deep Sea Diving Technician
8407 Field Service Dental Technician

Officers –
2100 Medical Officer
2200 Dentist
2300 Medical Service Corps

The MARSOC Headquarters Health Service Support Office has five billets with positions for:

Command Surgeon
Senior Medical Planner
Senior Enlisted Advisor
Force Protection Health Officer
Medical Clerk

MARSOC is headed by some highly qualified individuals:

CAPTAIN Stephen McCartney, USN, MC, (Vascular Surgeon) brings extensive Marine Corps experience to MARSOC. An outstanding choice to be the first MARSOC Command Surgeon, some of his past assignments include: Force Surgeon, III Marine Expeditionary Force, Okinawa; Group Surgeon, 3d Force Service Support Group, Okinawa: 1st Force Service Support Group, 1st Medical Battalion, Alpha Surgical Company; Chief of Medical Staff, OIF Kuwait (LSA Coyote) and Iraq (Diwaniyah, Al Kut); and Naval Medical Center San Diego. Senior Vascular Surgeon. While in the Selected Reserve his assignment included: Regimental Surgeon, 23rd Marines (USMCR), San Bruno, CA; Battalion Surgeon, 2Bn/23rd Marines (USMCR), Encino, CA; Naval Medical Center Oakland, Chief, Vascular Surgery Division; Naval Post Graduate Fellow in Vascular Surgery, Royal Victoria Hospital, McGill University, Montreal, Quebec, Canada; Naval Hospital Orlando, Department of General Surgery; Naval Hospital Camp Pendleton, Department of General Surgery, Med CRU 119 (NH Long Beach, CA). CAPT

McCartney was commissioned as a lieutenant in the U.S. Naval Reserve on 26 December 1982, in Los Angeles, CA.

CDR Patrick Paul, a seasoned and well qualified Plans, Operations & Medical Intelligence (POMI) Officer, who brings over two decades of Marine Corps experience to MARSOC, will take the helm as the first MARSOC medical planner. His past assignments include: 1st Medical Battalion, 1st Force Service Support Group, Camp Pendleton, CA, where he served as Detachment Commander, Health Services, 11th Marine Expeditionary Unit during Operations Impressive Lift, Pakistani Transport/Provide Relief, Somalia and Eager Mace '92 in Kuwait; Company Commander, Charlie Collecting and Clearing Company at First Medical Battalion; Head, Staff Education and Training Department Naval Hospital, Guantanamo Bay, Cuba, where he participated in Operation Sea Signal for Cuban and Haitian Refugees; Force Medical Planner, Commander Naval Special Warfare Command, Coronado, CA; Training Officer, Field Medical Service School, Camp Pendleton, CA; Health Service Support Officer, 3rd Force Service Support Group, Okinawa; Executive Officer, 3rd Medical Battalion, 3rd FSSG, Okinawa; Medical Planner, I Marine Expeditionary Force, Camp Pendleton, CA, where he deployed as Medical Plans Officer for I Marine Expeditionary Force / Multinational Force - West in OIF II.

A Hospital Corpsman Master Chief (TBD) will be assigned as the Senior Enlisted Advisor.

LT Shelton Lyons is assigned as the Force Protection Officer and HM2 Roy Brede is assigned as the Medical Clerk.

Medical personnel assigned throughout MARSOC make up the healthcare backbone of the Component. MARSOC will be at full strength by 2010. CAPT McCartney and his staff have a huge task on their hands to get all of the medical personnel organized, trained, equipped, and up to the standards outlined in United States Special Operations Command Directive 40-2. Currently 27 out of 169 medical personnel are assigned to include the Headquarters Surgical Support Staff.

One of the major challenges for CAPT McCartney is getting all the 8427 and 8403 billets filled. Overall 8427s are currently manned at 52% and 8403s are manned at 50%. It will take some time to grow these personnel, and training is not simple. To become a Recon Corpsman requires nearly 11 months of training that includes:

1. Graduation from 8404 Fleet Marine School.
2. Basic Reconnaissance School MOS (0321), nine weeks.
3. Marine Combatant Dive School, seven weeks.
4. Amphibious Reconnaissance Course, three weeks.
5. U.S. Army Special Operations Combat Medic 18D Short Course, 24 weeks.
6. U.S. Army Basic Airborne Course, three weeks.

If selected, qualified 8427s will attend an additional 24 weeks of specialized training that is part of the Special Forces Medical Sergeant Course taught at the Joint Special Operations Medical Training Center. At the end of this addition medical training, 8427 will be awarded a NEC 8403.

Another challenge is training the medical personnel in accordance with United States Special Operations Command Directive 40-2. This directive establishes and describes the command medical education and training policies and procedures for governing the management of Joint Special Operations Forces (SOF) medical and non-medical personnel, and assigns responsibility for ensuring that these guidelines are carried out. With about 169 medics who fall within this requirement and a limited number of seats, the CAPT and his staff have their work cut out for them.

CAPT McCartney and CDR Paul are working to determine if having a surgical capability built into MARSOC is a force multiplier. If they choose to pursue and implement this option, it will increase the flexibility and self reliance of MARSOC.

Things are moving at a frantic pace for MARSOC, but the Health Service Support Office is handling the pressure of standing up a major USSOCOM component with professionalism and expertise. With the current leadership in place and the experience they bring to the fight, MARSOC has a bright future ahead.

CARE COALITION

Joseph Coslett
USSOCOM Public Affairs

The first anniversary of U.S. Special Operations Command's Care Coalition signifies a year of successes and a continuous effort to help SOF and their families during some of the most challenging times of their lives.

"What the Care Coalition and the non-profit organizations do for our wounded men and women is just so important," said GEN Doug Brown, commander, USSOCOM. "The operator in the field takes great comfort and really focuses on the mission when they know that he and his family will be taken care of if something happens to them."

Over the last year, the Care Coalition formed an extensive support network to track, support, and advocate for wounded Special Operations Warriors and their families. The support network significantly enhances their quality of life and strengthens SOF readiness.

"Today, our severely injured Special Operations Forces and their families have an unprecedented amount of support available from government agencies, military services, units, and many benevolent organizations," said Jim Lorraine, Director, USSOCOM Care Coalition. "Knowing where to turn for assistance in the midst of recovering from an injury or supporting a family member can be an overwhelming task."

A unit teammate is with the casualty from the time an injury occurs to the point of theater medical care and the flight home.

"These teammates, medics, and doctors are the center of a SOF casualty's web of support; ensuring the casualty is not alone as they make it through their most critical time," Lorraine said.

The support network then expands when the injured member transitions through hospitalization in Landstuhl Regional Medical Center, Germany, to Walter Reed Army Medical Center or Bethesda Naval Medical Center. Additionally, SOF liaison non-commissioned officers are assigned to assist with questions and concerns.

"These liaisons know the hospital environment, personalities, and bureaucratic procedures," the Care Coalition director said. "They know what works and what doesn't, where to stay and where to eat, and even more importantly, where not to."

Throughout the hospitalization there is always someone there to support the SOF member and family. According to Lorraine, the joint service casualty offices work to meet the notification and travel needs of severely injured servicemembers. The SOF chain of command uses casualty reports to ensure the location and condition of casualties are known to commanders.

In addition, most hospitals have local and national benevolent organizations to assist injured servicemembers in areas the government cannot support. These organizations provide everything from backpacks and comfortable "hospital" clothes to transportation and lodging for families. The general benevolent organizations are great SOF centric organizations providing resources and much needed support to casualties.

"Whether the casualty is Special Forces, Ranger, SEAL, Civil Affairs, or Air Commando, there are organizations whose mission it is to support wounded SOF from hospitalization through transition to civilian life," Lorraine said. "Care Coalition is there lacing together this network of support. From the initial casualty report to the liaisons and their hand-over to another hospital in the United States, USSOCOM Care Coalition is making the connections and ensuring the best is provided for the SOF Soldiers, Sailors, Airmen, and Marines."

Past successes include improving communication with the Service casualty assistance office regarding family member travel to the casualty's bedside; educating and preparing for the medical or physical evaluation board; advocating for a member's retention when the process of an evaluation board was not followed correctly; and coordination with government and national benevolent organizations to meet the needs of the casualty and family.

Another success involves a servicemember who suffered a gunshot wound to his leg resulting in an amputation above the knee, Lorraine recalled.

The Soldier remained on active duty but needed a ramp built into his home. Since he was on active duty he was ineligible for a Veteran's Administration home adaptation loan. Upon hearing this story, the Care Coalition contacted *The Coalition to Salute America's Heroes* and the *Armed Forces Foundation* and both non-profit organizations combined their efforts in building a ramp and renovating his home.

"We were very happy the Care Coalition was able to help us when we believed we were not going to receive any more assistance," said the servicemember.

SOF Truth #3: Humans are more important than hardware

"Our SOF Warriors have seen first hand, the enormous price of freedom … it is essential to protect our heroes and their families," Brown said.

"SOF is not a passive career — you have to actively engage and pursue to become a member. Support to our SOF warriors should never be passive, the SOF warrior and their family have sacrificed too much" Lorraine said.

The Care Coalition encourages SOF Warriors who have been become ill, wounded, or injured while in training or during deployment in support of the Global War on Terrorism to contact them. The Care Coalition stays abreast of new and amended policies and there could be benefits available to servicemembers that they are not aware of. For more information please visit the Care Coalition's webpage at www.socom.mil or email USSOCOM.Care.Coalition@socom.mil or call 813-828-8071.

SFC David Glenn recovers at WRMC

SOF WOUNDED WARRIOR ADVOCACY & REFERRAL

FAMILY READINESS

Compliment and Support
Component Family Programs

(813)828-6037

1-877-672-3039

ussocom.care.coalition@socom.mil

http://socom.mil/Care_Coalition

LEAVE NO ONE BEHIND

UNITED STATES SPECIAL OPERATIONS COMMAND

CARE COALITION

"Our SOF Warriors have seen first hand, the enormous price of freedom... it is essential to protect our heros and their families"

General Bryan D. Brown
Commander, USSOCOM

MISSION:

Our mission is to provide Special Operations Warriors and their families a model advocacy program in order to enhance their quality of life and strengthen special operations readiness.

1-877-672-3039
(813)828-6037

ussocom.care.coalition@socom.mil

http://socom.mil/Care_Coalition

What We Offer All Special Operations Forces

Advocacy

- Personnel
- Pay and Entitlements
- Health Care

Education/Support

- Benefits
- Medical and Physical Evaluation Boards
- Retention/Transition Assistance

Unified Assistance

- Working in Conjunction with DoD, Service, and Veteran's Organizations
- Benevolent Organizations

Correspondence
Letters to the Editor & Apologies to the Readers

LETTERS TO THE EDITOR

To the JSOM Team

Congratulations on another outstanding edition of the JSOM. The journal continues to be a truly superb education and training tool for both medical practitioners and commanders alike. From cover to cover, you provide the type of relevant, valuable information that enhances personal and professional growth at all levels. Notably, in the Fall 2005 Issue, your article "Guide to Prevention on Infectious Diseases during Military Deployments" was outstanding -- especially for commanders who serve in units that are world-wide deployable. I continue to use the JSOM at the Joint Forces Staff College and when working with medical personnel from Portsmouth Naval Medical Center. Keep up the great job and "Bravo Zulu" to all.

COL Bill Davis, Special Forces (Retired)

I have a comment about an article that appeared in the Summer 2006 - Vol 6 Ed 3 of the JSOM. In the article *Combat Medicine*, by J.R. Wilson, in the right hand column, second paragraph of page 68, there is discussion about the career paths of SOF physicians. For USAF and USA, I would agree. However, the statement "So today every SOF doctor has completed an additional three-to-five years of training [referring to a residency] and certification than was true prior to 1999." is not true. The USN does not follow the same career path as USAF / USA. I am not aware of a policy stating that SOF physicians will not have residencies, but the VAST majority of SOF physicians in the Navy are without a residency. There are a few senior level (WARCOM, SOCOM, etc) positions that are manned by O-5 and O-6s with residencies, but this is not the norm. In my opinion, this results in internship trained physicians going to an operational SOF billet, eventually going to a residency, and then as senior physicians, not being able to return to SOF physician billets---as they are junior level jobs. Moreover, I feel this tends toward a detrimental loss of corporate knowledge.

Mickaila Johnston, MD
LT, MC (DMO) USN

I wanted to say thank you for the Winter edition of the JSOM. It is a big hit here with the DEA medics. Thank you for all of your help.

S/A R. Eric Rausch
Houston MET

Thank you very much. This is the best journal, bar none that I read. And, I read a bunch of medical journals; all meat, no potatoes!

Greg Natsch, EMT-P
State EMS Training/Education Coordinator

APOLOGIES

Apologies to COL Farr, CAPT Butler, and HMCM Welt. The dates listed in COL Farr's "From the Surgeon" were incorrectly inputted. HMCM Welt's retirement ceremony was 16 Jun 06 and CAPT Butler's was 30 June 06.

Maj DuGuay Landers

CME

Arterial Gas Embolism: A Case Report for Undersea and Diving Medical Officers

Daniel M. Sutton, MD

Accreditation/Designation Statements

CME: This activity has been planned and implemented in accordance with the Essential Areas and policies of the Accreditation Council for Continuing Medical Education (ACCME) through joint sponsorship of USUHS and the Journal of Special Operations Medicine. USUHS is accredited by the ACCME to provide continuing medical education for physicians.

The Uniformed Services University of the Health Sciences designates this educational activity for a maximum of **1.0** *AMA PRA Category 1 Credit(s)*™. Physicians should only claim credit commensurate with the extent of their participation in the activity.

CNE: This activity, for **1.0 contact hours**, is provided by the Uniformed Services University of the Health Sciences (USUHS), which is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center's Commission on Accreditation.

Expiration Date
Article published in the Vol 6, Edition 4 / Fall 06 edition and will expire in 25 Nov 2007

Time Requirement
This article requires 60 minutes to complete.

Financial Disclosure
Dr. Sutton has indicated that, within the past year, he has had no significant financial relationship with a commercial entity whose product/services are related to the topic/subject matter.

Disclaimer: The opinions or assertions contained herein are the private views of the author and are not to be construed as official or reflecting the views of the Department of Defense of the U.S. Government. This work was prepared as part of his official duties and, as such, there is no copyright to be transferred.

Objectives

1) Explain the meaning of an arterial gas embolism resulting from pulmonary barotrauma.
2) Describe the pathophysiology of an arterial gas embolism resulting from pulmonary barotrauma.
3) Recognize the signs and symptoms of an arterial gas embolism resulting from pulmonary barotrauma.
4) Summarize the proper steps in the evaluation, treatment (to include adjuvant therapy), and follow up of an individual suffering from an arterial gas embolism resulting from pulmonary barotrauma

Abstract

Arterial gas embolism (AGE) is an emergent condition resulting from inspired or iatrogenically (complications resulting from treatment by a physician) introduced gas entering the arterial system resulting in the disruption of normal function. Operationally, diving related AGE is more frequent than any other cause. It occurs in situations where the change in intrapulmonary pressure is greater than the ambient pressure. Over-pressurization within the airways of the lungs can rupture through pulmonary tissue planes forcing gas into the vasculature. The gas is then free to travel into the circulatory system where these bubbles can disrupt blood flow to critical areas of the heart, brain, and spinal cord. Individuals suffering from AGE present along a continuum of illness. Death is the

most severe sign, while mild focal neurologic deficits can be found in those suffering from very mild injury. Symptoms such as loss of consciousness, chest pain, difficulty breathing, neurologic deficits (severe to moderate), and nausea are but a few of the constellation of symptoms that are associated with AGE. Diagnosis is normally made very quickly after appearance of the symptoms, and symptoms that occur within ten minutes of exiting the water are pathognomonic for AGE. Treatment for AGE is aggressive, timely recompression utilizing Treatment Table Six from the U.S. Navy Dive Manual[1] (in some instances extensions of the Treatment Table are required). During a diving evolution (e.g., Salvage and Recovery, EOD, or Special Operations), awareness of the conditions under which AGE occur, the symptoms of AGE, and the proper evaluation and treatment of the injured diver are critical information sets beneficial to the supporting medical staff.

As a basic rule, any diver who has obtained a breath of compressed gas from any source at depth, whether from diving apparatus or from a diving bell, and who surfaces unconscious, loses consciousness, or has any obvious neurological symptoms within 10 minutes of reaching the surface, must be assumed to be suffering from arterial gas embolism.[1]

On 6 July 2006 a 22 year-old active duty Naval Special Warfare Operator was transported to our medical department after experiencing mild symptoms of vertigo, parasthesias, mild nausea, and headache. He had recently completed a pool evolution (dive profile: 58 minute bottom time and max depth of 12 feet) using the MK-25 closed circuit oxygen rebreather. He reported excessive off-gassing, or free flow state, of the rig and was unsure of whether he was over-breathing the circuit. The pool evolution included multiple diver rescue drills and buddy breathing ascents. There was no history of breath-holding or excessive rates of ascent; however, he noted increased resistance while attempting to exhale into the mouth-piece during the evolution. He decided to lie down during a lunch break in hopes of shaking the nausea, vertigo, and headache. After the lunch break and just before the next scheduled dive, he brought his concerns about his symptoms to the dive medical technician on the scene. The neurologic exam, performed at the pool side, revealed mild ataxia while walking heel-to-toe for 15 feet, bilateral forearm paresthesia extending to the fourth and fifth digits, (eighth cervical nerve: ulnar distribution) as well as very mild paresthesia in both feet. The patient also complained of mild nausea and a progressively worsening headache. Upon presentation to the medical department, his exam was consistent with the exam at the pool; however, he was now complaining of a severe pounding in his chest, increased nausea, and progressively worsening headache, as well as a fullness (stiffness) in the lateral and posterior portions at the base of his neck (right side greater than left and no evidence of crepitus). The local recompression chamber was notified, as was the duty Diving Medical Officer, a repeat of the neurologic exam at the chamber was consistent with the previous two exams, and the patient was recompressed using Treatment Table Six (Naval Experimental Dive Unit was notified and concurred with treatment plan). Except for the bilateral forearm paresthesia, the patient experienced complete resolution of his symptoms at 60 feet of seawater. The paresthesia resolved 14 minutes into the second oxygen period. After the third oxygen period and during the decompression to 30 feet of seawater, the patient had recurrence of the paresthesia. He was recompressed to 60 feet of seawater (and again had complete resolution of the symptoms) where he underwent four more 20 minute oxygen periods. Except for very mild substernal chest pain during the last oxygen period at 30 feet of seawater (which resolved spontaneously after coming off the oxygen), his transition to the surface was uneventful. Because the patient was fully coherent, he was allowed to hydrate orally throughout the recompression period. He was seen on 7 July and found to have continued resolution of symptoms. A chest x-ray demonstrated no evidence of pneumothorax or other cardiopulmonary disease. He underwent magnetic resonance imaging of his brain and spinal cord at Naval Medical Center Portsmouth on 12 July and was noted to have a negative study. He is currently not physically qualified for diving duty pending waiver via BUMED (M34).

The U.S. Navy Dive Manual Revision 5,[1] utilized by all branches and components of the Unites States military, provides concrete guidelines for the diagnosis and treatment of arterial gas embolism.

This potentially life threatening event can present along a neurologic continuum from sudden death to almost imperceptible symptoms. Divers surfacing unconscious or experiencing severe neurologic deficits upon surfacing require very little in the way of a trained medical officer's input for this diagnosis; however, as Undersea and Diving Medical Officers, it is our responsibility to ensure that proper exam and treatment decisions are made with respect to the diver surfacing with vague, almost intangible neurologic symptoms. The basic definition, pathophysiology, signs and symptoms, diagnosis, and treatment of arterial gas embolism will be discussed.

Traditionally, an arterial gas embolism (AGE) received during diving activities is the result of pulmonary barotrauma defined as gas rupturing through the alveolar walls and dissecting into the pulmonary vasculature.[2] This occurs on ascent when intrapulmonary pressures exceed the lung's ability to contain it, resulting in the over distention and rupture of the alveoli and bronchioles (i.e. breath-holding, airway obstruction, or uncontrolled ascent). This breach in alveolar integrity results in the movement of gas into the peribronchial space resulting in pulmonary interstitial emphysema. Inspiration and expiration can continue to cause tracking of the gas through tissue planes, resulting in pneumomediastinum and subcutaneous emphysema of the neck. The mechanism of breathing has also been implicated in the delivery of large volumes of gas into the left side of the heart via the disrupted vascular bed within the lung tissue, through the pulmonary veins, and then into the arterial circulation. Gas dissecting into the peripheral lung tissue may rupture through subpleural blebs and into the pleural space causing pneumothorax.[3,4,5] AGE can occur after upward movement (with breath hold or otherwise obstructed airway) in the water column at a depth of less than one meter. According to Boyle's Law ($P_1V_1=P_2V_2$ where P = pressure and V = volume), the greatest change in ambient pressure occurs just below the surface of the water. In an article published in 1958, Schaefer et al., demonstrated that intratracheal pressure greater than 80mmHg corresponded with pulmonary barotrauma (dog model).[6] During the 41st Undersea and Hyperbaric Medical Society Workshop (1990), the Pathophysiology of Arterial Gas Embolism was presented by Dr. Des F. Gorman. He reported gas embolisms arising from the arterial and venous systems as separate entities. The first, primary arterial gas embolism, can be caused accidentally (pulmonary over inflation during decompression, chest trauma, and oral sex in females[7]), criminally (knife and gunshot wounds), or iatrogenically (cardiac and vascular surgery, mechanical ventilation, and arterial catheterization). He proposed that the second type of AGE is more common, occurring when venous bubbles cross to arteries via a patent foramen ovale, other arterio-venous channels, or via the pulmonary capillaries when the pulmonary filtering capabilities are overwhelmed. This type of AGE results from accidental causes (venous bubbles in decompression sickness), criminally, or iatrogenically (venous catheters, hip surgery, hemodialysis, cesarean sections, and neurosurgery).[8] In its most severe presentation (sudden collapse, unresponsiveness, pulselessness, and apnea), AGE is reported (by autopsy) to result in massive amounts of gas in the central vascular bed, including air or foam in the main pulmonary artery and right ventricle. The cause of death is attributed to reflex arrhythmias due to brain stem

Signs and Symptoms	Number	Percentage
Loss of consciousness	25	81
Chest pain	9	29
Irregular breathing or apnea	9	29
Vomiting	9	29
Extremity weakness or paralysis	7	23
Hemoptysis	7	23
Sensory loss	6	19
Cardiac arrest	5	16
Confusion	5	16
Headache	5	16
Vision change	4	13
Crepitus	3	10
Dizziness	3	10
Dysarthria	3	10
Ear pain	3	10
Nausea	3	10
Shortness of breath	3	10
Ataxia	2	6
Abdominal pain	1	3
Diffuse joint pain	1	3
Retro-orbital pain	1	3

Table 1. Signs and symptoms of patients prior to presentation at the emergency department. (n=31)

embolization or direct myocardial injury secondary to coronary artery embolization and occlusion.[9] Satisfactory answers have not been found correlating cerebral thromboembolism (embolic stroke) to the sudden deaths associated with severe AGE. The large gas load on the cerebral vasculature results in cellular ischemia and disruption of the blood brain barrier. The immediate result of the event includes chronic endovascular changes (inflammatory response), alteration in vascular permeability, systemic hypertension, increased cerebrospinal fluid pressure, and a loss of neuronal activity.[10,11] In cases where pulmonary barotrauma is suspected, a healthy concern for the development of tension pneumothorax is recommended

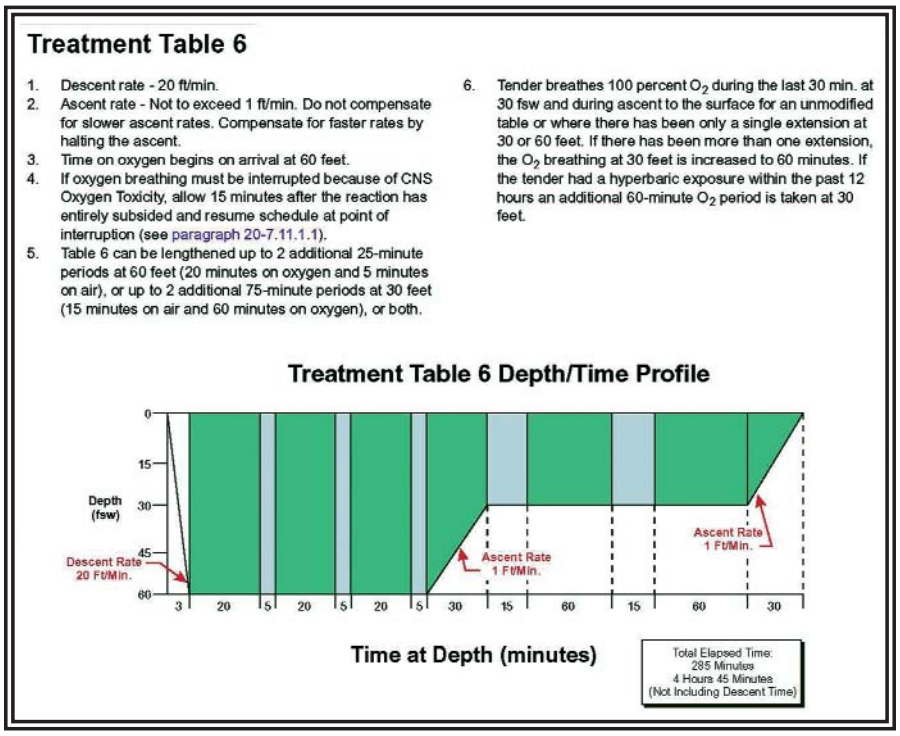


Figure 1.
U.S. Navy Treatment Table 6

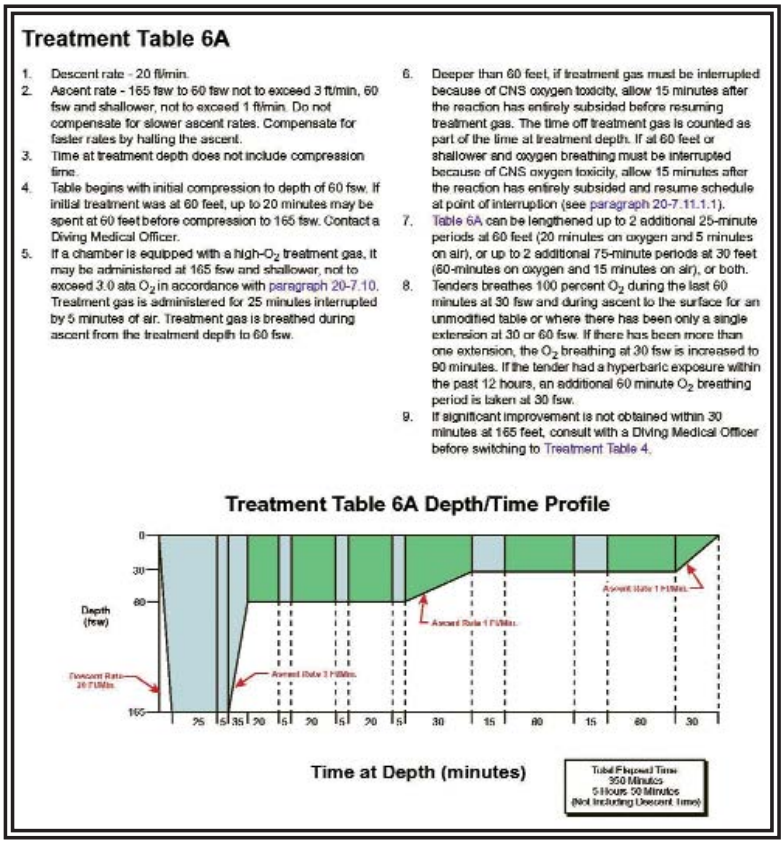


Figure 2.
U.S. Navy Treatment Table 6A

(treatment in a monoplace chamber is easily mitigated via tube thoracostomy prior to recompression).[12]

The treatment of AGE begins with recognition of signs and symptoms of this potentially life threatening insult. Table 1 provides data, published in the 5th edition of Bennett's and Elliot's *Physiology and Medicine of Diving*, of signs and symptoms associated with AGE.

Symptoms associated with AGE are generally apparent within 10 minutes after divers' surface (delays of up to 30 minutes have been reported but are very rare).[13] Table 1 demonstrates the breadth of the signs and symptoms but does not adequately relate a scale of severity to the presentation of the patient. As noted previously, the impact of AGE on the patient falls along a continuum; individuals without catastrophic AGE, but suffering from severe neurologic deficits (coma, variable levels of consciousness, unilateral motor and sensory changes, seizures, and blindness) are reported to have a good response to initial recompression treatment. However, in this group, a relapse in symptoms has been documented and additional recompression treatment has little benefit.[14] Hematologic analysis for creatine phosphokinase (CK) can be utilized to confirm the diagnosis of AGE in the injured diver, especially when the signs and symptoms are equivocal. While serum CK was not performed on this patient, elevated MM and MB portions can be isolated due to the embolization of organ and muscle tissues. The degree of CK elevation has been correlated with neurologic outcome.[15]

The recognized treatment for AGE (and neurologic DCS) is timely recompression on a Treatment Table Six (TT6); see Figure 1.[16] Individuals who do not respond to recompression at 60 feet of seawater can be compressed to a depth of relief not to exceed 165 feet of seawater on Treatment Table Six A (TT6A); see Figure 2 (oxygen will not be administered below a depth of 60 feet of seawater).[17] Surface oxygen (100%) is recommended during transport of the patient to the recompression chamber as it facilitates the wash-out of inert gas molecules from tissues (increased partial pressure gradient from inside to outside a gas bubble).[18] Should all symptoms of AGE resolve after recompression, the patient will remain at the recompression chamber under observation for a period of six hours unless released by the Diving Medical Officer to a competent medical care provider trained to recognize recurrent symptoms of AGE. The patient will remain within 30 minutes of the chamber if released by the DMO within the first six hours after recompression and will remain accompanied and within 60 minutes of the chamber for the first 24 hours after recompression for AGE symptoms.[19] The Manual of Medical Department (P-117) requires individuals treated for AGE (pulmonary barotrauma) to have post recompression non-contrast chest computed tomography (assessing for occult parenchymal disease and residual pneumothorax), transthoracic echocardiogram (assessing for PFO; results are pending at this time for the NSW operator discussed in the case report), and spinal/brain magnetic resonance imaging (MRI) studies (assessing for neurologic lesions) performed as soon as possible.[20,21,22] Divers and Special Operators treated for AGE and found to have a negative MRI will be disqualified from diving duty for a period of thirty days from the complete documentation of the incident/clinical presentation, results of recompression therapy, follow up to treatment, and approval of interim waiver via BUMED (M34). Individuals with a positive MRI, or residual symptoms after treatment will remain not physically qualified for diving duty until a complete evaluation is performed (requires initial MRI – within one week, follow-up MRI – at one month, and neurology consult) and a waiver is processed through NAVPERS for resumption of diving duty.

In some instances, inaccessibility to definitive recompression treatment may require transportation of the patient over long distances. Many of the Special Operations and diving communities found within the United States military are equipped with Hyperlite (Emergency Evacuation Hyperbaric Stretcher - EEHS) dive chambers. The chambers are compact enough to be easily transported on various aviation, aquatic, and ground mobility platforms. They are rated to 60 feet of seawater and can complete a standard Treatment Table 6 (no extensions) utilizing one oxygen filled K bottle (minimum 154 standard cubic feet) and two 3000 psi (minimum 60 standard cubic feet) air bottles. The primary purpose of the EEHS is initiation of recompression therapy while enroute to a fixed recompression facility. WARNING: Inability to maintain positive control of the airway throughout a complete recompression treatment is the number one reason not to use the Hyperlite dive chamber.[23]

The 2003 Report of the Decompression Illness Adjunctive Therapy Committee of the Undersea and Hyperbaric Medical Society provides information about the use of adjunctive therapies such as, but not limited to, supplemental oxygen, lidocaine therapy, and corticosteroids in the treat-

Class	Comment
1	Conditions for which there is evidence and/or general agreement that a given procedure or treatment is useful and effective
2	Conditions for which there is conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of a procedure or treatment
2A	Weight of evidence/opinion is in favor of usefulness/efficacy
2B	Usefulness/efficacy is less well established by evidence/opinion
3	Conditions for which there is evidence and/or general agreement that the procedure/treatment is not useful/effective and in some cases may be harmful
Level of Evidence A	Data derived from multiple randomized clinical trials
Level of Evidence B	Data derived from a single randomized trial or non-randomized studies
Level of Evidence C	Consensus opinion of experts

Table 2. American Heart Association Guidelines for Clinical Efficacy

ment of decompression illness (DCI: i.e., AGE, DCS I, and DCS II). The American Heart Association Guidelines for Clinical Efficacy were utilized to grade the adjunctive therapies (Table 2). Supplemental oxygen therapy should be used in all instances of DCI (Class 1, Level C). Lidocaine therapy may be used in the treatment of AGE; however, there is insufficient evidence to support its routine use for AGE (Class 2A, Level B). Recommendations from the report suggest attainment of serum concentrations suitable for anti-arrhythmic effect (one to six milligrams/liter or micrograms/millimeter) as the endpoint for titration. One milligram/kilogram followed by 0.5 milligrams/kilogram every 10 minutes to a total of three milligrams/kilogram, infused continuously at two to four milligrams per minute, will normally produce therapeutic serum concentrations. Side effects of lidocaine therapy have been reported during its use in other settings, and include ataxia, perioral parasthesias, and possibly a more severe effects such as seizures. These side effects can potentially cloud the neurologic assessment of the injured diver. The injured NSW operator discussed in the case report received no lidocaine therapy prior to recompression. The Committee also recommended not using corticosteroids for treatment of DCI (Class 3, Level C).[24]

In conclusion, the diagnosis of AGE can be especially difficult when the initial signs and symptoms are vague. The patient presented in the case report attended many pre-dive briefings and understood the importance of alerting the training staff to changes in his health after each evolution. The dismissal of vague signs and symptoms for up to two hours post-exposure demonstrates the need for intrusive medical leadership from all provider levels. Individuals with subtle signs of AGE should receive a complete and thorough pulmonary and neurologic exam with focus on the signs of pneumothorax as well as the mental status exam, exam for coordination (cerebellar function), motor/sensory exam, cranial nerve exam, and examination of deep tendon reflexes. Appendix 5A in the U.S. Navy Dive Manual provides exceptional direction for the questioning and examination of injured divers.[25] As demonstrated in the case report, the neurologic examination may not always result in an unquestionable finding that supports the diagnosis of AGE. In these instances, when the answer is not obvious, the clinical suspicion of the treating DMO plays a critical role in deciding when and when not to recompress. In such cases, prudence will often dictate that the individual patient undergo recompression as a test of pressure.

LT Dan Sutton is a 2003 graduate of the Uniformed Service University of the Health Sciences. He completed a General Surgical internship at Portsmouth Naval Medical Center in 2004. After completing Undersea and Diving Medicine training in December of 2004, he reported to Naval Special Warfare Group TWO where he currently serves as a Diving Medical Officer.

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Basketball-related Sports Injuries and Their Impact on Medical Supplies and Operational Readiness at a Forward Operating Base in Afghanistan

James D. Frizzi, MD; Peter D. Ray, MD; John B. Raff, MD; Robert F. Malsby III, DO, FS, DMO

Abstract

The forward surgical and Special Operations facilities located at a Forward Operating Base in Afghanistan were tasked with providing initial resuscitative and surgical care for injured U.S. and Coalition Forces. In addition, this facility was tasked with providing basic sick call and daily outpatient clinic support for all units stationed there. Eventually, organized sports such as soccer and basketball appeared at this base. Participation in organized competitive sports in theater, just as in CONUS, carries an increased risk of injury. Knee and ankle injuries routinely occur in this population. For a commander to decide whether to allow such activities, few guidelines exist to help with risk assessment. The purpose of this paper is to provide input that will assist commanders and medical providers with conducting the risk-benefit analysis that is part of making training and recreational decisions. In this case, the incidence of ankle injuries doubled after a basketball court was opened on our FOB. The need for medical supplies (Class VIII) such as crutches, ankle orthoses and knee immobilizers, also increased commensurately. The authors hope their experience with introducing a basketball court on a FOB will influence other commands to take this medical impact into account during their decision-making process.

Introduction

In the Global War on Terrorism (GWOT), the United States continues to deploy tens of thousands of athletic Soldiers, Sailors, Airmen, and Marines to third-world nations. Supporting these missions, often in forward operating areas, requires the reconfiguring of medical assets into smaller sub-units. As is the case at their home stations, deployed service members strive to maintain their strength, flexibility, and peace of mind - initially by conducting routine physical training or using make-shift weights and gym equipment. Eventually, organized sports such as soccer and basketball appear at these bases. Participation in organized competitive sports in theater, just as in CONUS, carries an increased risk of injury. For a commander to decide whether to allow such activities, few guidelines exist to help with risk assessment.

Our study was conducted at a Forward Operating Base (FOB) in southeastern Afghanistan. The forward surgical team (FST) stationed there was augmented with additional personnel to allow for increased medical holding capacity. The austere locations of such bases challenge current medical logistic support systems. Supplies and personnel shortages occur with changes in the personnel rotations, weather, and/or enemy activity. One way to improve morale in such an austere environment is to increase recreational outlets for Soldiers. In May 2004, the FOB's command welcomed the opening of a concrete basketball court to improve both physical fitness and the mental well-being of the Soldiers on the FOB.

The physicians on the FOB postulated that a new basketball court could lead to an overall increase in knee and ankle injuries due to the nature of the

sport.[1] Previous studies conducted in the civilian sector documented an injury rate of 18.3 persons per 1000 participants, with the most common injury occurring at the ankle joint.[2] This paper focuses on documenting the medical impact of opening a basketball court on a forward operating base, providing commanders, as well as medical planners, with new data to perform a risk assessment and logistical planning if such projects are pursued at FOBs supported by Echelon II(+) or III(-) medical treatment facilities (MTFs).[3]

Materials/Methods

The authors conducted a retrospective review of emergency room consultations for the period of three months in 2004 for all diagnoses of knee and/or ankle injuries occurring at this FOB. They further divided patient data into two groups - those injuries occurring prior to the date the basketball court opened for use and those injuries occurring on or after that date. Each subgroup thus sampled 47 days of emergency room admission data. The authors included in this study only U.S. Soldiers stationed on the FOB. Fifty-two patients sustained knee and/ or ankle injuries on the FOB from 24 March through 26 June (see table 1).

The number of knee injuries increased after introduction of the court, although only to a minor degree (n=11 vs. n=13). The number of ankle injuries, however, went up to a much greater degree (n=9 vs. n=19). The proportion of knee and ankle non-battle injuries (NBI) increased as well (25% vs. 44%). Thus, during the second time period, physicians treated two out of every five NBI Soldiers for either an ankle or a knee injury. This rapid increase was the nidus for this paper. Table 2 provides the subgroup analysis for each month.

Analysis of 52 Injuries	Pre-court	Court opens 10 May 2004	Post Court
Knee/Ankle Non-Battle Injuries (NBI)	20		32
Total Non-Battle Injuries (NBI)	77		72
Percent of NBI is knee/ankle injury	0.26		0.44
Days sampled	47		47

Table 1. Incidence of knee and ankle injuries

During the review period, the overall Soldier population at the FOB remained constant and the tempo of military operations underwent no significant changes. Aside from the basketball court, the command constructed no other new sports facilities (soccer fields, gymnasiums, et al.) during the review period at this FOB.

Discussion

Knee and ankle injuries routinely occur in the active and athletic population typically assigned to a FOB. Given that football and basketball contribute to the highest rates of injuries in male Soldiers,[4] we proposed and the data supported that the incidence of these injuries increased when basketball was introduced on this forward operating base. Establishing the degree to which these injuries affected operational capability is beyond the scope of this paper. However, a previous study of the Armed Forces database that reviewed 13,861 hospital admissions over a six year period for injuries related to sports or Army physical training concluded that these injuries account for a significant number of lost duty days and have an impact on military readiness.[4]

The intent of the authors is not to second guess the decision to build the concrete basketball court on the FOB; that operational decision took multiple factors into consideration and concluded that the presence of the court supported the overall FOB mission. Our intent is to provide input that will assist commanders with conducting the risk-benefit analysis that is part of making such a decision. In this case, the incidence of ankle injury doubled after the basketball court opened. The need for medical supplies (Class VIII) such as crutches, ankle orthoses and knee immobilizers, also increased commensurately. Perhaps this scenario had greater meaning to the medical providers as the facility ran out of crutches and ankle boots until new supplies arrived. Although the FOB ultimately continued its wartime mission uninterrupted, it had to adjust supply requirements and personnel assignments in response to these additional injuries.

Month	Number of Knee Injuries	Number of Ankle Injuries	Percent of Total Injuries (n = 52)	Days in reporting period (% total days)
March	1	1	4%	7 (7%)
April	9	7	31%	30
May	4	9	25%	31
June	10	11	40%	26

Table 2. Injury pattern by month

Conclusion

While Soldiers and commanders both applaud improvements in the athletic and sports facilities at far-forward areas, planners must address the medical impact and potential operational impact of these facilities prior to their construction. While a basketball court may invoke memories of home to a Soldier, to the deployed physician the presence of the court means a need for additional surgeries, treatments, crutches, casts, and cold compresses. If the base commanders do not affix priority to obtaining the additional medical supplies needed to address sports injuries, they may lack the same supplies when faced with battle injuries to the lower extremities. The authors hope their experience with introducing a basketball court on a FOB will influence other commands to take the medical impact into account during the decision-making process. They recommend that the United States continue to construct sports facilities for its deployed troops and augment the medical facilities and supplies at bases where such facilities exist. In this fashion, the U.S. Soldier may remain physically fit, mentally sharp, and under the finest care America has to offer.

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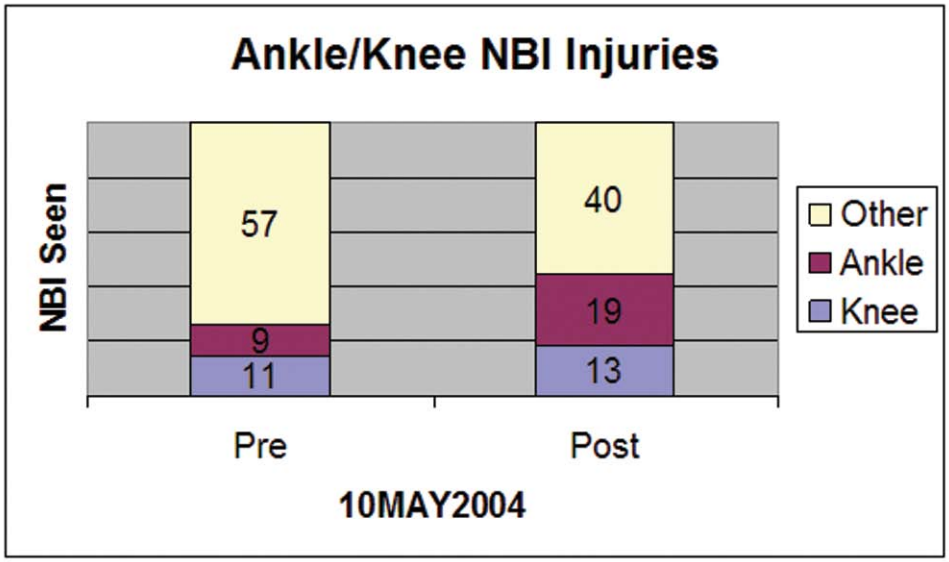

Chart 1. Ankle and knee non-battle injuries

Theater Command Surgeon: An Evolving Leadership Role For Special Operations Medicine

Invited Commentary

Francis G. O'Connor, MD, MPH; Keith A. Wilson, NC, MPH

Abstract

Theater Special Operations Command (TSOC) by current doctrine does not have a permanently assigned Command Surgeon. During the last year, we had the unique opportunity to perform a 360 degree review of the role of the Command Surgeon at Special Operations Command Central/ Combined Forces Special Operations Component Command (SOCCENT/CFSOCC) and develop and execute a theater surgeon cell. This article reviews our experience at SOCCENT, highlights successes for the Command and its area of responsibility (AOR), and makes recommendations for the future. Most importantly, this article brings to light the urgent requirement to provide a senior SOF medical leader in the role of Command Surgeon at the TSOC level.

Objectives

1. Describe the current mission and command structure of SOCCENT/CFSOCC.
2. Discuss lessons learned during a 360 degree Command and AOR review of the role of the Command Surgeon.
3. Describe the potential value-added by a Theater Command Surgeon.

"The boss has been hearing from the docs on the ground that we need a Command Surgeon. You leave in two days to visit Afghanistan, Iraq, Djibouti, Qatar, and Bahrain to figure it out. Tell me what I don't know. Tell me if we need a Command Surgeon."

With those brief comments from the deputy commander, my deployment as a Command Surgeon with SOCCENT began in October of 2005 as an individual augmentee. There was no right-seat left-seat ride; there was no turn-over guidance; there was no playbook, but as I would come to learn, SOF doesn't always use a playbook. Most importantly, I had no SOF experience and no significant operational experience. What began as a "shock" however, proved to be one of the most rewarding experiences of my military career. The purpose of this commentary is to reiterate lessons learned, and to identify the critical need for senior SOF medicine leadership at the TSOC (Theater Special Operations Command) Command Surgeon level.

Background: SOCCENT/CFSOCC

SOCCENT is one of six regional Theater Special Operations Commands, and is the acronym for Special Operations Command Central. SOCCENT is a sub-unified Command, located at MacDill AFB, FL. SOCCENT performs three primary functions: Theater Special Operations Command (TSOC), USCENTCOM Directorate for SO (CCSO), and USCENTCOM Executive Agent (EA) for SO.

The mission of SOCCENT

"Plan, prepare for, and when directed, conduct Special Operations and other activities in support of United States objectives in the CENTCOM Area of Responsibility"

SOCCENT/CFSOCC is a joint headquarters with nearly 70% of the force being made up of active duty and individual augmentee reservists.

Combined Forces Special Operations Component Command (CFSOCC) is the forward headquarters for SOCCENT and has operational

control (OPCON) over SOF units in the CENTCOM AOR. Figure 1 depicts the SOF units OPCON to the SOCCENT/CFSOCC Commander.

SOCCENT has had a medical element since 1997; the section was initiated by a Special Forces 18D. The section has subsequently grown to include seven personnel: two physician assistants, a senior NCO, two medics, a Special Forces 18D, and an administrative NCO. This section provides routine and emergent care for the Command and dependents, as well as forward care during exercises and operational deployments to include direct support of OIF and OEF. In the history of the Command, it activated only one other physician against the individual mobilization augmentee (IMA) slot for a Command Surgeon.

Figure 2 dipicts the command structure for SOCCENT/CFSOCC as of October 2005.[1] The surgeon serves as principal staff advisor for all medical matters including direct clinical care and combat health services and support. Specific duties are as follows:

- Advises COMSOCCENT on all medical matters concerning SOF in the USCENTCOM AOR
- Provides oversight for primary and urgent care to SOCCENT personnel and dependents
- Facilitates provision of specialty care and as needed emergent care to SOCCENT personnel and dependents
- Provides oversight for the SOCCENT medical clinic to include training, immunization records, policies, procedures, equipment, and supplies
- As directed and in accordance with COMSOCCENT guidance plans and coordinates SOF combat health support in the USCENTCOM AOR
- Maintains liaison with medical advisors at USCENTCOM, USSOCOM, USCENTCOM component commands, and SOCCENT subordinate commands

The joint manning document to support this mission, however, assigns only one active duty physician assistant. The other medical staff members, including the Command Surgeon, consist of IMAs. The medical planning component of SOCCENT also includes IMAs who are assigned to the J4 directorate. These augmentees include a medical planner, medical logistician, and a medical operations officer.

Theater Special Operations Commands do not routinely have assigned Command Surgeons. FM 8-43 Combat Health Support for Army Special Operations Forces outlines the health service support for SOF operations at all levels.[2] Appendix G of this document, Command and Control Structures and Integrating Elements of Special Operations Forces in the Joint Campaign, says that: "Special Operations commands do not have permanently assigned surgeons or staff medical personnel."[2]

AOR Assessment: Is There A Need For a Command Surgeon?

In the spring of 2005 the Chief of Medical Plans reported to CENTCOM that the CJSOTF Surgeons in Iraq and Afghanistan wanted a TSOC Surgeon to assist with clinical matters, coordinate with other component commands, represent SOF medicine with CENTCOM and SOCOM, and finally, to provide "top-cover."

In early November 2005, myself, the lead author, a reservist augmentee, the Chief of Medical Plans, and a CFSOCC four month AEF medical planner, conducted nearly 50 interviews during a six week time period. The interviews began in Tampa at MacDill, included travels to Qatar, Iraq, Afghanistan, and Bahrain, and concluded in Djibouti. The interviews represented a 360 degree review of the intended role of a Command Surgeon at SOCCENT, and included clinic staff, hospital administrators, SOCCENT directors, CJSOTF Surgeons, Battalion Surgeons, Joint Task Force Surgeons, Component Surgeons and Operational Commanders. This team sought to identify expected tasks, requirements, structure, and lessons learned. The SOCCENT Command Surgeon webpage contains the details of this report, which this article will not review; however, several interviews warrant discussion as they highlight key lessons learned.[3]

Deputy Commanding Officer (DCO)

The DCO was the initial point of contact and the officer who asked the original question. He felt that he had "no visibility" into what was happening or failing to happen in the medical lane. His instructions were clear: "Tell me what I don't know." As the conduit to the commander, he also was the center of staff communication. He was very clear that even though the Command Surgeon had a personal staff mission, communicating and participating as an active member of a joint staff would be a key role.

Chief of Staff (COS)

The COS was very clear in his expectations of the Command Surgeon to the Command. The COS witnessed to a deluge of changes involving the healthcare of staff and family members at MacDill as well as

in Qatar. Changes included downsizing the facility at MacDill to a super-clinic, changing the guidance for the ARCENT clinic in Qatar affecting contractor care, and increasing the complexity of the rules of enrollment with TRICARE. The COS was sincerely concerned about the care of the Command and he needed answers on a regular basis. In addition to having a senior leader to understand the medical care system, and how to access it, there was an expectation for more control over the joint nature of the Command to include profiling, medical boards, and assessment for deployability.

CJSOTFA Surgeon

The team had the opportunity to speak with multiple SOF medical providers to glean their insight into the role of SOCCENT/CFSOCC, and the potential value added of a Command Surgeon, but none more valuable than LTC James Czarnik. Dr. Czarnik, who has an extensive background with Special Operations medicine, provided considerable time in assisting the team to prepare a detailed overhaul of the surgeon's cell structure and function. Dr. Czarnik had been one of the ground Special Operations surgeons who requested the presence of a SOCCENT surgeon's cell to assist with emerging concerns he identified in his role in Afghanistan. In particular, Dr. Czarnik identified numerous opportunities that were lost by the absence of a strong surgeon's cell:

- No rigorous clinical oversight of medical planning from point of injury to level II surgical care to level IV rehabilitative care
- No senior clinician communication with medical leadership at subordinate commands
- No senior clinician communication with superior commands
- No active strategic forward thinking medical planning section
- No senior clinician oversight of SOCCENT direct clinical care or force health protection
- No active mentorship of SOCCENT medical assets
- No current joint wartime-peacetime protocol for conducting advanced medical training to include live tissue training

Dr. Czarnik followed his identification of problems associated by the absence of a surgeon by contributing to what currently is a revised structure of the Surgeon's cell.

Commander NAVCENT

The team met with the NAVCENT Commander in Bahrain and queried Admiral Walsh about his expectations and the role of his Command Surgeon and the Command Surgeon's role on his staff. They additionally questioned the Admiral on the needs of a supporting staff for the Command Surgeon because they identified as a consistent theme throughout many of their visits the location of the medical planners, who were frequently outside of the realm of the surgeon's office. The Admiral clearly expressed his expectation for horizontal communication across the staff. He felt that a focus on vertical orientation was limiting while the location of the medical planners was immaterial. He additionally commented that staff members who failed to communicate on a horizontal level would not remain on his staff for long.

Commander SOCCENT

MG Kearney, who was clearly engaged in the fight in the AOR identified the Command Surgeon as a strategic planner for SOF medicine. In addition, his operative word for the staff was "facilitation." The Commander envisioned a down-range presence regularly working and problem-solving for those medical units under the operational control of CFSOCC. He additionally looked to the surgeon for forward thinking on issues that will confront SOF medicine in the future (e.g., avian influenza).

The team reviewed and summarized all the interviews and presented them to DCO. They emphatically affirmed the need for a Command Surgeon. The consistent theme throughout all of the 360 degree review was the opportunity lost by not having a presence in this position and the value added of senior leadership in a Command Surgeon role at the TSOC level.

Filling the Leadership Gap

The AOR assessments led to the development of a medical cell structure that would function for SOCCENT, as well as individual job descriptions. The team derived this basic structure from the core missions that confronted the Command Surgeon: medical planning, force health protection, and clinical care (Figure 3). Two guiding principles - leadership and communication - predominated in the development of the Command Surgeon's role. The SOC-

CENT Command Surgeon's webpage provides details. The team paid particular emphasis to developing the vision and a mission statement:

Vision

"Ensure quality, world-class health care, and mission health service support to Special Operations Forces operating in the CENTCOM AOR."

Mission Statement

"SOCCENT/CFSOCC Medical will execute the Commander's intent for SOF in the CENTCOM AOR by implementing Force Health Protection to win the War on Terror. Force Health Protection includes: ensuring a healthy and fit force (pre, during and post deployment); prevention of casualties through cutting edge training; essential medical logistics, and use of medical intelligence to make appropriate systems and support for optimal casualty management and evacuation."

The development of a vision, mission statement, and job descriptions allowed the staff to move forward as a TSOC surgeon cell to engage the Command and the AOR. The remainder of this article highlights several of the unclassified successes the surgeon cell accomplished.

Service to Headquarters SOCCENT

The Command Surgeon provides service to the command regarding their health and for the command by representing the unit to CENTCOM and SOCOM. The Headquarters looks to the Command Surgeon to ensure that the unit is healthy and mission ready pre, during, and post-deployment. This process was intact at SOCCENT secondary to the efforts of the high quality of the physician assistants, medics, and NCO leadership at the clinic. However, challenges emerged with the host facility as the dynamic nature of TRICARE and down-sizing affected patient access and satisfaction. Developing clinical memorandum of agreements with medical facilities in ARCENT Area Support Group at Qatar and MacDill AFB improved this process by allowing for medical coverage for the unit if SOCCENT physician assistants and medics were not available secondary to operational requirements. Another initiative to improve the clinical process was to empanel all uniformed service members to a single TRICARE provider.

Providing clinical care for a headquarters element presents some interesting challenges since the average age of the staff is significantly older than that for a typical operational unit. This older staff has more chronic medical issues including osteoarthritis, hypertension, lipid disorders, and cardiac disease. Administrative work is critical for readiness and force health protection of the unit and includes attention to such areas as immunizations, profiles, and MEBs. Supervision of the physician assistants and medics also includes chart review to ensure quality of care, and support of continuing medical education. To more effectively communicate with the Command, and to provide force health protection guidance as well as answers to frequently asked questions when negotiating health care in Tampa and Qatar, the staff developed a medical webpage.[3]

The Command Surgeon represents SOCCENT to its higher headquarters, CENTCOM, and to SOCOM for SOF-specific issues. The surgeon regularly meets with the CENTCOM Surgeon staff whether it is via VTC, in person while at MacDill in Tampa or at the CENTCOM Surgeon conferences. By virtue of the title, the Command Surgeon has a seat at the table, that his action officers do not, to represent SOF medicine with the other surgeons. The Command Surgeon works with the CENTCOM Surgeon's office to facilitate specialty care for a SOF officer by submitting a Request for Assistance (RFA) to Combined Forces Land Component Command (CFLCC). The Command Surgeon also advocates for SOF medicine with the SOCOM Surgeon's office. Recently the Command Surgeon forwarded a proposal to have live tissue training in the AOR for SOF medic training. Although this was ultimately not approved it is an example of SOCCENT advocating for SOF medicine with SOCOM.

Service to AOR CFSOCC

More important than support to the headquarters element is the medical support provided to the the Special Operations war-fighter whether Army, Navy, Marines, or Air Force. It is required to take a strategic view for the region and look beyond parochial service concerns since SOF operations take place in joint and coalition environments. Topics of concern for the Command Surgeon are preventive medicine/force health protection, plans and operations, medical logistics, and clinical issues.

The Command Surgeon works with the Combined Joint Special Operations Task Force - Afghanistan (CJSOTF-A), Combined Joint Special Operations Task Force Arabian Peninsula (CJSOTF-AP), Combined Joint Special Operations Task Force

Air Component (CJSOAC), and Naval Special Warfare Unit-3 (NSWU-3) to assist with their issues and provide guidance as required.

The Command Surgeon worked on several preventive medicine/ force health protection issues during this time frame. The most important was the issue of multiple confusing policies regarding malaria prevention. This issue came to light during AOR visits, as well as during CFSOCC medical planning guidance for an intended SOF operation. The CFSOCC Surgeon developed a malaria policy for SOF working with Major Keith Wilson from CFSOCC J-4 and Major Maza from CENTCOM SG, as well as CJSOTF-AP, CJSOTF-A, and JTF-HOA inputs. Another issue was the introduction of the Joint Medical Electronic Work Station (JMeWS) for Disease Non-Battle Injury (DNBI). This system allows for reporting with analysis and feedback of data. The Command Surgeon's Office was able to eliminate unnecessary reporting on the part of the SOF components in the AOR, as well as to create a resource to assist in tracking disease and injury trends.

Medical issues need to be considered for planning at the strategic, operational, and tactical levels. The Command Surgeon reviews and approves SOF exercises and other plans as well as plans to support SOF for linking tactical evacuation with strategic evacuation. The Command Surgeon advocates surgery and evacuation support for SOF in a dynamic changing theater, especially in Afghanistan with the transition to NATO forces in much of the country. The Surgeon specifically advises the SOCCENT Commander on current issues confronting SOF medical care in Afghanistan to assist in his communication with higher headquarters.

The Command Surgeon must review and approve medical plans, Annex Q, and appendices to operations orders while at the same time supporting current operations by reading SITREPS and being engaged with the CFSOCC components to meet their needs. Medical planning can be a frustrating process due to many shifting requirements, asset availability, and the fact that many planning efforts are never executed. The recent non-combatant evacuation operations (NEO) plan for Lebanon became an operation that required medical support by a CFSOCC Special Forces medic.

Another initiative that helps current operations is the Joint Patient Tracking Application (JPTA). The components use it to track the location and clinical status of patients moving through the evacuation system and provides unit commanders and the SOF component surgeons with more timely detailed patient information and unit commanders with information about the current status of SOF casualties.

Medical logistics is another area in which the Command Surgeon advocates for SOF. When SOCOM recently changed the requirements for the SOF Individual First Aid Kit (IFAK), this action required coordination with SOCOM, USASOC, MNCI, USAMMC-SWA, and CENTCOM. CFSOCC Medical worked to insure the Tactical Combat Casualty Care (TC3) guidance of transitioning from gatifloxcin to moxifloaxicin was supported and instituted. The Command Surgeon office additionally worked medical logistic issues related to blood support for remote SOF operating locations, and the new addition of fentanyl lozenges for SOF medics, as well as working with the CFLCC Surgeon's Office to acquire the Warrior Aid and Litter Kit (WALKs) to increase survivability of SOF convoys and vehicle operations.

Conclusions and Recommendations

CENTCOM is currently engaged on multiple fronts in the Global War on Terror. SOCCENT/CFSOCC continues to play an instrumental role in the engagement of the enemy. The requirement exists for a TSOC Command Surgeon and a dedicated surgeon cell as best expressed by MG Frank Kearney, Commander, SOCCENT:

> *"We knew instinctively that we needed a Command Surgeon. The scale and scope of the requirement, however, was not evident till we had a competent senior medical officer who assessed the situation and day to day identified the magnitude of the position's value. Clearly we didn't know what we didn't know. The Command Surgeon in CFSOCC/SOCCENT oversees the health issues of a command at war with rotational subordinates in various organizational constructs from all components of all services who require a degree of organizational consistency that mandates a full time position(s). This year we had a surgeon and it was a difference in impact that is as clear as the difference between night and day. We cannot go back."*
>
> -- MG Frank Kearney,
> Commander, SOCCENT

The authors recommend that the Command Surgeon of USSOCOM continue to endorse all efforts to support the development of the TSOC Surgeon because it can make a difference for SOF medicine. The Command Surgeon developed a structure, a mission, and a vision that allowed for giving a voice for SOF medicine and making a difference with that voice. The Army extended the initial six month TCS assignment to 11 months and followed that with a replacement that is a 12 month TCS position. It is our strong belief that if the Global War on Terror is truly a long war that the Command Surgeon should be placed on the Joint Manning Document as a PCS position.

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Keith A. Wilson, Maj, NC, USAF, is currently the Chief of Medical Plans at SOCCENT. Prior to this assignment he was a student at USUHS where he obtained a MPH. His prior operational assignments include duty as a flight nurse with the 43rd Aeromedical Evacuation Squadron (AES) and prior to nursing school he was a medic with the 1st Ranger Battalion.

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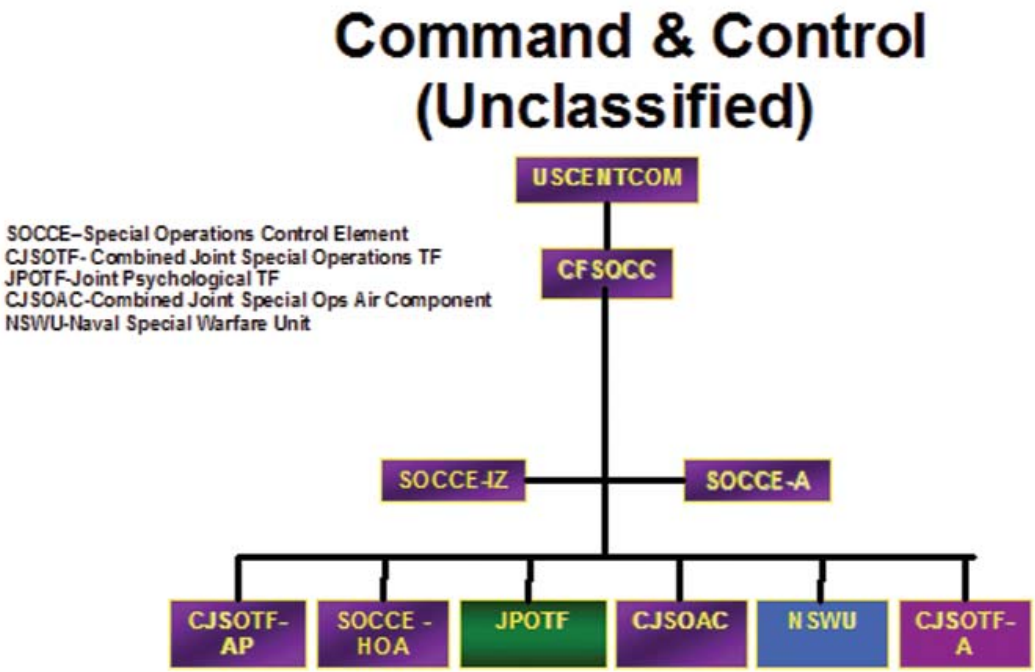

Figure 1. SOCCENT/CFSOCC Operational Units

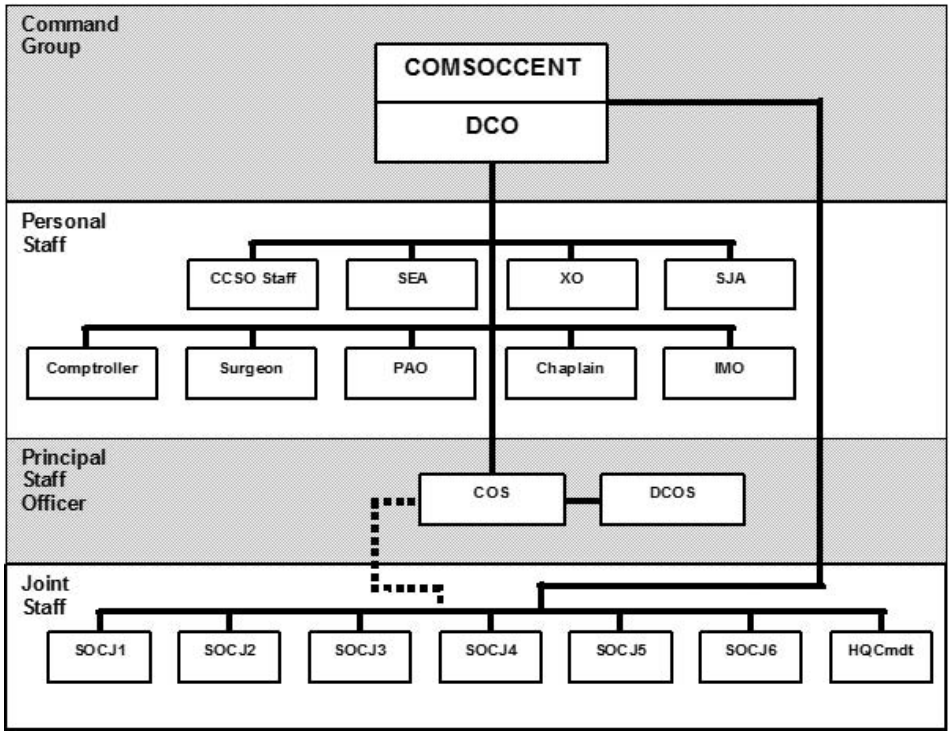

Figure 2. SOCCENT Command Structure

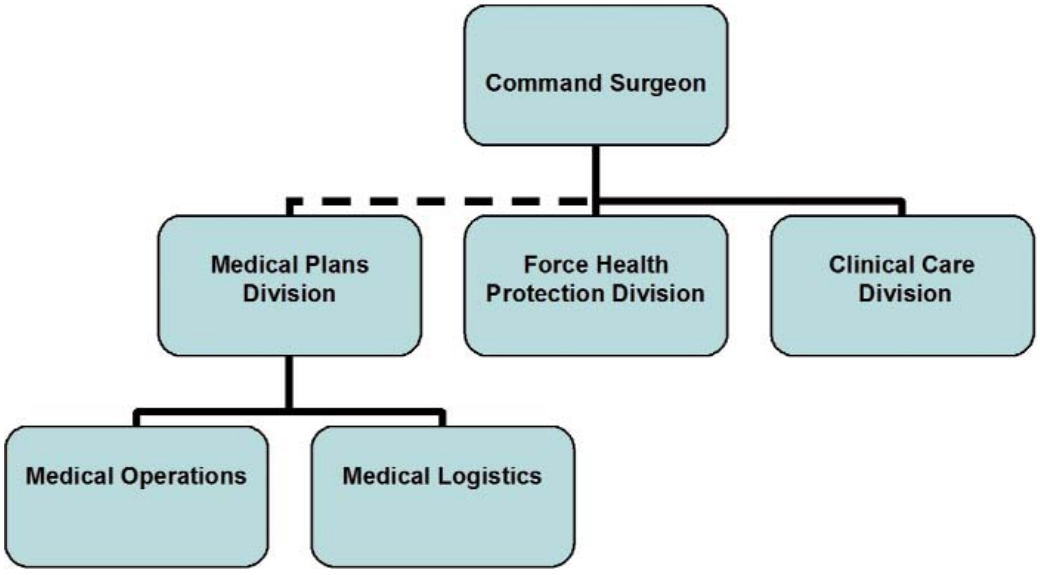

Figure 3. SOCCENT Medical Structure

Fall 06 CME Test

Please be sure to return the completed test as well as the Continuing Education Evaluation Form for 1.0 CME

Arterial Gas Embolism:
A Case Report for Undersea and Diving Medical Officers
Page 24

1. AGE is the default diagnosis when neurologic symptoms appear during which of the following statements?
   a. After 60 minutes, although rare delays of up to 90 minutes have been documented.
   b. Within 10 minutes, although rare delays of up to 30 minutes have been documented.
   c. After 90 minutes, although rare delays of up to 3 hours have been documented.
   d. Within 5 minutes, although rare delays of up to 10 minutes have been documented.
2. AGE during diving activities is the result of
   a. Gas rupturing through the alveolar walls and dissecting into the hepatic arterial vasculature.
   b. Over-pressurization of the intrapulmonary tissue allowing gas to dissect into the pulmonary arterial vasculature.
   c. Rapid exhalation as the diver moves downward in the water column.
   d. An excessive carbohydrate load prior to the diving evolution when utilizing MK-25 (LAR-V) diving systems.
3. AGE can occur
   a. Only in depths greater than 33 FSW.
   b. Never occur in depths less than 3 FSW.
   c. While utilizing any system that allows the diver to create an equalization of pressure between the ambient pressure and the intrapulmonary pressure.
   d. In the area of least pressure change (within 10 meters of the surface).
4. During a diving related incident, AGE can arise through which of the following systems?
   a. The arterial and venous system of the liver.
   b. Only the pulmonary arterial system.
   c. The pulmonary venous system only.
   d. Both the arterial and venous system of the lungs.
5. The treatment for AGE is
   a. Surface oxygen only.
   b. Surface oxygen and treatment via U.S. Navy Dive Treatment Table 6 or 6A.
   c. Surface oxygen and treatment via U.S. Navy Dive Treatment Table 5 or 6A.
   d. Surface oxygen and in water recompression.
6. The correct post recompression follow up radiographic evaluation(s) is/are required after diagnosing AGE and include
   a. Non-contrast Chest CT.
   b. Non-contrast Chest CT, Transthoracic echocardiogram.
   c. Non-contrast Chest CT, Transthoracic echocardiogram, MRI +/- brain/spinal cord.
   d. Non-contrast Chest CT, Transthoracic echocardiogram, MRI +/- brain/spinal cord, Ventilation Perfusion Scan.

7. Individuals treated for AGE and found to be asymptomatic
    a. Are required to stay at the chamber facility for six hours unless released to a competent medical provider and then should stay within one hour of the facility for the full six hours.
    b. Are required to stay at the chamber facility for 24 hours unless released to a competent medical provider and then should stay within 30 minutes of the facility for the full 24 hours.
    c. Are required to stay at the chamber facility for six hours unless released to a competent medical provider and then should stay within 30 minutes of the facility for the full six hours.
    d. Are required to stay at the chamber facility for eight hours unless released to a competent medical provider and then should stay with 30 minutes of the facility for the full eight hours.
8. An in-depth example of the proper neurologic evaluation can be found in.
    a. Chapter 15, P-117, The Manual of the Medical Department
    b. Appendix 5A, U.S. Navy Dive Manual.
    c. Chap 2, Bove and Davis' Diving Medicine.
    d. Chap 10, Kindwall and Whelan's Hyperbaric Medicine Practice.
9. Symptoms normally associated with AGE include
    a. Loss of consciousness, vomiting, chest pain, confusion.
    b. Nausea, vomiting, diarrhea, fever.
    c. Localized joint pain (knee, elbow, hip).
    d. Cutaneous bruising over the extremities.
10. A patient suspected of having a tension pneumothorax should receive a tube thoracostomy
    a. Prior to initiating recompression therapy using a multiplace chamber.
    b. After completing recompression therapy using a monoplace chamber.
    c. After completing recompression therapy using a multiplace chamber.
    d. Prior to initiating recompression therapy using a monoplace chamber.

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POST TEST – ANSWER SHEET

Arterial Gas Embolism: A Case Report for Undersea and Diving Medical Officers
Author: Daniel M. Sutton, MD - Page 24

1. A B C D	**6.** A B C D
2. A B C D	**7.** A B C D
3. A B C D	**8.** A B C D
4. A B C D	**9.** A B C D
5. A B C D	**10.** A B C D

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Arterial Gas Embolism:
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Page 24

	Strongly Agree Strongly Disagree
Educational Value:	5 4 3 2 1
I learned something new that is important.	_ _ _ _ _
I verified some important information.	_ _ _ _ _
I plan to discuss this information with colleagues.	_ _ _ _ _
I plan to seek more information on this topic.	_ _ _ _ _
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I understood what the authors were trying to say.	_ _ _ _ _
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Abstracts from Current Literature

Treatment of War Injuries of the Shoulder with External Fixators

Slavko Davila, MD PhD; Danko Mikulic, MD; Neda Jaria Davila, MD; Ljiljana Popovic, MD PhD; Boiidar Zupancic, MD PhD

Military Medicine, 170. 5:414. 2005

Abstract

In this retrospective study, 18 patients with war injuries of the shoulder were reviewed to evaluate the technical problems associated with external fixation and to analyze the incidence of infection and late functional results. The average patient age was 28.5 years. All patients were male. Thirteen patients had explosive wounds, whereas five wounds were caused by gunshot missiles. All injuries were extensive in terms of bone and soft tissue defects. Six patients presented with complex injuries involving neurovascular structures. Sixteen patients were treated with external fixation. Application of the proximal pins of the external fixator through the humeral head was possible in eight patients, the scapula served as the site of proximal fixation in four patients, only the clavicle was available for placement of pins in two patients, and both the scapula and the clavicle had to be pinned to achieve proximal stabilization in two patients. In two patients, fixation was not possible and early amputation was performed. Infection was eventually eradicated in all patients, allowing for adequate soft tissue coverage of the wounds. Analysis of functional results at an average of 6 years after the injury showed a considerable degree of functional deficit in most patients.

Tactical Combat Casualty Care in the Assault on Punta Paitilla Airfield

LCDR James J. Mucciarone, MC USN; COL Craig H. Llewellyn, USA FS MC (Ret); Lt Col John M. Wightman, USAF MC FS

Military Medicine, 171,8:687,2006

Abstract

Casualties incurred during the assault on Punta Paitilla Airfield during Operation Just Cause were evaluated through reviews of records and interviews with the participants. There were eight initial casualties. One-half of all subsequent casualties were wounded trying to move to these men while still under effective hostile fire. Consistent with other studies, the most common cause of death was internal hemorrhage; the second most common was catastrophic brain injury. Rapid control of external exsanguination was the technique most likely to prevent death. Tourniquets were applied to three lower extremities for two casualties, without sequelae.

The Navy-Marine Corps Combat Trauma Registry

Michael R. Galarneau, MS; William C. Hancock, MS; Paula Konoske, PhD; Ted Melcer, PhD; Ross R. Vickers, PhD; G. Jay Walker, BA; James M. Zouris, BS

Military Medicine, 171,8:691,2006

Abstract

The U.S. military services, drawing on the experiences of civilian trauma systems in monitoring trauma care delivery, have begun to implement their own registries, emphasizing injury incidence and severity in a combat environment. This article introduces and describes the development of the U.S. Navy-Marine Corps Combat Trauma Registry and presents several preliminary inquiries of its database regarding combat injury patterns and casualty management during Operation Iraqi Freedom. The Navy-Marine Corps Combat Trauma Registry is composed of data sets describing events that occur from the point of injury through the medical chain of evacuation and on to long-term rehabilitative outcomes. Data were collected from Navy-Marine Corps level 1B, 2, and 3 medical treatment facilities. Data from the official combat period were analyzed to present a variety of preliminary findings that indicate, among other things, how many and for what type of injury casualties were evacuated, specific mechanisms of injury, and types of injuries treated at the medical treatment facilities.

Body Mass Penalties in the Physical Fitness Tests of the Army, Air Force, and Navy

Paul M. Vanderburgh, EdD; Todd A. Crowder, PhD

Military Medicine, 171,8:753,2006

Abstract

Recent research has empirically documented a consistent penalty against heavier service members for events identical or similar to those in the physical fitness tests of the Army, Air Force, and Navy. These penalties, which are not related to body fatness, are based on biological scaling models and have a physiological basis. Using hypothetical cases, we quantified the penalties for men, with body mass of 60 vs. 90 kg, and women, 45 vs. 75 kg, to be 15% to 20% for the fitness tests of these three services. Such penalties alone can adversely affect awards and promotions for heavier service members. To deal equitably with these penalties in a practical manner, we offer two recommendations, i.e., (1) implementation of revised fitness tests with balanced events, in which the penalties of one event for heavier service members are balanced by an equal and opposite bias against lighter service members, or (2) development of correction factors that can be multiplied by raw scores to yield adjusted scores free of body mass bias.

Asthma in Military Aviators: Safe Flying Is Possible

Carter, Dan; Pokroy, Russell; Azaria, Bella; Barenboim, Erez; Swhartz, Yehuda; Goldstein, Liav

Aviation, Space, and Environmental Medicine, Volume 77, Number 8, August 2006, pp. 838-841(4)

Abstract

Introduction: Asthma is considered relatively incompatible with aviation. Firstly, due to the risk of sudden incapacitation, and secondly, due to cold and dry air and other asthmogenic factors characteristic of the aviation environment. The medical requirements for flying fitness of asthmatic aviators are inconsistent between different air services, and many flight surgeons are unfamiliar with the recent developments in asthma management. This study aims to describe our experience with asthmatic aviators and to discuss the medical standards required for flying fitness in chronic asthma. **Methods:** The records of all aviators diagnosed with asthma between January 1988 and September 2005 were reviewed. Pulmonary function tests and examination by a pulmonary disease specialist and flight surgeon were performed at least annually. **Results:** Nineteen Israeli Air Force aviators with asthma were studied. Most were treated with inhaled long-acting beta agonists and corticosteroids. Disease control was satisfactory in more then 90%, with significant worsening in only one case. We had no cases of sudden incapacitation or any other safety breach. One aviator was grounded 23 year after diagnosis due to deterioration in the severity of the disease, and another aviator was permanently grounded one year after diagnosis. **Conclusions:** Adequate asthma control is readily feasible, even in the aviation environment. Long-term inhaled corticosteroids are effective and have few side effects in aviators. Our management approach to aviators with asthma appears to be safe and effective.

Cancer Incidence in the U.S. Air Force: 1989-2002

Yamane, Grover K.

Aviation, Space, and Environmental Medicine, Volume 77, Number 8, August 2006, pp. 789-794(6)

Abstract

Background: Cancer incidence in U.S. Air Force active duty (AFAD) personnel is unknown. Defining the epidemiology may support more effective prevention and clinical services. **Methods:** Standardized incidence ratios (SIRs) for invasive cancer in AFAD personnel during 1989-2002 were determined using U.S. national incidence rates as the reference. SIRs were adjusted for age and race. Cutaneous squamous and basal cell carcinomas (CAs) were excluded. **Results:** There were 2750 cases: 1986 in men and 764 in women. The all-cancers SIRs were for men, 0.50 (95% CI: 0.48-0.53), and for women, 0.96 (95% CI: 0.89-1.03). Among men, the 10 most frequent cancers (77.6% of total) were, in descending order: melanoma; testicular CA; prostate CA; non-Hodgkin lymphoma; follicular/papillary thyroid CA; Hodgkin's Disease; colorectal CA; brain neuroepithelial CA; and (tied) bladder CA and oral squamous cell CA. Among women, the 10 most frequent cancers (88.1% of total) were, in descending order: breast CA; cervical CA; follicular/papillary thyroid CA; melanoma; Hodgkin's Disease; colorectal CA; (tied) non-Hodgkin lymphoma and ovarian epithelial CA; vulvar CA; and (tied) brain neuroepithelial CA and oral squamous cell CA. Compared with the U.S. population, cancer type-specific SIRs were significantly increased for cervical CA, prostate CA, and vulvar CA (range,

1.44-3.54). SIRs were significantly decreased for bladder CA (men), brain neuroepithelial CA, colorectal CA (men), Hodgkin's Disease (men), non-Hodgkin lymphoma, oral squamous cell CA (men), and testicular CA (range, 0.31-0.68). The remaining SIRs were not significantly different from unity. **Conclusions:** The cancer experience of the AFAD population differs substantially from that of the U.S. population.

Sound Attenuation from Earmuffs and Earplugs in Combination: Maximum Benefits vs. Missed Information

Sharon M. Abel and Patricia Odell

Aviat Space Environ Med 2006; 77:899-904.

Abstract

Introduction: Noise levels from military aircraft range from 100-130 dBA. Peak pressure levels from large caliber weapons may reach 180 dB SPl. To protect against hearing loss, individuals are encouraged to wear double hearing protection. This study determined ways to maximize benefit. **Method:** Hearing thresholds from 0.25-8 kHz and consonant discrimination were assessed in normal-hearing subjects with ears unoccluded and fitted with highly rated earmuffs and earplugs, singly or in combination. The earplugs were available in two sizes. Selection was based on best fit. Attenuation values were derived from the threshold measurements. **Results:** With the muff, plug, and muff and plug in combination, thresholds ranged from 35-48 dB SPL, 40-55 dB SPL, and 44-66 dB SPL, respectively, across the frequencies tested. The combination (without regard to size of plug) resulted in attenuation values of 38-54 dB. With the smaller of the two plugs, low-frequency values as high as 53-61 dB were realized. Consonant discrimination decreased by 6-8% with the devices worn singly and by 22% with the devices in combination, relative to unoccluded listening. **Discussion:** Sufficient low-frequency attenuation may be achieved with muffs and plugs in combination to prevent hearing loss from operational noise. Attenuation may be maximized by choosing a smaller earplug to achieve a better fit. Possible downsides are reduced detection of warning sounds and speech intelligibility. To be heard warning sounds should surpass protected thresholds by at least 5 dB. Choosing devices which provide somewhat less attenuation may be necessary to preserve communication capability.

Post-Dive Bubble Formation in Rats: Effects of Exercise 24 hours Ahead Repeated 30 min Before the Dive

Are Loset Jr., Andreas Mollerlokken, Vegard Berge, Ulrik Wisloff, and Alf O. Brubakk

Aviat Space Environ Med 2006; 77: 905-8.

Abstract

Introduction: Recent studies have shown that a nitric oxide releasing agent or a single bout of high-intensity exercise 20-24 hours before a dive can prevent bubble formation following decompression. The aim of this study was to determine whether high-intensity exercise immediately prior to a dive eliminates the protective effect of a single bout of high-intensity exercise 24 hours before the dive. **Methods:** Twelve female Sprague-Dawley rats were randomly divided into two equal groups. Group 1 performed 90 min of exercise twice, beginning 24.5 hours and again 2.0 hours before compression. Group 2 performed 90 min of exercise beginning at 25.5 hours before compression. The standardized exercise protocol was 7 x 8 min at 85-90% maximal oxygen uptake (V02max) followed by 2 min at 50% Vo2max for a total of 90 min including a 20 min warm-up at 40-50% of Vo2max. All rats were exposed to a pressure of 700 kPa (7 AT A) for 45 min in a dry hyperbaric chamber followed by decompression to the surface at 100 kPa (1 AT A) at a rate of 50 kPa . min-1 (0.5 atm' min-1) breathing air. **Results:** Bubble formation was significantly higher in rats that had exercised 24 hours and 30 min prior to dive than rats that had only exercised 24 hours prior to the dive (median bubble grade 4.5 vs. 0.5). **Conclusion:** This study demonstrated that acute exercise prior to a dive eliminated the protection against bubble formation found 24 hours after high-intensity exercise in rats.

Cognition During Sustained Operations: Comparison of a Laboratory Simulation to Field Studies

Harris R. Lieberman, Philip Niro, William J. Tharion, Bradley C. Nindl, John W. Castellani, and Scott J. Montain

Aviat Space Environ Med 2006; 77:929-35.

Abstract

Introduction: Military operations, especially combat, expose individuals to multiple stressors, including sleep loss, food deprivation, and sustained physical activity. Civilians, such as woodland firefighters, disaster victims, and relief workers, are also exposed to such environments. Our laboratory developed a brief, intense, laboratory-based simulation of a multistressor environment which included sleep loss, continuous physical activity, and food deprivation. **Methods:** During this sustained operations (SUSOPS) scenario, and a control period, cognitive performance and mood were measured in 13 volunteers. The scenario included road marches, battle drills, and land navigation. Physical activity and sleep were assessed with actigraphs. **Results:** Significant decrements in visual vigilance, choice reaction time, and matching-to-sample, a test of short-term memory, were observed. Marksmanship was stable and physical activity significantly increased. Mood states assessed by the Profile of Mood States (POMS: Tension, Depression, Anger, Vigor, Fatigue and Confusion) also significantly deteriorated. **Discussion:** Cognitive function declined more extensively and rapidly than physical performance. Decrements in cognitive performance were comparable to those in a field study conducted for an equivalent period of time in uncontrolled conditions. This demonstrates that decrements in cognitive function and increased physical activity, similar to those in highly stressful field environments, can be duplicated under controlled conditions. The simulated SUSOPS scenario is an appropriate paradigm for assessment of adverse effects of military and civilian multistressor environments on human performance, physiology, and interventions designed to mitigate them.

Fatigue and Related Human Factors in the Near Crash of a Large Military Aircraft

Jeffrey J. Armentrout, Dwight A. Holland, Kevin J. O'toole, and William R. Ercoline

Aviat Space Environ Med 2006; 77:963-70.

Abstract

Introduction: During approach to a remote island location, a U.S. Air Force heavy-airlift aircraft was flown into an aerodynamic stall, resulting in the loss of more than 4000 ft of altitude, with the crew recovering the aircraft just before impact would have occurred. **Methods:** An analysis of the mishap was conducted through a review of non-privileged USAF mishap data, cockpit voice recordings, flight data records, and interviews of the aircrew involved. A thorough examination of fatigue-related factors was conducted, including computerized fatigue modeling. **Results:** The crew traveled over 11,000 mi in a westward direction over a 6 day period. They had been on duty for nearly 21 hours on the day of the mishap, with minimal in-flight rest. The pilots were late beginning their descent for landing, and a minor aircraft malfunction distracted the crew, contributing to channelized attention and degraded situational awareness. A breakdown in crew communication and failure to adequately monitor and interpret true aircraft state culminated in loss of aircraft control. Analysis of the crew's work/rest schedule confirmed that multiple elements of fatigue were present during this mishap, including acute and cumulative fatigue, circadian disruptions, and sleep inertia. Additionally, reduced situational awareness and spatial disorientation, exacerbated by the underlying fatigue, were causal in this mishap. **Discussion:** This mishap highlights the importance of maintaining a high degree of situational awareness during long-haul flights with a continuing need to address issues regarding spatial disorientation, proper application of human engineering principles in modern cockpits, and mitigation of aircrew fatigue factors.

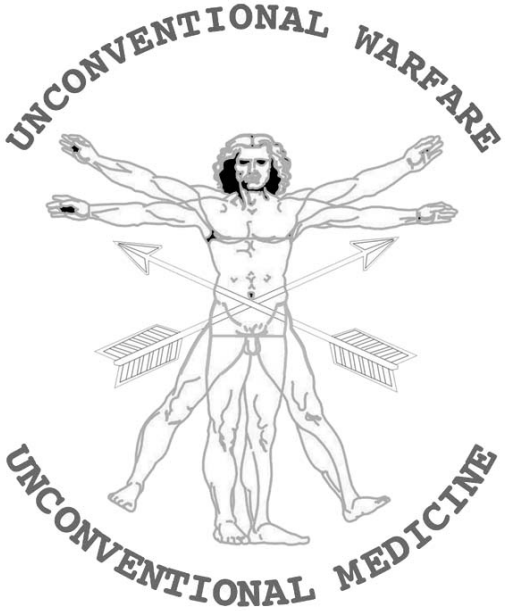
Pandemic Influenza: A Note on International Planning to Reduce the Risk from Air Transport

Anthony Evans, Silvio Finkelstein, Jarnail Singh, and Claude Thibeault

Aviat Space Environ Med 2006; 77:974-6.

Abstract

The rapid and intercontinental spread of avian influenza in 2005 and the potential for human pandemic influenza caused preparedness plans for such an event to be highlighted. The World Health Organization (WHO) has developed a global influenza preparedness plan, but this document does not address in detail the contribution necessary by the aviation community. The International Civil Aviation Organization, with assistance from WHO, the Airports Council International, and the International Air Transport Association, and others, has developed preparedness guidelines that are in accord with those of WHO but which are focused on the aviation aspects. Effective communication between stakeholders is the single most important issue that is addressed in the preparedness guidelines. States are recommended to appoint a clear contact point at the national aviation level that has responsibility for ensuring that all stakeholders are adequately consulted in the development of an aviation preparedness plan and that the relevant communication links are established. It is also important that the aviation preparedness plan is incorporated into the State's general preparedness plan, which demands efficient collaboration between the departments of health and transport at the government level. Communication with passengers, and those considering traveling, is important so that individuals are made aware of the risks associated with travel to particular parts of the globe and of the risk-reduction measures they may experience, or can take themselves, at airports and on aircraft. The guidelines will be web-based and will evolve as more knowledge becomes available.



Previously Published

Primitive Blood Transfusion in a Prisoner-of-War Camp, WW II

John E. Rogers, Jr., MD

Previously published in Military Medicine 1966; Vol 131, No. 9, pp 802-805.

Executive Editors Note: I had the privilege of working for Colonel Rogers in the late 1970s. He was an infantry medic on a troop ship bound for the Philippines when Pearl Harbor happened. His ship was diverted to Singapore where he was captured. He spent the war in a POW camp at the other end of the railway that the British POWs were building on the Bridge Over the River Kwai.

Introduction

Reading Chapter 1, "Historical Note," of General Douglas B. Kendrick's *Blood Program in World War* ll[1] - particularly those portions concerning early equipment and techniques and the special problems encountered in the administration of blood - reminded me of some experiences in this field while a prisoner of the Japanese Army in Thailand. In 1943 and 1944, captured troops from the American, Australian, British, and Netherlands Indies Armies were put to the task of building for the Japanese a railroad from Moulmein, in Burma, to Bangkok, Thailand. The camp where these experiences took place was very like the ten or twelve others scattered along that line. It consisted of a complex of large bamboo buildings - cookhouse, barracks and hospital - and held as a labor force some twenty-five hundred prisoners. Heavy labor on the railroad, inadequate diet, almost complete lack of medical supplies, and tropical diseases had all combined to leave a great percentage of the PWs in bad shape, and the hospital hut was always full.

By this time men had begun to die. With little or no drugs available, and in weakened condition to start with, a severe attack of malaria or amebic dysentery would simply slide a man quietly over the edge. Appeals to the Japanese authorities for medical supplies and better food got nowhere; indeed, conditions got worse.

The Problem

In the summer of 1944, the camp doctor - a member of the Royal Army. Medical Corps, British Army - decided that the use of fresh whole blood by transfusion was indicated for several of the prisoners sick in the hospital.

The decision made, there remained days of searching and bringing together the necessary equipment, and long discussions on how we could best overcome the many problems that immediately arose. The following is an account of our equipment and the procedures used in the procurement and administration of fresh blood.

Acquisition of Supplies

The equipment available to us included a pint Mason jar with a screw-on lid, an empty 1,000ml double-ended ampul, a two-foot length of quarter-inch rubber tubing and an inch and a half needle of approximately 18 gauge. The sources varied; the jar was given to us by an Australian; the needle I had previously stolen from a Japanese medical corpsman, for no reason except "to have it"; the ampul, which had contained Ringer's solution, was the only one remaining of three given the hospital by the Japanese in 1943 as material for which they had no use (the other two had their contents used and were discarded before we realized how handy they might be); and the rubber tubing came as a set with the ampules of Ringer's. (As I recall, the needle which came with the set was lost after the first use.) An American artillery officer donated a sheet he had carried since the day of our capture; a mosquito net was kept in the hospital when its owner, a Soldier in the Netherlands Indies Army, died. This material was used to wrap the glassware during sterilization and as covers for the gear while being used. With the exception of the jar, which required some modification, all these items were used without modification.

The Mason jar was used as a container for the collection of the donor's blood. Since we had no anti-

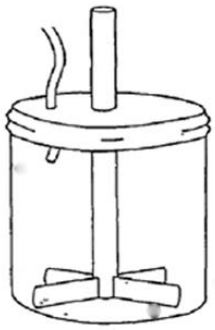


Figure 1. Mason jar, assembled, showing dasher and rubber tubing in place. Blood ran into jar by gravity; defibrination accomplished by dasher, which was slowly rotated during and for a short time after collection.

coagulants, our only method of preventing clotting of the blood during collection was defibrination. The jar, with its lid, was taken to an Australian PW – a tinsmith in civilian life – who had received from the Japanese empty cans, shears, solder, and an iron so he could make for them any light metal items they might require. It was a simple matter to fabricate a dasher cut from tin cans, and soldered together, resembled a churn with a handle which protruded through a hole punched in the lid. A second hole was made in the lid to accommodate the rubber tubing and the collection set was ready. (Figure 1) In actual usage it functioned as well as expected, though the volume of liquid blood obtained was naturally decreased by the volume of fibrin and cells which collected on the dasher as it turned.

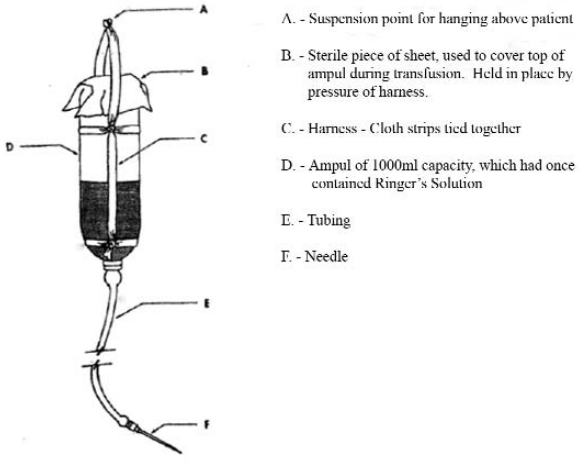


Figure 2. The completed and assembled apparatus ready for use.

The double-ended ampul needed no modification. One tip was left so that the tubing could be attached and used as a recipient set. The other tip was broken off completely in order that the collected blood could be poured into the ampul without spillage. All that remained was the making of a harness for suspension of the ampul over the recipient, and the "bottle" was completed for use. (Figure 2)

Since we had only *one* large gauge needle and *one* length of tubing, this system, of necessity, was used as both donor and recipient set.

Blood Group Compatibility Test

There still remained the problems of compatibility of donor with recipient, and sterility of both equipment and venipuncture sites. As for the first, most of the PWs still had dog-tags, on which their ABO groups were noted; it was usually easy enough to find a prospective donor whose listed group was the same as the patient needing the blood. Final testing of the bloods was done by mixing a drop from the finger of each man on a glass slide (produced by the British doctor from his personal gear). The mixture was viewed from beneath the slide; a suspension of cells with no agglutination obvious to the naked eye was regarded as a compatible cross-match.

Iodine crystals were given to us by the Japanese and rice alcohol was available from our own still (made weeks before by the Australian tinsmith who modified the Mason jar). A tincture of iodine was used to prepare finger punctures and venipuncture sites – an important procedure, as our own experience showed that breaks in unsterilized skin had a tendency to evolve into serious (and often fatal) tropical ulcers. This alcohol was triple distilled from a mash of rice, water, and yeast, and burned with a bright blue flame.

We had in the hospital a large, deep instrument tray, with cover, that was capable of holding the glassware, needle and tubing, the pieces of cloth and mosquito netting requiring sterilization, and enough water so that the tray could be kept at a boiling temperature for ten minutes without running dry. A fireplace of the proper size was built in the still hut, and our equipment sterilization problem was resolved. We found that the glassware, tubing, and needle would drain completely and become bone-dry from their own heat if they were placed upside down on a sterile drainage pad and covered with a sterile cloth immediately after boiling.

The Phlebotomy

Finally, it was felt that the major problems were overcome, and a standing operating procedure (SOP) arrived at which (with one change) was used in the first and subsequent transfusions:

The rubber tubing was placed over the hub of the needle, the open end and needle wrapped in small

pieces of mosquito net, and the whole assembly coiled and wrapped in a piece of sheet. The Mason jar, lid, and dasher were individually wrapped in pieces of sheet, and all items placed in a tray, along with extra pieces of cloth for use of covers after sterilizing. Water was added, the tray put on the fire, and the contents boiled for ten minutes. The tray was taken from the fire and the packages removed, using bamboo tongs which were soaked in alcohol. The cloth wrappings were taken off, and with extra pieces, wrung out and opened; the sterile surfaces were used as drainage bases and covers for the hard components while they drained and dried out.

The previously selected and cross-matched donor lay on a bamboo table and the venipuncture site scrubbed, first with the iodine tincture, then with alcohol, and covered with a piece of sterile cloth.
The jar was carefully assembled so that the dasher was in place with the handle protruding and the lid screwed down. The mosquito netting was removed from the open end of of the tubing and it was inserted for about an inch through the second hole in the lid.

The needle was uncovered and the venipuncture made. Blood then flowed into the jar by gravity; as it collected, the handle of the dasher was turned slowly and constantly so that as the clot formed the strands of fibrin collected on the paddles of the dasher, leaving only serum and cells. (This method of defibrinating blood worked quite well and was not changed during subsequent collections).

After collection of what the doctor felt was sufficient quantity of blood, the tubing was pinched off and the needle was removed from the donor's arm. The lid of the jar was taken off, the dasher drained of liquid blood, and set aside for cleaning. The jar lid was replaced and covered with a sterile cloth, while the tubing and needle were taken apart and cleaned so they could be re-wrapped and sterilized with the Ringer's ampul, and used as the recipient set. (The first time in practice the tubing and needle were cleaned by repeatedly filling them with water and allowing them to drain; we hoped that any dried blood left from the collection procedure would be completely laked and washed away. As we found out, this was not sufficient, and a mild pyrogenic reaction resulted during the second transfusion. Subsequently, I used a bit of piano wire to clean the hub and bore of the needle, while the tubing was cleaned by repeatedly forcing through it a piece of wet clean rag on the end of a flexible silver probe. The bore of the needle and tubing were examined as would be the bore of a weapon, by holding them to the light and checking for visible bits of dried clot.)

The cleaned tubing and needle were assembled as before, and the open end of the tubing placed over the tip of the ampul. The whole assembly was wrapped in cloth and boiled for ten minutes; then it was removed from the tray, unwrapped, covered with sterile cloth, and allowed to drain and dry.

As soon as the ampul assembly had dried and cooled, the recipient lay on the table and the venipuncture site prepared as was the donor's. While this was being done the liquid blood in the Mason jar was slowly poured into the open end of the ampul, using several thicknesses of sterile mosquito netting as a filter; the tubing was pinched during the pouring to prevent any wastage of blood.

When all the blood was in the ampul the tubing was allowed to fill until a drop appeared at the point of the needle, and the needle inserted into the recipient's vein. The tubing was released, the ampul hung on a line or pole above the patient's arm, and the blood allowed to flow by gravity. (As I recollect the procedure, no effort was made to regulate the flow, though it would have been a simple matter to make an adjustable clamp out of tin.) The blood level in the ampul was watched closely, and as it reached the rubber tubing the latter was pinched off and the needle removed from the patient's arm.

Using the equipment and procedures outlined above, some eight or nine transfusions were carried out. To the very best of my knowledge, these were the only transfusions attempted or completed in the entire complex of camps, along the Moulmein-Bangkok railway; certainly they were the only ones comp1eted in any camp in which I was a prisoner!

MAJ Rogers attended the University of Texas, receiving his BA degree in 1950. He is presently assigned as Blood Bank Fellow, Blood Transfusion Research Division, U. S. Army Medical Research Laboratory, Fort Knox, Ky. Past assignments since 1951 have been as Clinical Laboratory Officer in military hospitals in both CONUS and Puerto Rico. Last assignment before coming to Fort Knox was at U.S. Army Hospital at the U.S. Military Academy, West Point.

Reference

1. Kendrick, Major General Douglas B., MC, USA: Blood program in World War 11, Office of The Surgeon General, Department of the Army, Washington, D.C., 1964.

Pain Management in the Wilderness and Operational Setting

Ian S. Wedmore, MD; Troy Johnson, MD; Jim Czarnik, MD; and Steve Hendrix, CRNA.

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The information in this article represents only the views and experiences of the authors. It does not represent the official policies of the Department of Defense, the U.S. Army, or any subordinate commands of either.

The wilderness and operational setting places unique constraints on one's ability to treat pain. In this article we will discuss methods for treating pain both in the wilderness and operational setting. By operational we mean the austere deployed military setting, to include both noncombat and combat operations. The authors combined experience with wartime trauma pain management consists of experience in Operation Just Cause (Panama Invasion), Operation Desert Storm (the Persian Gulf War), Operation Uphold Democracy (Haiti liberation), Operation Enduring Freedom (Afghanistan conflict), and Operation Iraqi Freedom (OIF) (Iraq conflict).

Because of the austerity of care for patients in these settings, there is limited evidence based information for "ideal" pain control. We will present what little literature is available as well as providing much information on what is done, what seems to work, and some novel ideas in the area. Much of what will be described will include actual patient care cases. It is hoped this article will provide some basic pain management principles for those who practice in the austere environment.

Overview

The wilderness and operational setting provides unique challenges for pain assessment and management. The diversity and quantity of pain control medication is limited by the quantity and type of medication one can carry with them into the austere setting. The type of medication may further be limited by the lack of or difficulty in obtaining intravenous (IV) access. This is often due to the difficulty in carrying heavy, bulky IV supplies. In the operational setting there is often difficulty in obtaining IV placement due to a given tactical situation, that is, doing so in a moving tactical vehicle or while under enemy fire. The inability to use IV medications therefore often limits the choice of pain medication that may be used. Consideration must also be given to cases where one must treat multiple casualties at one time, and how to best safely manage pain with limited resources.

The patient in the austere setting may also be required to assist with or actively be involved in his evacuation, limiting the type of medication that can be administered to something nonsedating. In the operational setting a wounded individual may still be required to defend himself and his comrades, also limiting the type of pain control he receives. Other factors of concern include the hydration status of a patient, individuals in the wilderness or military operations tending to be at least minimally dehydrated on a frequent basis. Environmental considerations also become paramount, not only for the patient but for the storage of the medications; for example, any medication requiring refrigeration is poorly suited for austere use. These multiple factors often decide what medications will be ideal for a given situation.

The ideal pain medication for wilderness and operational use would be:

- Light
- Compact
- Can be carried and stored without concern for environment or temperature
- Have a very high therapeutic index particularly with regard to ensuring that airway reflexes are protected
- Not require an IV or other equipment to administer
- Can be used regardless of a patients level of stability

Although no pain control agents perfectly meet these criteria, we will discuss those most commonly used with some of their specific considerations for austere use.

Nonsteroidal anti-inflammatory drugs

Nonsteroidal anti-inflammatory drugs (NSAIDS) have long been the mainstay for oral treatment of mild to moderate pain in the austere setting. So much so that in the operational setting ibuprofen is colloquially known as "Ranger Candy." NSAIDS have been shown to be both effective for moderate pain control as well as to reduce the dosage of narcotics required for adequate pain control,[1] thus reduc-

ing the risk of over-sedation of patients in the austere setting. Ketorolac has often been the military intramuscular (IM) choice of moderate or greater pain control. Ketorolac has variously been shown to have analgesic properties equal to everything from acetaminophen to standard doses of narcotic agents depending on the disease process being treated.[2] Despite its having been shown to have this variable analgesic effect, it is often used as a first-line IM agent. Oral NSAIDs as well as acetaminophen have remained the most commonly used oral medications in the austere environment; they have been covered in detail elsewhere, so we will only discuss their side effects and its influence on austere use.

Three problems with NSAIDs that cause concern with their use in the austere environment are: (1) increased incidence of gastrointestinal distress and bleeding,[3,4] (2) the possible risk of inducing renal failure in those already somewhat dehydrated,[5,6] and (3) inhibition of effective clot formation due to NSAID "poisoning" of platelet function.[7]

These side effect profiles have led to consideration, particularly in the operational setting, of the use of selective cyclooxygenase-2 (COX2) inhibitors. The COX2s do have a lower incidence of gastrointestinal side effects.[8] The risk of inducing renal failure, however, is no different between regular NSAIDs and COX2.[9,10] There is, furthermore, no difference in pain control between the two classes.[11] Of greater concern, particularly in the tactical environment, is the effect of NSAIDS on platelet function and bleeding time. The COX2s do have an advantage here in they do not appear to effect platelet function and bleeding time.[12,13] Because of this, the Committee on Tactical Combat Casualty Care consensus panel recommended the use of COX2 inhibitors as the NSAID of choice for combat operations.[14]

Some military units have, in fact, developed "wound packs," which are to be taken in the event that a Soldier receives a penetrating extremity wound of any type. The packs contain acetaminophen, a COX2, and a fluroquinolone. Immediately upon wounding the individual will open the pack and take these medications. The addition of acetaminophen to an NSAID has been felt to increase the degree of pain relief while not increasing sedation. (Figure 1)

Anecdotal experience in OIF showed this to be very effective in treating pain from minor penetrating soft tissue injuries (fragment wounds, and so on), although the numbers involved have thus far been small.

The risk of renal injury remains a consideration with NSAID use in the austere environment. Fortunately, the risk of this in healthy individuals is extremely small, the incidence of hospitalization for acute renal failure being 0.6 per 100,000 person years of NSAID use in individuals younger than 64.[5] Theoretically, one would expect the incidence to be higher in individuals with mild dehydration, as is often seen in the wilderness and combat environment. There is, however, no good data on the effect of mild dehydration on the incidence of NSAID-induced renal failure. If we assume that the increased risk of renal failure is probably similar to that seen in older individuals (> 65 years old) who often have impaired renal function due to age, medication use, and other factors including volume depletion that decrease renal blood flow, then the risk from NSAID use causing renal failure incidence increases to 4.6 per 100,000 person years.[5] An increased risk to be considered, although again not a high risk.

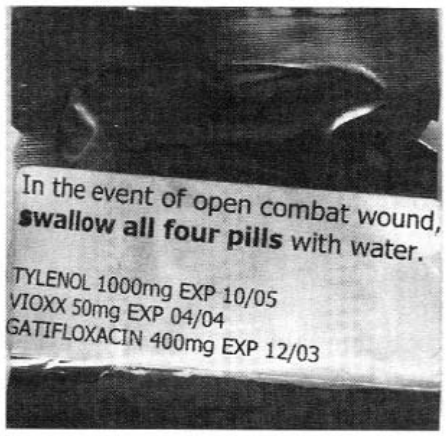

Figure 1. Wound pack utilized in OIF
Courtesy of Troy Johnson, MD

Oral and IM NSAIDs are the most common types used; however, other forms of NSAIDs have some utility in the austere environment. Topical NSAIDS have some excellent utility in specific situations. They have been shown to be very effective for reducing pain associated with corneal abrasions,[15] with a number of them approved for ophthalmologic use.[16] An ibuprofen gel for use in acute soft tissue injuries has also been found to be as effective as oral ibuprofen with obviously less gastrointestinal upset.[17]

OPIATES

Opiate analgesia is by far the most effective pain management drug class for severe pain. Frequently encountered situations involving injuries in the austere environment will often require opiate medication for adequate pain management. Morphine has been the standard IV opiate analgesic for operational use,[18] its familiar dosing and side effect profile being the primary reason to recommend it. Opioids can be given via the oral, IM, and IV routes. IV has been the route of choice due to variable absorption and "first-pass effect" seen with oral and IM dosing methods. The IV method of delivery, however, may be difficult in the combat setting; the medical experience in the Falklands conflict found the use of IV narcotics to be impractical.[19] Specifics of opiates have been covered in depth elsewhere, so we will not repeat them here. There have been, however, some recent innovations in the use of oral opiates in the tactical setting. Oral opiates are commonly used for pain control, but up until recently oral opiate analgesia have been slow in onset and difficult to titrate to effect without having significant side effects or prolonged absorption profiles. Before OIF, several physicians in the Special Operations community addressed this problem.

Several choices were available; none were perfect. Our ideal opiate analgesic agent would have to be given orally, potentially self-administrable, have a significant safety profile, low side effect profile, and be rapid in onset. Pill-form opiate medications such as oral morphine were of limited use secondary to the prolonged time of onset and limitations in dosages. Liquid agents were limited by the significant first-pass effect of opiate metabolism and the administration and packaging in the field environment. The recent release of an oral preparation of fentanyl citrate under the trade name of Actiq appeared to fit our requirements. Actiq (Oral Transmucosal Fentanyl Citrate, OTFC) is a crystalline form of fentanyl citrate incorporated into a sweetened white lemon-flavored lozenge on a plastic handle (Figure 2).

Fentanyl citrate is a highly lipophilic synthetic phenylpiperidine derivative that is approximately 80 to 100 times more potent than morphine, and selectively binds to the mu-l and mu-2 receptors. OTFC is intended to be administered orally over 15 minutes, and reaches maximal serum levels after 10 to 20 minutes following administration. It undergoes metabolism in the liver and intestinal mucosa by the cytochrome P450 3A4 isozyme to an inactive metabolite, norfentanyl. The mechanism of action is both transmusocal and gastrointestinal. OTFC is rapidly absorbed through the oral mucosa, and has an onset of action of five to ten minutes. Only 25% of the total dose is absorbed in this way. The rest of the medication is swallowed and absorbed through the intestinal mucosa. There is a significant first-pass metabolism with the only one third of the swallowed dose reaching the systemic circulation (25% of the total). This gives a total functional absorbed dose of 50% of the administered preparation. The mucosal absorbed medication accounts for its rapid onset, while the swallowed preparation accounts for the duration effect. The terminal half-life is six to seven hours, and serum concentration increases in a dose-dependent manner. The side effect profile also appears to follow a dose-dependent graph, with the most severe side effect, respiratory depression, starting to occur at serum levels of 2ng/ml. This serum level is reached by using dosages greater than 800mg.[20]

Figure 2. Actiq Fentanyl Lozenges.
Courtesy of Troy Johnson, MD

Oral fentanyl citrate is Federal Drug Administration-approved as two preparations, Oralet and Actiq. Oralet is no long available on the market due to financial reasons. The current Federal Drug Administration approval for Actiq is for opiate-dependent pain in cancer patients that have breakthrough pain. There are several studies documenting its efficacy in this area.[21-24] Several studies using Oralet have also documented its efficacy in the hospital setting with children.[25-28] There is also one study documenting its effectiveness for the use of acute pain in the emergency department setting.[29] In a yet unpublished observational study documenting its use by Special Operations Forces in OIF, it again proved to be a safe and effective analgesic agent (Johnson T, personal communication, pending publication). The packaging held up well to significant wear and tear, and the preparation tolerated a variety of temperatures. Common side effects seen in most studies are pruritis (50-60%), vomiting (40%), and transient oxygen desaturation below 94% (0-24%). Severe side effects can include respiratory depression, bradycardia, and chest wall rigidity, but these have not been

seen with standard dosing.[30] The absorption profile can also be altered by swallowing the preparation, which will delay the maximal concentration 20 to 30 minutes.[30] However, the significant first-pass metabolism will lower the serum concentration to 25% of the total swallowed dose. OTFC has been shown to have a morphine equivalency of 8 to 14:1.[31]

Overall, OTFC appears to be ideal for administering safe rapid-onset oral opiate analgesia in the prehospital austere setting.

This was used very effectively during an episode in OIF. Nine patients required care for extremity fractures simultaneously. Due to the tactical situation the placement of IVs was, at best, difficult. Of the nine patients, seven had significant fractures and all had significant pain. All were given OTFC with 90% plus reduction in pain within 15 minutes. Several fell asleep but maintained airway reflexes and oxygen saturation. Two, however, fell asleep with the "lollipop stick" hanging out of their mouth. Because of this it is recommended that the OTFC be taped to the patient's finger while they use it to prevent inadvertent choking on the same if they became somulent. Two developed nausea and one had one episode of emesis. All did well with effective pain relief during transport to definitive care.

Another opiate form recommended for austere use includes intranasal butorphanol (Stadol NS). Nasal butorphanol has been shown to be effective for postoperative pain with an onset of approximately 15 minutes.[32,33] It has also been used in the third world as a method of providing postoperative analgesia without the need for IV access.[34] The authors have no experience with this medication, although it shows promise as another method of providing rapid onset pain relief in the austere environment.

Ketamine

Ketamine, a dissociative anesthetic agent, has been used extensively as an anesthetic agent for traumatic war wounds.[35,36] Ketamine fits many of the criteria for an ideal pain control agent: it provides effective analgesia, it provides amnesia to pain and events, and the patient's airway reflexes remain intact despite dissociation. Airway reflexes are protected to the point where patients maintain oxygen saturations even while spontaneously breathing air during austere surgery.[37] Ketamine is also cardiovascularly stable, and it has both a rapid onset as well as being both relatively short acting and titrateable.[38]

Ketamine has been found to be a very effective pain control method for both painful procedures, that is, in burn care,[39] as well as for treating pain not otherwise well controlled by other means, that is, in refractory cancer pain.[40] It has been used as a narcotic "sparing agent" to effectively treat postoperative pain.[41] Ketamine has also been used independently as an infusion to treat postoperative pain.[42] Ketamine has also been used preoperatively as an infusion for analgesia of warwounded individuals awaiting treatment for wounds incurred in fighting along the Thai-Cambodian border. In this situation, ketamine infusion significantly reduced pain, particularly with landmine injuries,[43] and was the drug of choice for pain control in hemodynamically compromised individuals.

The doses used for analgesia are less than the typical procedural "conscious sedation doses." Recommended dose ranges are 0.44 to 1.0mg/kg IM or 0.2 to 0.5mg/kg IV.[44,45] The authors typically start with 0.1mg/kg IV and titrate to effect.

In OIF, a patient with a traumatic knee fracture/dislocation was in significant pain despite IV morphine. The injury was unstable, but fortunately, the popliteal artery appeared intact. To control pain for placement of the injury in a splint as well as for transport, 0.1mg/kg IV of ketamine was given. The patient's pain was effectively controlled, allowing stabilization of the injury and transport of the patient to definitive care.

In an incident related by a NATO physician several years earlier, ketamine was also effectively used. During a parachute training event, a patient suffered a fracture/dislocation of the ankle. The physician gave 1mg/kg of 1M ketamine, and was both able to reduce the injury as well as control pain for the patient without the need for an IV.

Author Czarnik had a similar experience with ketamine use in the emergency department. A 27-year-old male sustained an open fracture of the third to fifth metatarsals secondary to a motorcycle accident. He had no other injury and 8/10 pain. A single dose of IV ketamine at 0.5mg/kg brought on marked pain relief, reducing the pain to 1/10. The patient remained coherent and cooperative throughout.

Because of its limited side effect profile ketamine has been suggested as an easy and effective method of pain control in mass casualty/disaster situations,[46,47] the idea being that it can be used quickly on multiple individuals as a single IM injection.

Ketamine has furthermore been used as an agent for intravenous anesthesia in very austere surgery. In one study it was used in Somalia and Uganda to perform a number of significant surgeries with spontaneous ventilation and no monitoring equipment.[48] It has likewise been used in diverse warfare conditions from combat injuries in the Falklands to the Thai border to conflict in Afghanistan.[19] Ketamine is not, however, without side effects, although true toxicity is extremely rare.[49]

The major side effects of ketamine include "bad dreams" as well as more severe emergence phenomena. Although the "bad dreams" are not so problematic, a patient suffering emergence with access to loaded weapons in a combat zone could be a significant potential problem. The incidence of these side effects does appear to be somewhat dose related,[50] with less delirium noted with typical "pain" doses. The concomitant use of benzodiazepines with the ketamine has been shown to reduce psychotomimetic side effects.[51-53] This combination, however, increases the incidence of cardiovascular and respiratory side effects, and is therefore not routinely recommended for austere use, although in the Uganda study the combination was used with little problem.[48] Falkland War experience also showed there to be no problems with emergence when diazepam was coadministered.[54] It has also been shown that the isomer makeup of ketamine determines both its potency and incidence of psychogenic side effects.[55] The typical ketamine used today is a racemic mixture of d and I forms. The d form has been shown to be more potent, and also to have less psychotomimetic side effects.[55,56] Work is being done to use the d-isomer as a pain control medication.

Ketamine is most commonly given IM or IV; however, it is also available in oral, sublingual, rectal, and nasal preparations. Oral tablets appear to have approximately 20% bioavailability. Rectal and sublingual preparations appear to be 30%, and intranasal at least 45%.[57] Intranasal ketamine is being studied for use as an intranasal pain control agent in the operational setting. When using the d-isomer, intranasal ketamine may hold promise as an effective analgesic without the requirement of an IV and with a decreased incidence of psychotomimetic side effects.

Regional anesthesia

The most often discussed and written[58] about method of wilderness[59] and operational pain control is the use of regional anesthesia, which offers many advantages for the austere environment.[18] Although the following section is written primarily from an operational standpoint, regional anesthesia works equally well in the wilderness setting.

Wounds received during military conflicts present as challenges that require medical providers to possess a mastery of manifold anesthesia management techniques to deliver optimum care. The mechanism of injury, desires of the patient, and the skills of the practitioner dictate the type of regional anesthesia administered for any military wound. This section will briefly review the physiologic variables, technical highlights, and austere environment considerations for the administration of regional anesthesia to the trauma patient. In addition, common potential complicating factors present in the trauma patient will be discussed. The regional anesthetics discussed below were used whenever time allowed. For example, numerous amputations were performed on Iraqi soldiers during the Persian Gulf War using regional anesthesia and supplemental ketamine.

Regional anesthesia has been administered in one form or another during all major conflicts involving the United States over the last 100 years.[60] It has even been used as the sole method of anesthesia for cranial surgery![61] Its use has been limited due to sterile environment considerations and the anesthesia provider's regional anesthesia comfort level. Despite this, it has been recommended as a pain control technique of choice in mass casualty situations as it "provides complete and instantaneous pain relief … and provides an economy in personnel, time and money."[62] There have been no studies that demonstrate a higher risk of infection with regional anesthetics administered outside of the operating room setting. The level of regional anesthesia experience among anesthesia providers varies greatly due to varying levels of emphasis demonstrated in the different training programs in the United States. This lack of training and familiarity with the involved techniques will likely present the greatest deterrent to use of regional anesthesia for austere pain control.

Regional blocks most frequently used in the austere setting include femoral blocks, ankle blocks, axillary blocks, wrist blocks, facial blocks, and digital blocks. Blocks that have been used by the authors in the field environment include all of these.

The majority of these blocks have been covered elsewhere in this text. We will, therefore, only discuss the techniques for those blocks not previously covered or where the authors have a slightly dif-

ferent approach. Many blocks can be performed in a variety of ways, all of which are acceptable, and dependent solely on the preference of the practitioner.

The femoral nerve block is relatively simple to administer and provides reliable anesthesia. In the hospital setting the common indications for use of femoral nerve block include knee arthroscopy, patella tendon repair, repair of patella fracture, and skin grafting from the anterior aspect of the thigh. The femoral-sciatic block, in particular, has been shown to be effective in reducing postoperative pain after outpatient knee surgery.[63]

The femoral nerve originates from the L2 to L4 lumbar roots, and it descends between the psoas major and iliac muscles. In the inguinal region, the nerve is positioned anterior to the iliopsoas muscle (medial to the femoral artery) and inferior to the inguinal ligament. It innervates the muscles of the anterior thigh (quadriceps and sartorius muscles), and supplies articular branches to the hip and knee joints. Sensory branches innervate the skin of the medial thigh, medial part of the lower leg, and the medial part of the foot. With certain injuries, this regional anesthetic may mask the onset of compartment syndrome in the affected extremity; this must be considered if the femoral block is used.

The landmarks for the femoral nerve are inferior to the femoral crease. The insertion point is immediately lateral to the pulse of the femoral artery. The mnemonic NAVES is used to remember the relationship between the femoral nerve and the femoral artery. Structures are ordered lateral to medial: nerve, artery, vein, empty space, lymphatics, pubic symphysis.

To place this block, position the patient in the supine position with a fully extended lower extremity. This block may be accomplished with an iodinebased antiseptic solution and a 22-gauge 2-inch needle in addition to local anesthetic. Successful placement of the block can be performed by eliciting a paresthesia with a needle in the sensory/motor distribution of the femoral nerve. Light sedation of the patient is acceptable, but the use of the paresthesia technique requires an awake and responsive patient.

The landmark region is prepped and draped sterilely. Cutaneous anesthesia at the point of needle insertion may be obtained with a skin wheel of local anesthetic. A 2-inch 22-gauge (B bevel/dull point) needle is introduced through the skin at a 45-degree angle directed cephalad and medially toward the umbilicus. An evoked response of the rectus femoris is sought as the needle is carefully advanced. Movement of the patella indicates stimulation of the femoral nerve. If this motion is not found, the needle is brought back to the skin and redirected in a more lateral or medial direction. Once the desired nerve response is elicited, aspirate and inject the local anesthetic (0.5% bupivacaine) in 5mL increments. A total of 30mL of local anesthetic is usually injected.[64]

In Operation Just Cause, a Soldier had sustained an open tib/fib fracture from the airborne insertion. A femoral nerve block was placed, with immediate pain relief lasting several hours until the Soldier could be taken to the operating room.

In Operation Desert Storm, an enemy combatant had his foot blown off in combat. A femoral nerve block allowed amputation of the remaining affected limb without pain.

Ankle blocks and brachial plexus blocks may be used to provide surgical anesthesia or pain control. The ankle block is described as the impulse blockade of the five nerves that provide motor and sensory innervation to the foot. These nerves include the superficial peroneal, deep peroneal, saphenous, sural, and tibial nerves. Procedures that lend themselves to use of an ankle block include foot debridement, amputations of toes, or shortterm pain relief. Anesthesia of the medial foot requires blockade of the superficial, deep peroneal, saphenous, and tibial nerves. Surgery of the lateral aspect of the foot requires blockade of all but the saphenous nerve. The ankle block has been covered elsewhere in this text.

In Operation Desert Storm, an enemy combatant had suffered a gunshot wound to the foot. An ankle block was placed for wound debridement. The procedure as well as subsequent transport of the Soldier was done without pain.

Brachial plexus anesthesia will provide excellent anesthesia to the forearm and hand. An axillary block is the most commonly performed variety of brachial plexus anesthesia. The landmarks are easy to identify, and it is associated with fewer complications than other approaches to the brachial plexus. The axillary block does not provide reliable anesthesia above the elbow.

Insert an IV in the opposite arm. With the patient lying supine the arm is abducted to about 90 degrees, externally rotated, and flexed at the elbow. Prepare the axilla using a skin sterilizing solution. Palpate the axillary artery and place a finger on its as high in the axilla as possible. Cutaneous anesthesia at the point of needle insertion may be obtained with a skin wheal of local anesthetic. Slowly advance the 2-

inch 22-gauge (B bevel/dull point) needle perpendicular to the skin through the weal toward the artery. A "pop" may be felt as the needle enters the nerve sheath. Correct placement in the sheath is confirmed if the needle gently pulsates, indicating close proximity to the artery or if the patient complains of pararesthesia in nerve distribution areas. Aspirate to exclude intravascular placement of the needle and then inject the local anesthetic in 5mL intervals. During injection aspirate again to ensure the needle has not changed position and entered a vessel. Injection is easier if an extension set (K-52 tubing) between the syringe and the needle is used. This allows the syringe to be changed without moving the needle. Some anesthesia providers elect to place a plastic cannula in the sheath for further injections. The volume of the local anesthetic injected is between 30 to 40mL. If an arterial puncture occurs, slowly advance the needle until blood cannot be aspirated (thus indicating needle position in the nerve sheath posterior to the axillary artery) and then slowly inject 5mL increments while watching for local anesthetic toxicity.[65]

In Operation Just Cause, a Soldier shot through the hand was given an axillary block. This allowed debridement of the wound as well as pain control for transport back to the United States.

Intercostal (rib) blocks have been shown to be effective in providing immediate, sedation free pain relief in thoracic trauma, thereby reducing respiratory splinting and the pulmonary complications, which are resultant thereof.[66] Intercostal blocks have been previously covered elsewhere in this volume.

Nonpharmacologic pain control

In addition to pharmacologic pain control, several other techniques have been described and used for austere environments. These include the physical pain relief modalities of splinting, compression, cold and heat therapy, as well as the complimentary medical technique of acupuncture.[72]

Splinting is a well-known and used technique, which provides pain control by preventing further injury and nerve stimulation by inhibiting movement of injured extremities. It will not be covered, as there is only reason to recommend its continued use and no recommendations against, based on practical experience as well as literature review.

Compression anesthesia tends to be an inadvertent result of wrapping an injured limb either for splinting or hemostasis of bleeding. This typically occurs as an ace wrap is placed over a gauze hemostatic dressing. The resultant compression may also compress the involved peripheral nerves leading to distal anesthesia.[73] Placing a proximal compression bandage on a limb proximal to the injury can likewise induce this.

The authors do not recommend this technique, but if it is used, one must be extremely careful to ensure the paresthesia is not a sign of compartment syndrome.

Cryoanalgesia or application of cold to decrease pain has been used for soft tissue injuries for centuries. This may be done with ice packs, snow, cold water compresses, or commercial cold packs. The standard recommendation is to place a towel or other barrier between the skin and cold pack and apply it for 15 to 20 minutes every few hours.[74] Care must be taken to not cause cold injury to the underlying tissues. Cold application has been shown to have variable efficacy, from no effect[75] to effective in decreasing pain, depending on how it is applied as well as what the treatment is for.[76] If one is careful to avoid cold injury to the tissue, however, there is little downside, and this adjunctive technique is recommended. Heat therapy has not been shown to be particularly effective for acute pain control, and is therefore not recommended.

Acupuncture is another complimentary medicine technique that has been suggested for use in austere pain management.[72] Developed in austere settings thousands of years ago in Asia, acupuncture has been found to be of benefit in certain conditions.[77] It has also shown promise in use in the wilderness setting.[78,79] The supplies themselves are lightweight and compact. Unfortunately, acupuncture requires lengthy prior training. Given the positive recommendations of the National Institutes of Health Consensus Panel on Acupuncture it seems that this is a modality of potential adjunctive use for pain control in the hands of a properly skilled provider.

The austere wilderness and operational setting puts increased strain on injured individuals and those attempting to assess and treat the pain of the injured. We have attempted to cover some of the unique aspects of pain control in these settings. It is hoped this information will both aid the provider going into the austere environment as well as initiate further discussion and research in this area.

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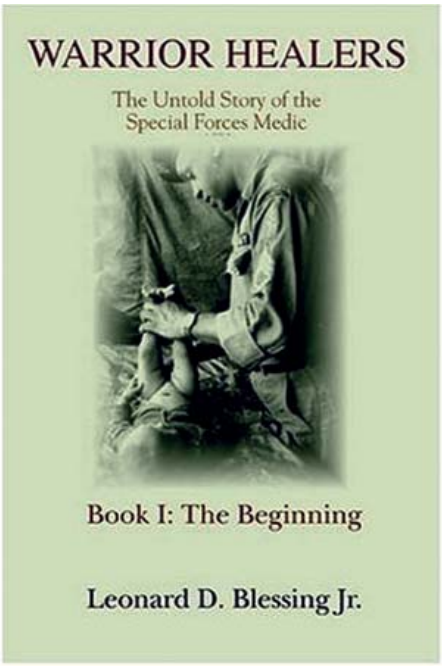
Book Review

Reviews by COL Rocky Farr

Warrior Healers: The Untold Story of the Special Forces Medic. Book I: The Beginning. Blessing L. New York, New York: iUniverse, Inc, 2006. ISBN: 0595402569



Special Forces (SF) medics have needed a written history for many years. Len Blessing made the very first attempt at this daunting task and has succeeded with his first volume in what should be a grand series. This subject is near and dear to my heart since, as many of you know, I started my Army career as a SF medic. I went through the medical qualification course at Fort Sam Houston in 1967 and followed with tours in Vietnam and Cambodia. Therefore, I speak from experience when I say that Blessing's words ring true.

Blessing has been researching the SF medic community for six years now and we have talked several times. He successfully incorporated much material from an extensive archival collection at the U.S. Army John F. Kennedy Special Warfare Center and School (USAJFKSWCS). These archives are known as the "Dorogi Collection" being derived from LTC Louis Dorogi, a Medical Service Corps officer and an army historian, who conducted many interviews with SF medics in the Vietnam era.

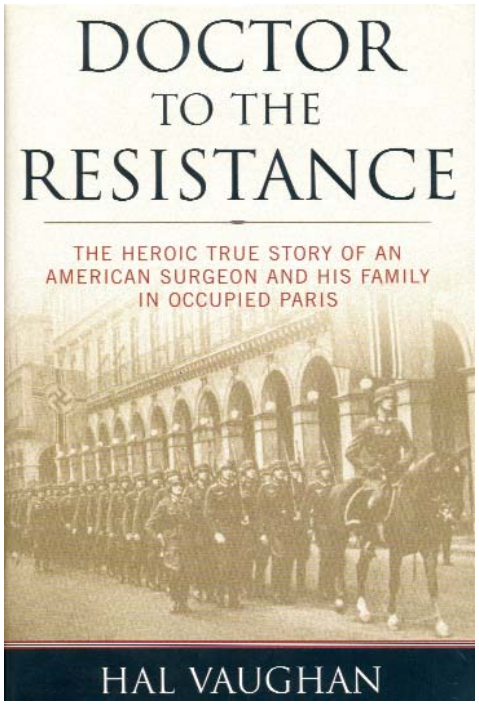
Blessing's first volume begins in 1952 with the founding of Special Forces groups and culminates in 1962 with various operational missions in Iran and Laos. He gives the proper flavor of those medics in the early days of SF. He documents the development of the SF medic – what began as a ragged array of previously trained, nearly trained, haphazardly trained, and left over World War II trained medics – that evolved into a group of professional medical warriors who proved their worth in Laos and other pre-Vietnam arenas before their main show came. Since I personally recognized many of the individuals cited, this book contains a ring of ground truth. Blessing's book illustrates that some of the early days are surprising in what they show. For instance, the first "group surgeon" of 1st Special Forces Group was a Medical Service Corps officer who spent most of his group time in the intelligence shop. In the earliest days, Special Forces had not formalized the "course" (the medical qualification course). Soldiers took bits and pieces, depending on their prior medical experiences, and cobbled them together into an ad hoc syllabus. On page 71 of this volume is a 1959 training program. It seems identical to the course I went through in 1967.

This book brought back memories. When I was an NCO instructor in 1979 at 300-F1 (as the Fort Sam Houston part of the medical qualification course was then known), it was not a co-proponency course. It was run by the Army Medical Department (AMEDD) Center and School and USAJFKSWCS ran the second part at Fort Bragg. I can remember shouted conversations between the AMEDD's Colonel Roger Juel, the course overseer at Fort Sam Houston, and Colonel Galen Radkte, a senior officer at USAJFKSWCS. Moving the 300-F1 course to Fort Bragg under co-proponency with USAJFKSWCS in the mid-1990s eliminated much of the friction.

Mr. Blessing does a great job of showing the flavor of those early days when Special Forces medics were still proving themselves to the team on what they could do, both medically and in what they offered toward the overall mission effectiveness. Many of the stories that he relates show the pivotal role which medicine began to fill in "winning the hearts and minds" of the indigenous personnel that these early SF missions were all about. The author discusses in detail the lessons learned and aspects of the missions into Laos. Many of the issues come as no surprise: sanitation, medical resupply, higher echelon medical support, medical intelligence issues, and stability of drugs in tropical environments.

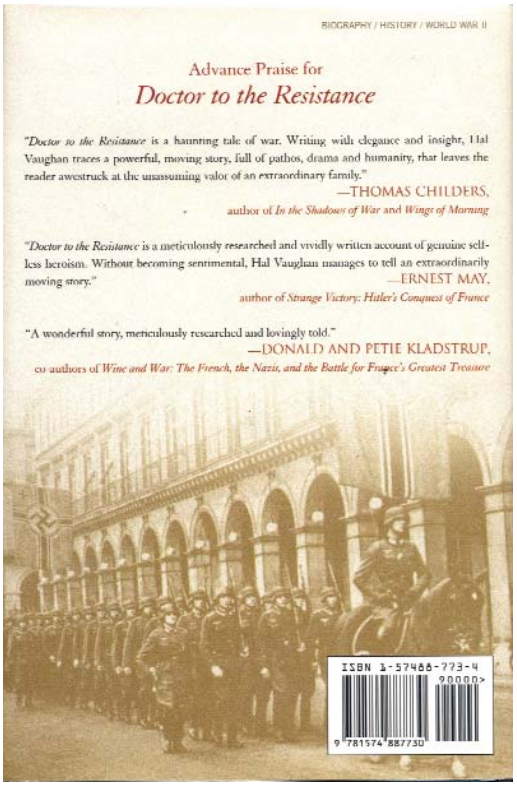
History books are only as good as the archives they come from. I encourage individuals whose training or experience includes the period after 1962 to share their stories with Len Blessing. Contact him through the Special Forces Association. This volume is a great start in what should be a landmark series on a unique group of Soldiers who made significant contributions to our nation's conflicts, the SF community, and the indigenous peoples they have doctored. I eagerly look forward to volume 2!

Doctor to the Resistance: The Heroic True Story of an American Surgeon and His Family in Occupied Paris. Vaughan Hal. Brassey's Inc.: Washington, DC: 2004.



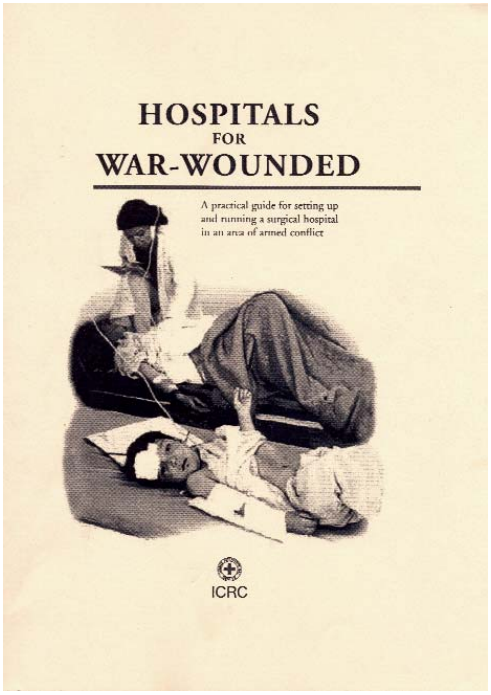
This book is one of the few accounts of a "stay behind" agent who was a physician. Dr. Phillip Jackson was an American surgeon in Paris before World War II who stayed and served until killed in 1945. When the war started he began caring for downed fliers, agents, saboteurs, and the Resistance. The book is based on recently declassified records of the French Resistance, the National Archives, family letters and diaries, and the author's interviews with Dr. Jackson's son.

He had joined the British Army as a volunteer physician during World War I and then transfer to the American Expeditionary Forces. He then married a French Red Cross nurse. After the war, Jackson joined the staff of the American Hospital in Paris, where his patients included Hemingway and Fitzgerald. With the coming of World War II, Jackson, his wife, and their teenage son joined the French Resistance. Hiding and treating wounded Allied flyers and Resistance fighters, they used the hospital as a cover for Resistance activities, photographed the German submarine base at Saint-Nazaire, and helped smuggle plans for the V-1 rocket to England. Just before the Americans liberated Paris, the family was betrayed to the Gestapo and deported to German concentration camps. The day before the war ended, Dr. Jackson was killed while a prisoner of war.



Hospitals for War-wounded: A Practical Guide for Setting Up and Running a Surgical Hospital in an Area of Armed Conflict.

Hayward-Karlsson J., et. al. International Committee of the Red Cross: Geneva, 2005.



We all have seen how numerous Non-Governmental Organizations (NGOs) and Private Voluntary Organizations (PVOs) are on today's complex battlefields. Since in war, existing healthcare system are disrupted or overwhelmed, the International Committee of the Red Cross (ICRC) has much experience in running independent hospitals in or near war zones. This expertise, coupled with the fact that emerging guerilla doctrine says, especially in urban area, for guerrilla forces to rely on PVOs and NGOs for medical supplies and medical treatment, makes this book important.

This book can be used by anyone faced with the task of setting up or running a hospital for war casualties. It is an in-the-weeds, nuts-and-bolts, manual which covers it all. Starting with setting up a hospital, it transitions to how to run one in detail. It covers everything from how to hire a chief nurse to fire safety and the laundry. There is also a nice section on "training untrained personnel."

Annexes provide lists of consumable supplies to treat 100 war wounded, surgical instruments required, and basic anesthesia.

It can be purchased from the ICRC or downloaded from: http://www.icrc.org/Web/Eng/siteeng0.nsf/iwpList525/706EDFFCF01DA25FC1256C5B00313F65

Johnny Wayne Paul, PA-C

Dear Johnny
The SOF VA Disability Answer Man

Dear Johnny,

I have been in Special Forces for a number of years. I have never been to sick-call and when I do go in for routine physical exams, I tell the Doc "I am in excellent health, and have no medical complaints." I have never wanted to look like a wimp or be taken off of jump status. Secretly however, I have some serious neck and back pain with numbness and tingling down my legs. I am always bugging the medics for Motrin. I have never documented any of my pain and now I am thinking about possibly retiring in less then two years. What do I need to have documented so that I am covered for retirement? Help! Signed, Bent Over

Dear Bent,

Fortunately, you have some time left in your career to document your medical conditions. If you are military veteran with a service-related disability you may qualify for over $2,393 in monthly benefits. These benefits are paid to veterans who have injuries or diseases that happened while on active duty, or were made worse by active military service. These benefits are tax-free. In addition, The 2004 National Defense Authorization Act, Combat Related Special Compensation was expanded to include disabilities incurred as a direct result of:

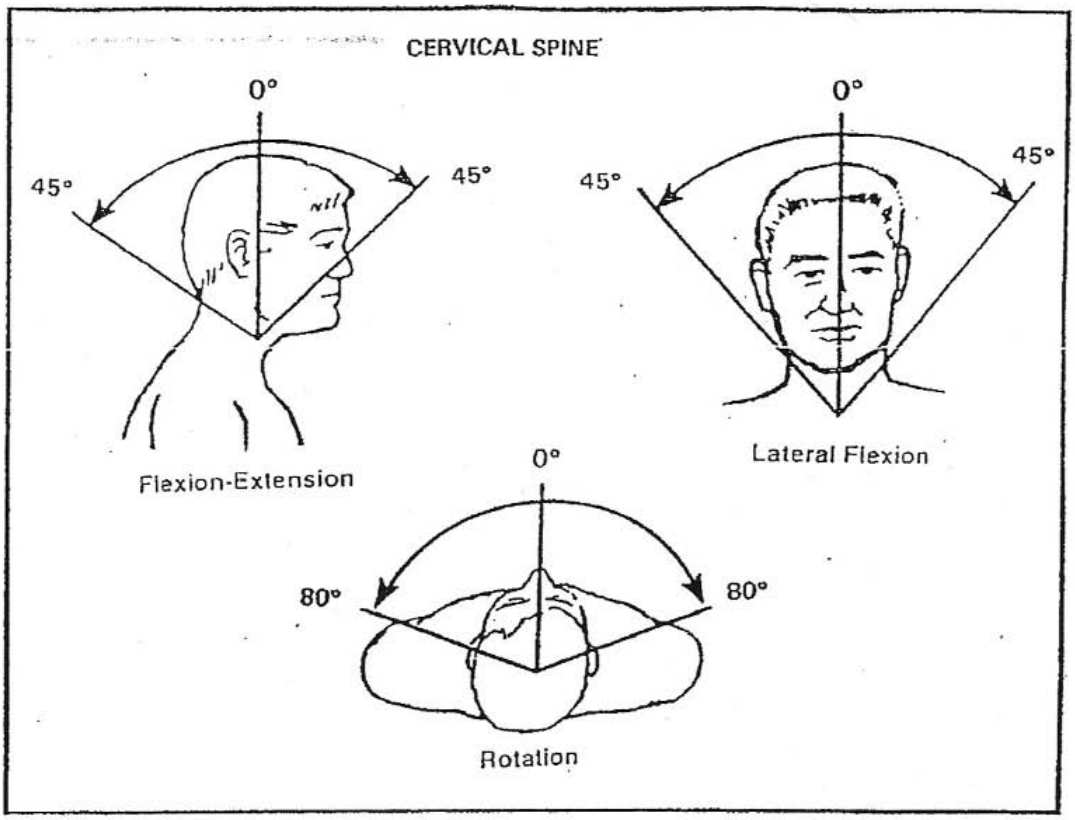
- Armed Conflict
- Hazardous Duty
- Conditions Simulating War
- An Instrumentality of War

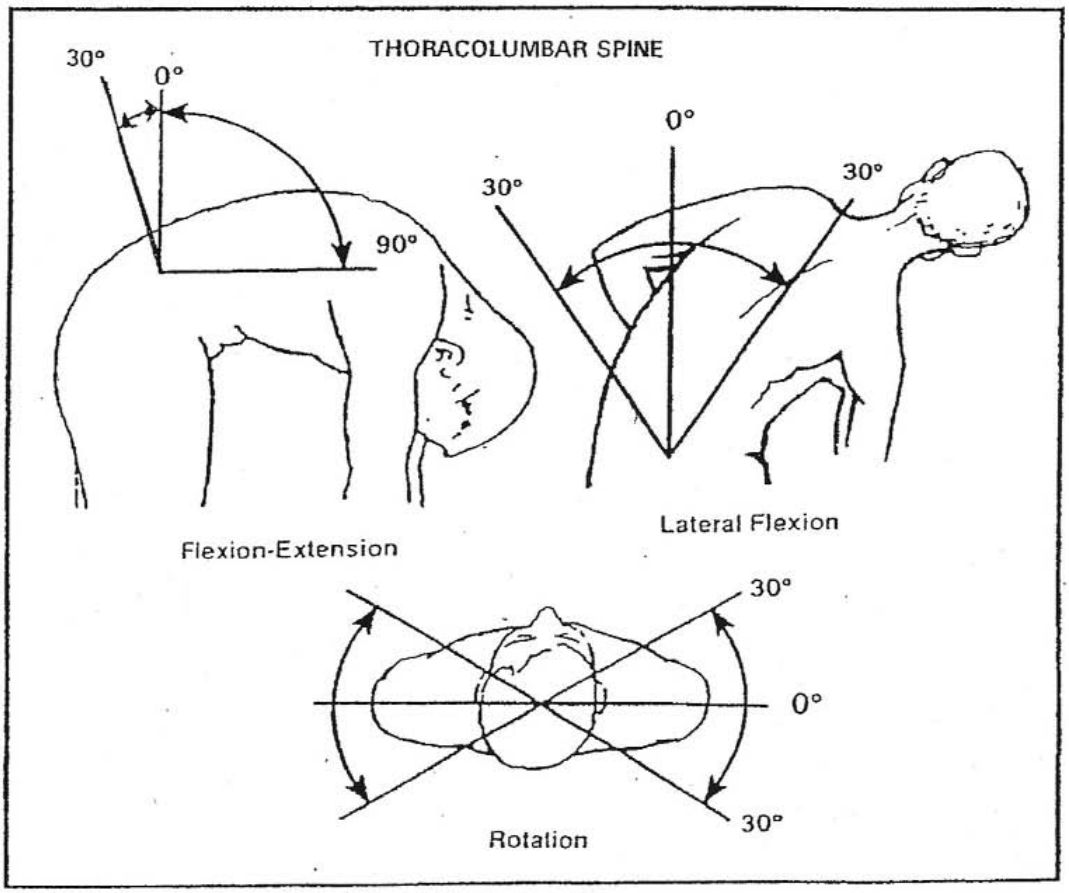
I have come up with a checklist for Back Pain/Injury that your Medic/PA/Doctor should pay particular attention to.

The first thing to be documented is a good history of any known back injuries, MOS, parachute jumps, combat operations, or other hazardous duty. The documentation must also include:

1. Current range of motion to include active and passive measurements. Make sure that your medical provider documents at how many degrees you have either pain or limited range of motion. Ensure that they USE a goiniometer for measurement, and that they DOCUMENT that they used a goiniometer for the exam.

2. The neurological exam must include: heel-to-toe walk, muscle strength, sensory abnormalities, reflexes, and the presence or absence of muscle atrophy.

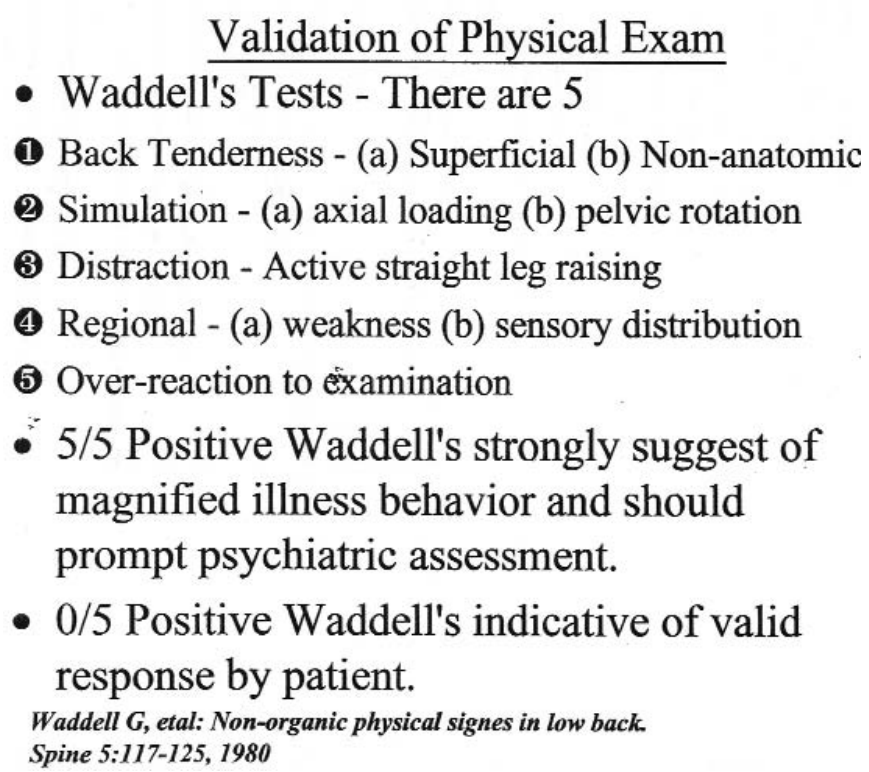

CERVICAL SPINE
0°
45°
45°
Flexion-Extension
0°
45°
45°
Lateral Flexion
0°
80°
80°
Rotation


THORACOLUMBAR SPINE
30°
0°
90°
Flexion-Extension
0°
30°
30°
Lateral Flexion
30°
0°
30°
Rotation

3. The exam must document radiculopathy, include where the radiculopathy is located, what makes it worse, and what, if anything, helps. A complete neurological exam of the affected area must also be documented.

4. Include all Xrays, MRI, and any electro-diagnostic studies.

5. Provide validation of the physical exam by the Waddell's Tests.



Also, note that "pain" can be a cause for disability. The following chart provides guidance on the rating of pain and the associated disability rating recommended. As you can see by the chart, making the determination whether your pain is "moderate" and "intermittent" versus "moderate and "occasional" can be very important.

GUIDANCE ON RATING OF PAIN

INTENSITY/SEVERITY OF PAIN

MINIMAL. The pain is annoying, but has not been documented medically to have appreciably diminished an individual's capacity to carry out daily activities. The pain does not interfere with sleep and requires nonnarcotic analgesics only occasionally. (1-2 times per week).

SLIGHT. The pain is tolerated by the individual but has been medically documented to cause diminution in an individual's capacity to carry out some specified daily activities. The pain may interfere with sleep. Nonnarcotic medication may be consumed regularly (daily) and narcotic analgesics may occasionally (1-2 times per week) be required.

MODERATE. The pain has been documented medically to result in extensive diminution in an individual's capacity to carry out the activities of daily living. The pin may be tolerable, but it interferes with sleep. It frequently (1 time per day) requires the use of narcotic medication , or it may require invasive procedures (steroid/novacaine injections). Recreational and social activities are severely limited.

MARKED. The pain precludes carrying out most activities of daily living. Sleep is disrupted. Recreational and social activities are impossible. Narcotic medication or invasive procedures are required and may not result in complete pain control.

FREQUENCY OF PAIN

INTERMITTENT. The pain has been documented medically to occur less than one fourth of the time the individual is awake.

OCCASIONAL. The pain has been documented medically to occur between one fourth and one half of the time when the individual is awake.

FREQUENT. The pain has been documented medically to occur between one half and three fourths of the time the when the individual is awake.

CONSTANT. The pain has been documented medically to occur between three fourths and all the time when the individual is awake.

RATING	INTENSITY	FREQUENCY
0%	Minimal	Intermittent
0%	Minimal	Occasional
0%	Minimal	Frequent
0%	Minimal	Constant
0%	Slight	Intermittent
0%	Slight	Occasional
10%	Slight	Frequent
10%	Slight	Constant
0%	Moderate	Intermittent
10%	Moderate	Occasional
10%	Moderate	Frequent
20%	Moderate	Constant
0%	Marked	Intermittent
10%	Marked	Occasional
20%	Marked	Frequent
20%	Marked	Constant

Be sure your medical provider includes a nice medical note with all of the above; however, a sick call slip or a hasty note can do as well as long as you show some sort of documentation. The VA also looks at time needed for recovery or for how long you were unable to perform your job; so if you required quarters or light duty, you will want to include those dates and documentation, if you have it, as part of the dictation.

If you have a VA disability question for Johnny, e-mail him at j.paul@us.army.mil. He currently works at HQ, USSOCOM for COL Warner "Rocky" Farr as a Physician Assistant.

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http://www.military.com/benefits/military-pay/va-disability-compensation
MEB Physician's Checklist, 28 October 2003, Ft. Sam Houston, Texas
https://www/perscom.army.mil/tagd/pda/doctors.htm

Medicine

Frank Anders, MD, USSOCOM Deputy Command Surgeon, Reserve Component

This is an essay, not a reference article; therefore, there are no footnotes. The bibliography is my thirty years experience as a physician and surgeon and forty two years of understanding the Special Operations community. I am nearing the end of both those careers and wish to remind my target audience of key lessons learned.

I was first introduced to the unconventional warfare (UW) concept when I joined the U.S. Army 20th Special Forces Group (Airborne) in October 1964. Twelve men were clandestinely inserted into a hostile environment where people were being oppressed by persons more powerful than they. These two officers (there mostly for their political clout with their indigenous counterparts) and two each NCOs trained in Medicine, Weapons, Communication, Engineering (demolition) and Operations/Intelligence were charged with meeting, befriending, equipping, and training their hosts in a multitude of ways in order to throw off the yoke of their oppressors. This concept was proved and refined by the Jedburghs of the OSS in World War II like COL Aaron Bank and BG William "Wild Bill" Donovan. The history of UW medicinal care delivered in previous wars by those who have gone before us is available. Read it and use it. My opinion, after visiting over sixty-five countries, is that most of the worldwide conflicts I foresee today should be handled in this way.

I was taught the importance cross-training our teammates as well as the "indig" because of the necessity of operating under cover for prolonged periods with poor and irregular resupply and the possibility of my becoming a casualty. These requirements forced each man to become a thinker and master of improvisation. I was a commo NCO (05B MOS in those days, now 18E). I quickly saw the extreme value of the A team medic both for team support in an austere environment and also for mission performance by caring for and teaching others to care for sick and wounded host nation fighters and their families.

When I left the military following the completion of our government mandated six year obligation those lessons went with me.

During my nine year break in service I attended medical school and completed a residency in orthopaedic surgery. I was very fortunate to be trained by a lot of old men at Charity Hospital in New Orleans which at that time was the largest hospital in the world with three thousand three hundred beds. New Orleans was also the per capita murder capital of the world for all the years that I was there. Those who died and those who survived all came to Charity. The men who taught me did not emphasize reliance on CT or MRI scans for a diagnosis because they didn't exist. They were even suspicious that the use of x-ray as a diagnostic tool might diminish our clinical evaluation skills. They reminded me of the assertion of Sir William Osler, one of the great physicians and professors of the last century, that an astute clinician should be able to make a correct diagnosis in more than 70% of his cases with a thorough clinical history alone. He felt that percentage should rise to over 95% with the addition of a physical examination. They taught us to use our eyes, ears, noses, and hands to determine the presence and extent of abnormalities. After thirty years I have seen the result of reliance on the rapidly advancing world of technology and I don't like what I see.

The SF Medic in a UW role should be in his element. In order to be properly prepared for this task he needs a sound foundation in (1) gross anatomy; musculo-cutaneous, musculo-skeletal, cardiovascular, gastro-intestinal and neurological. (2) basic human physiology, and (3) basic pharmacology. I

have had the privilege of teaching for a short while at the Joint Special Operations Medical Training Center, --"the schoolhouse," and these disciplines are well supplied there. The next step takes more than courage and confidence in his ability to use his skills. He must have a burning desire to use his knowledge and skills to relieve pain and suffering. This is the heart and soul of the practice of medicine. That's what SF Medics do. They practice medicine where there are no physicians.

I have, in very remote Africa, incised and drained a 30cc inguinal abscess with my pocket knife, packed it with Methiolate soaked cotton cloth, using Pombe (locally brewed beer) as both a sterilizing agent and anesthetic (some in the wound, some in the patient) then given him a 500mg Penicillin VK tablet because that's all I had to work with. It worked. He got well. I was paid with the smile of relief and genuine gratitude. I have evaluated the neurological loss in a man with a through and through gunshot wound in his neck in a small village in remote Syria. I did it just so I could tell him what he could and could not hope to use of his arms and legs in the future. A surgeon without an operating suite is simply a well trained medic and neither of the aforementioned patients was going to see a higher level of healthcare. I have also accurately diagnosed and effectively treated a previously misdiagnosed musculo-skeletal problem in a three star general's shoulder while standing in his office with nothing more than a 3cc syringe and 27 gauge needle. It's not your equipment and technology which relieves pain and suffering. It's your knowledge and skill and your willingness to appropriately apply them with the least amount of risk to the welfare of your patient. One of the old men who trained me as a physician told me that more is missed by not seeing than by not knowing. That axiom should always be on the mind of a clinician.

I recently observed an unclassified briefing on a device to be worn by Soldiers which will individually identify the Soldier if wounded and transmit his vital signs and trends in them, giving a prognosis in the decline or elevation of his condition through a unmanned aerial vehicle (UAV) loitering nearby to a level III medical facility without any interaction with a human. This device currently exists. Nice concept for the techno-battlefield of the future, but no use to the SF medic in the UW environment.

Understanding the effect of injury and pathogens on the human body is far more important in the care of those afflicted than any device that will go in your ruck. It is imperative that the SF Medic come to rely on his foundation of knowledge in anatomy, physiology, and pharmacology to win the hearts and minds of those who don't yet know us as Americans who seek peace for all people. He, in my opinion, is the best ambassador we can send abroad. You, as SF Medics are making UW medicine history. I implore you to share your experiences in this forum with your brothers in arms so they may benefit from your lessons as I hope you have benefited from mine.

My desire is that those of you who have chosen to give unselfishly of your time and energy to suffering people in far away places without the luxury of the availability of better trained consultants and a laboratory will strive to become better practitioners of the art and science of "medicine" in the classical sense. Your reward, though not money or glory, will be great. After all, human anatomy and physiology hasn't changed in the past several thousand years and is very unlikely to in the next several thousand. De oppresso libre!

The Special Operations Trauma Skills Course (SOTS-C) Course Synopsis

Dan Godbee, MD

The Special Operations Trauma Skills Course (SOTS-C) consists of two Air Force sponsored training opportunities. First is a two-week rotation on the Trauma Service at the University of Cincinnatti sponsored by the Air Forces Center for Sustainment of Trauma and Readiness Skills (C-STARS). In this part of the training participants function as trauma team members and manage trauma patients from presentation in the Emergency Department, through surgery, and on to in-patient management (generally in the SICU). Similar to residency experiences, the participant rounds with attending physicians in the SICU, Burn Unit, and MICU, and takes call as a member of an assigned team. Conferences and Grand Rounds in the Departments of Surgery and Emergency Medicine are scheduled activities.

The second part of SOTS-C is training in the Critical Care Air Transport Team (C-CATT) Advanced Course. This formal course is an additional two weeks of didactic and practical training in transporting critically ill/injured patients on Air Force Aeromedical Evacuation Flights. The class consists of professional providers (physicians and PAs), critical care RNs, and cardio-pulmonary therapists. Class teams are composed of a provider, a nurse, and a technician. Didactic subjects covered are the spectrum of critical-care and trauma management with orientation on how to perform care in an aircraft. Scenarios are practiced in a simulator that even has the noise of an aircraft piped in. Other experiences are a day of flight with University Air Care, the helicopter ambulance service for the hospital, and in Anesthesia for practicing endotracheal intubation. Evaluated exercises consist of a written test and the final practical exam on an Aeromedical Evacuation training flight out of Wright-Patterson AFB.

The people in the pictures are:

SFC Mike Watson (wearing ACUs), Medical Training NCO from the USASOC DCofS Surgeons office; MAJ Lisa DeWitt (wearing ACUs) the 20th SFG Deputy Group Surgeon (Alabama National Guard); MAJ Dan Godbee (wearing BDUs), Battalion Surgeon, 3rd Battalion, 20th SFG (Florida National Guard).

All of the pictures were taken on the graduation exercise from the C-CATT portion of the training. It was a C-130 that flew out of Wright-Patterson AFB, OH. It was a joint training flight for us (the C-CATT students) and the crew of the C-130 who were Air Force Aeromedical Evacuation personnel.

MAJ Lisa DeWitt prepares equipment for loading patients on the flight.

MAJ Lisa DeWitt secures patient and equipment and puts patient monitor into operation prior to take-off.

MAJ Dan Godbee connecting aircraft electrical supply to patient monitoring equipment.

MAJ Lisa DeWitt evaluates a patient during flight.

C-CATT course students prepare patients and equipment for take-off.

MAJ Lisa DeWitt prepares to perform a needle thoracentesis.

MAJ Dan Godbee replaces a non-functional endo-tracheal tube using a Cook exchange catheter.

Medical History

Did a SOF Medic Save Ho Chi Minh's Life and Alter History?

Warner D. "Rocky" Farr, MD

Abstract

One of the many urban legends in Special Operations medicine is that an Office of Strategic Services (OSS) medic saved Ho Chi Min's Life in 1945 when he was dying of malaria and thereby altered the course of history in Vietnam. The author discusses the event as related by some of the participants.

"People also say that as a result of our support, Ho [Chi Minh] came to power. I don't believe that for a minute, I'm sure Ho tried to use the fact that the Americans gave him some equipment. He led many Vietnamese to believe that we were allies. But there were lots of reasons why Ho came to power and it wasn't because we gave a few arms for 100 men or less."

--Major Allison Thomas,
Commander, OSS Team Deer[1]

Introduction

Special Operations Forces (SOF) medics have played important roles in many SOF missions from the earliest days. In primitive locations, they often provided medical care for both team members and the indigenous personnel that the SOF teams lead. In 1945, the Office of Strategic Services (OSS) inserted a team into what was then Indochina (now northern Vietnam) to work with native forces opposing the Japanese in the closing days of World War II. A new recently published book discussed this theater of the unconventional war within World War II.[2]

The Mission

As it did earlier during the war in occupied Europe, primarily in France and Yugoslavia, the OSS inserted special operations teams to work against the Axis powers by assisting the Viet Minh and other anti-colonialist factions that opposed the Japanese in Indochina, in the area now known as Laos, Vietnam, and Cambodia. Indochina was a French colony before the war and was in the area into which the Japanese forces sought to enlarge their "Greater East Asia Co-Prosperity Sphere." The OSS cooperation with these groups, some of which were communist, was no different from the OSS cooperation with French and Yugoslav freedom fighters, since some of those were also communist.

The French controlled Indochina during the first part of World War II until the Japanese overran and occupied it. By 1945, the Japanese announced that the now occupied colony would become independent under them. This change in status lead to the rejuvenation of indigenous anti-Japanese and anti-colonial resistance groups. It also showed the need on the part of the Allies for better intelligence from an area of growing interest to them in the closing days of the war. Consequently, Major General "Wild Bill" Donovan sent an OSS team to link up with Indochinese resistance fighters. The OSS had had previous contacts in the area, primarily from rescuing downed allied pilots.

On May 16, 1945, Major Allison Thomas received his marching orders for Special Operations Team Number 13, code named Deer. The team's mission was to interdict Japanese lines of communication, work with the guerrillas, and perform target identification for the Army Air Corps. Thomas had served in the European theater on an OSS team, Special Forces Detachment G-3, with the 3rd U.S. Army as it swept across France. The team executive officer was Lieutenant René Défourneaux, French by birth but a serving American officer. The interpreter was Private First Class Henry Prunier who spoke French and Vietnamese. The radio operator was Sergeant William Zielski, and Sergeant Lawrence Vogt was the weapons man. The team photographer was Sergeant Alan

Squires, and the team medic was Private First Class Paul Hoagland.

PFC Paul Hoagland had trained as a nurse before World War II in New York. He then was a merchant marine medic on a Swedish ship. The OSS recruited him in 1942. While a medic on OSS Team Deer, he trained indigenous Vietnamese medics to take care of the guerrilla forces that the OSS-Viet Minh collaboration raised and trained. One of the leaders in the Viet Minh camp was Vo Nguyen Giap. Giap would later become a North Vietnamese General in the war with South Vietnam and then the North Vietnamese Minister of Defense.

One person missing from the initial Viet Minh contacts made on 1 August by Team Deer was Ho Chi Minh. When the team inquired about this Viet Minh leader on 3 August, the Viet Minh said he was ill. The team executive officer, the team medic, and others went to a nearby village to see him. Captain Défourneaux relates:

"In the darkest corner of the room lay a pile of bones covered with yellow, dry skin. A pair of glassy eyes stared at us. The man was shaking like a leaf and obviously running a high fever. When my eyes had become accustomed to the darkness, I noticed the long scraggly goatee hanging from a pointed chin. ... Hoagland took a quick look and said, 'This man doesn't have long for this world.'"[3]

After his initial examination the medic's differential diagnosis was malaria, dengue fever, dysentery, or perhaps a combination of them all. PFC Hoagland administered quinine and sulfa and repeatedly visited his patient. Captain Defourneaux states that "The medic had Ho Chi Minh on his feet in about ten days."[4]

Although PFC Hoagland was certain that Ho Chi Minh would have died without timely intervention, his team leader, though admitting that Ho looked quite ill, thought he might have recovered without aid.[5] Historian Cecil B. Currey maintains that the team's medic may have saved Ho's life.[6] As time went on, other rumors circulated and, by 1984, local villagers claimed that Ho Chi Minh had received modern medicines from a Soviet in 1945. The book *Brothers in Arms* quotes a village local as relating:

"For a while that summer [1945], he [Ho] was very, very sick. General Giap thought he would die. They brought a traditional healer from Dai Tu – he gave Uncle Ho special herbs and potions of ground turtle shell. But he did not become well until some Russian friends gave him modern medicine."[7]

Most probably this version was a form of North Vietnamese communist political correctness as the Soviets were not at war with Japan at that time. They declared war on Japan in August 1945 and no record exists of their presence in Indochina during this time period some three months earlier. The newest book on the OSS in this theater, *The OSS and Ho Chi Minh: Unexpected Allies in the War Against Japan* has new details of the missions but relates this medical episode exactly as previous accounts.

One other interesting point from the OSS Team Deer is that no one ever asked any of the members, from team leader on down, about his dealings with Ho Chi Minh or asked for any advice on how to deal with "Uncle Ho." Neither then nor later, when the United States entered the war with North Vietnam, were they consulted. The team considered Ho much more of a nationalist than a communist. They believed that he admired America and could have been an ally. In the words of the team leader, Major Allison Thomas:

"No one ever contacted us. .... Oh, no. To my knowledge, none of us who were there was ever contacted. We made full reports, of course. But I don't believe they were ever read."[8]

What lessons learned can be drawn from this mission? First, medicine makes a significant and sometimes decisive difference on many SOF missions and this is a great example. Second, it illustrates the age old problem of a failure to properly interface SOF experiences with conventional units and distribute their intelligence reports. This will definitely not be the last time that Special Operations warriors may have had insight from which follow-on conventional forces could profit.

References

1. Thomas A. "Welcome to Our American Friends," in Mauer H. Strange Ground: Americans in Vietnam, 1945-1975. New York: Henry Holt, 1989, 35.
2. Bartholomew-Feis D. The OSS and Ho Chi Minh. Unexpected Allies in the War Against Japan. Lawrence, Kansas: University Press of Kansas, 2006.
3. Ibid, 208. Defourneaux R. "A secret encounter with Ho Chi Minh." *Look,* August 9, 1966, 32-33.
4. Ibid, 32.
5. Mauer, 33.
6. http://www.richmond.edu/~ebolt/history398/AdvisingTheVietMinh.html (downloaded 23 June 2006)
7. Broyles W. Brothers in Arms. A journey from war to peace. Austin, Texas: University of Texas Press, 1986, 104.
8. Ibid, 105.

The Medic - 10th Special Forces Group (Airborne)

Einar Himma, MD

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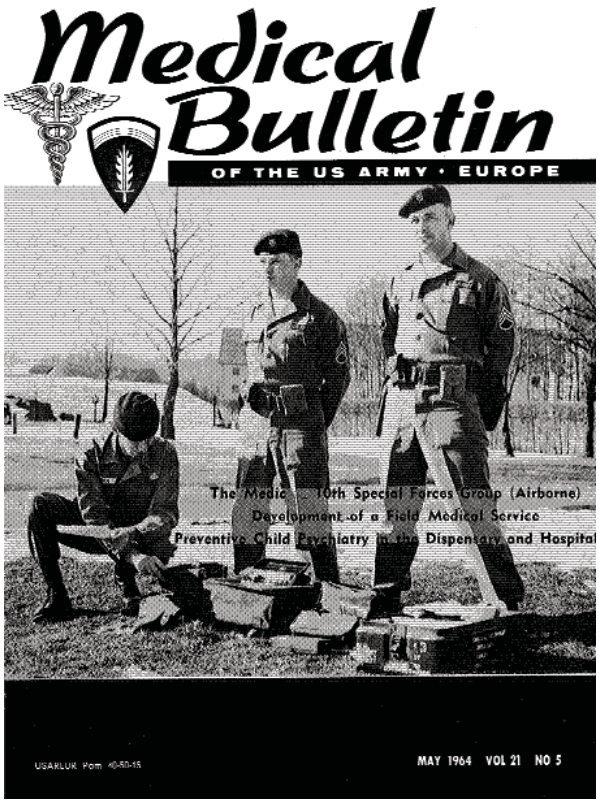


The Surgeon of the 10th Special Forces Group (Airborne) discusses some of the misconceptions concerning Special Forces in general and the Special Forces medic in particular. Also, in addition to presenting the background as well as the mission and organization of what is probably the U.S. Army's foremost example of an "elite" unit, the author describes the intensive training program of the unit's medical Soldiers and what Special Forces expects of them.

The 10th Special Forces Group (Airborne), 1st Special Forces, was activated on 19 June 1952 in Fort Bragg, North Carolina. The heritage of the unit commenced 9 July 1942 with the activation of the 4th Company, 1st Regiment, 1st Special Forces - a joint U.S.-Canadian endeavor. In the ensuing years the original heritage was passed through several Ranger units to the Group as it is known today.

The Group arrived in Europe in November 1953, and presently occupies the former home of another one time elite unit of another Army that has long ceased to exist - the barracks of Hitler's former SS-Junkerschule (SS Officers' Candidate School) located in the scenic lower Bavarian resort town of Bad Toelz. The Green Beret, proudly worn by the tough Special Forces troopers, has for years been a familiar sight around this resort area and is recognized by the local population as the mark of an elite Soldier.

The present Group Commander, Colonel Jerry M. Sage, is himself a former guerrilla fighter. As a member of the former OSS during World War II, he spent most of his wartime service creating havoc deep behind the Nazi lines. His experience makes him the ideal officer to command the Group since the mission of the Special Forces is not unlike the mission of the former OSS.

Mission

The mission of Special Forces is twofold. Should general war break out, the Special Forces Soldiers, organized into small, highly skilled detachments, will infiltrate by land, sea, or air behind enemy lines deep into hostile territory to organize guerrilla units among the friendly population, train and equip them, and advise and direct these units in conducting operations against the enemy. On the other hand, under limited or cold war conditions, these detachments work in counterinsurgency situations, such as exists today in Viet Nam, in advising, training, and assisting the local forces in their fight against guerrillas. Thus the Special Forces Soldier not only has to be an expert guerrilla fighter, but he also has to be skilled in hunting down and neutralizing enemy guerrillas.

As part of the Special Forces medic in role of counterinsurgency, he has to be skilled in setting up civic action type programs, such as operating medical treatment facilities somewhere in the back-country, in mountains, or in swamp villages. At the same time, he teaches villagers first aid, personal hygiene, and village sanitation, and trains the medical personnel of the indigenous forces to enable them to continue with

these civic action programs. By doing this, he wins the support of the civilian populace for our cause. The civilian support, gained in a large part through the actions of Special Forces medics, becomes even more important during wartime, since without the support of the local civilians no guerrilla movement can survive.

Organization

The heart of the Special Forces operations is it's A detachment. This detachment consists of two officers and 10 noncommissioned officers. A captain commands the detachment; his executive officer is a senior lieutenant. The noncommissioned officer ranks are represented by an operations sergeant, an intelligence sergeant, two medical specialists, two weapons experts, two demolition specialists, and two radio operators. This small but highly skilled group of men has the capability to operate efficiently with a guerilla regiment consisting of up to 1500 guerrillas. One Special Forces company consists of 12 such detachments in addition to three B detachments which act as command and control groups for a variable number of A detachments. The highest command grouping is the C detachment, commanded by a lieutenant colonel, who in garrison is also the company commander.

The Special Forces Medical Specialist

The Special Forces medic, like all the other members of the Group, must be a triple volunteer. First, he has to be a professional Soldier and thus a volunteer for the Regular Army, or in case of officers, a Regular Army officer or on extended active duty. Second, he must be a paratrooper, and third, provided he meets the special qualifications, he must volunteer for Special Forces duty. Once he is accepted for Special Forces duty, he is constantly scrutinized and tested, and must continually live up to the high standards set for him. He must prove himself to be a mature, well disciplined Soldier, highly motivated, highly skilled in his field, and devoted to his mission. If he fails, he will not be retained in the Special Forces.

Medical evacuation uses every conceivable means of transportation. Evacuation of casualties by means of rappelling is a required part of Special Forces training.

As with any elite unit, numerous misconceptions exist in the public mind about the Special Forces in general, and about the role of the Special Forces medic. Many of these misconceptions stem from well-meaning but somewhat exaggerated and misinformed publicity coverage by popular news magazines. The statement that a Special Forces medic is equal to a regimental surgeon is often heard and requires clarification. This particular statement is commonly misinterpreted as meaning that the Special Forces medic has the same professional skill and ability as a military surgeon. This, of course, is obviously not true. However, it is true in that his position in a guerrilla regiment is that of a regimental surgeon, since he is the only medically trained man available. Thus, he is in fact equal to a regimental surgeon by the uniqueness of his position. Since the entire medical service of the guerrilla regiment depends on his ability to organize and train this service, he must be more highly skilled than his counterparts in conventional units. His training, therefore, is thorough and varied. He is trained to act and think as a physician and trained with the aim in mind that under adverse conditions and hundreds of miles behind enemy lines, far removed from any conventional medical support, he almost certainly will have to perform certain operations such as amputations, debridements, and tracheotomies, treat major illnesses, and perhaps even deliver babies. A lot of time goes into his training to prepare him for this role where he, in certain situations, has to and can assume the responsibilities of a physician and practice medicine and surgery with reasonable knowledge, skill, and ability. To enable him to live up to these standards is the ultimate goal of his training, which is more time consuming and prolonged than the training of any other specialty in Special Forces. Before he is even assigned to an operational group, he undergoes approximately one year of intensive training - first at Brooke Army Medical Center in Fort Sam Houston, Texas, then in Fort Bragg, North Carolina, and then in OJT in one of the several Army hospitals in CONUS. This is only the beginning; once assigned to the Group, his training continues at

the same pace, interrupted only by actual missions. Even these missions can be considered as a training vehicle since it is here that the medic can really apply his skills. It is not uncommon at all for a Special Forces medic to treat hundreds of adults and children in a week's time while on a mission in a foreign country. This has happened on numerous occasions during the missions the 10th Special Forces Group has carried out in recent years. Viewed through even the hypercritical eyes of a physician, the professionalism, knowledge, and skill as applied by these NCOs, and the results obtained, have left very little room for criticism. Not to be underestimated is the tremendous potential of these men as goodwill ambassadors for the United States, and as a result of these missions we have won many stout and lifelong friends in remote and underdeveloped parts of the world - friends that perhaps a year ago didn't even known that our country exists.

In addition to his medical training, the Special Forces medic is also cross-trained in one or more other Special Forces specialties, to enable him to take over the functions of any other specialist in the detachment, should this become necessary.

Group Surgeons Section

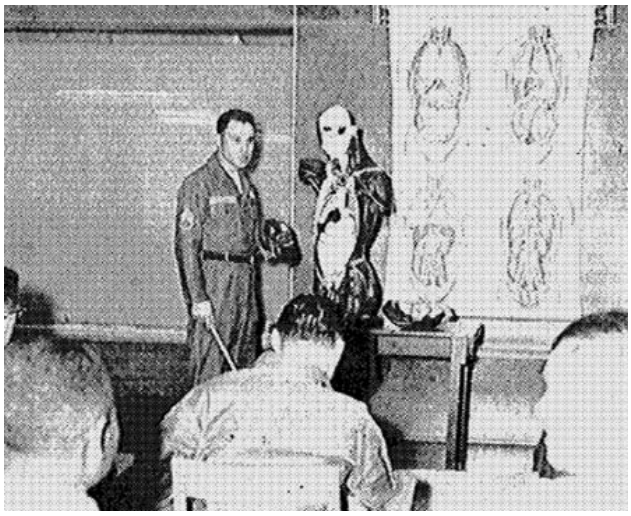
The Surgeon's section consists of a Group Surgeon (Major, MC), medical administrative assistant (Captain, MSC), two general medical officers (Captain, MC), one dental officer (Captain, DC), and 13 enlisted men. The Group Surgeon is a special staff officer working directly under the Executive Officer. One general medical officer works as the dispensary officer, the other functions as the medical training and operations officer. Activities of the Surgeon's section are wide and varied. They include medical planning for operational detachments, collection and evaluation of medical intelligence, debriefing of medical personnel returning from missions, medical training for all Group medical personnel, cross-training other Special Forces specialists in the medical field, dispensary service including dental service for all Group personnel, medical supply, and medical support for training such as parachuting, mountain climbing, SCUBA, and demolition ranges.

Medical Training

Medical training for Group medical personnel is one of the major activities in the Surgeons section. As mentioned before, the detachment medic must be prepared to provide medical service to up to 1500 guerrillas during wartime, including training of the guerrilla unit's own medical cadre. Medical personnel assigned to the 10th SFG undergo a 120-hour Special Forces Medical Specialist Course, conducted by this organization's Training Company. This is mainly a refresher type course, and prepares the medic for further advanced training. This course is presently being expanded to 160 hours. A surgical laboratory utiliz-

As a USAREUR unit, the 10th Special Forces Group (Airborne) is frequently visited by high-ranking officers of major commands. Here Major General Arthur W. Oberbeck, J3, European Command, is accompanied by Colonel Jerry M. Sage, Group Commander, and by the Group Surgeon, Major Einar Himma, on an inspection tour of the Group Surgical Laboratory.

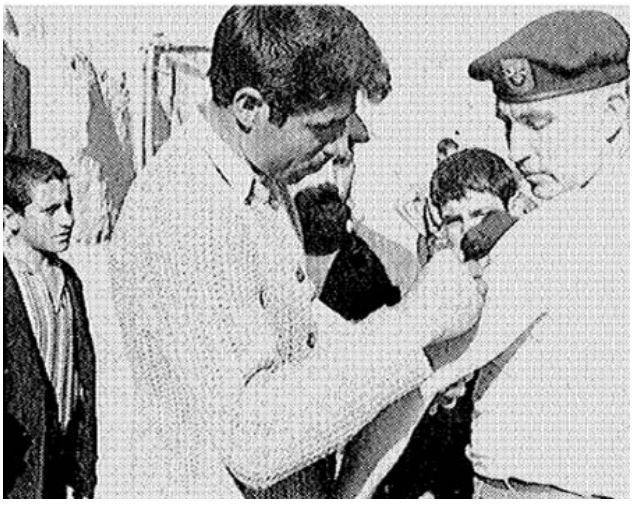
Infiltration by water can be used to gain access to enemy territory. SCUBA training but one of the many facets in water infiltration techniques.



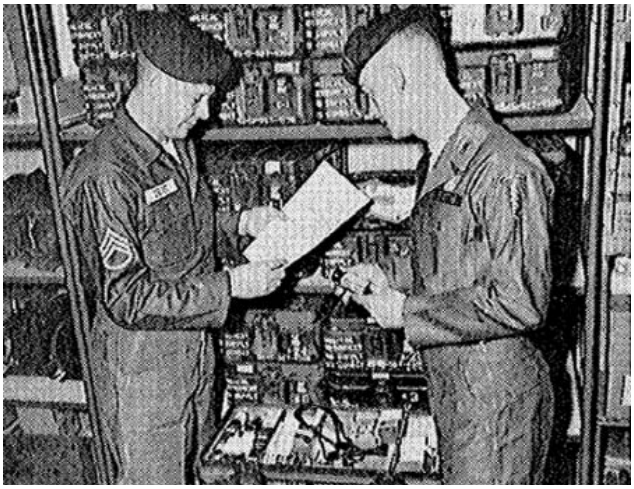
All newly arrived medics undergo the 120-hour Special Forces Medical Specialist Course regardless of their previous background. All instruction is given by personnel organic to the Group.

Ski training is a vital part of Special Forces training. Here the detachment medic is examining an injury incurred by one of his detachment's members.

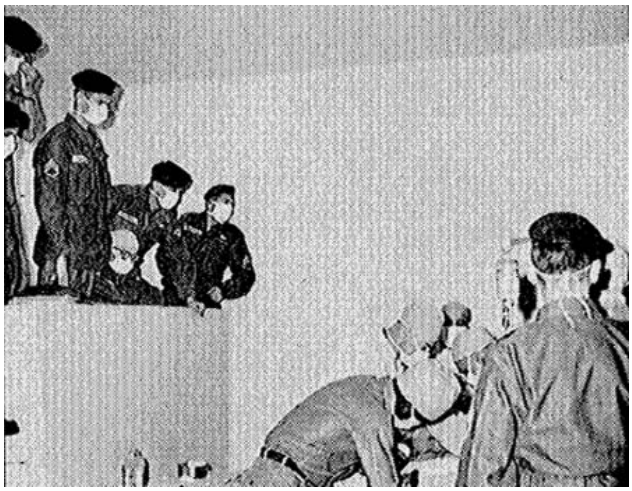
Collection and evaluation of medical intelligence is an important part of daily activities in the Surgeon's office. Here incoming medical intelligence is evaluated, classified by area, and disseminated to the detachment having that particular area assignment.



Ingenuity is a necessary attribute of the Special Forces medic. One of the medics is given an injection by a villager during a civic action program. This demonstration convinced the reluctant villagers to take their immunizations.



Medical supply requirements are wide and varied because of numerous missions. The administrative assistant conducts a periodic supply inventory.



Group surgical laboratory plays an important part in Group medical training. Operative procedures on animals include wound debridement, amputations, and tracheotomies. In addition, the student learns sterile techniques, administration of general anesthesia, and pre and postoperative care.

ing animals has been established and is used to teach surgical procedures such as debridement, tracheotomy, and amputations. Advanced Special Forces medical specialist OJT has been established in the 2nd Field Hospital, Munich, and consists of two nine-week phases, one in medicine and one in surgery. Both phases are completely doctor-oriented, that is, of a clinical clerkship type; the Special Forces medic works full time with a physician, learning to examine, diagnose, and treat patients. In the medical phase, the medic spends three weeks each in the pediatric clinic, in the dermatology clinic, and on the medical ward. The surgical phase provides three weeks of obstetrics, orthopedics, and combined surgical clinic and emergency room. Other courses covering advanced surgical laboratory techniques, general medicine, veterinary medicine, and laboratory, x-ray, and pharmacy procedures are being added.

Che Guevara, an Argentine physician who became one of the most skilled Cuban Communist guerrilla leaders, once stated that "the success of any guerrilla force is in direct proportion to the quality of medical care available to this force." He knew what he was talking about. With dedicated, well-qualified medics, the 10th Special Forces Group is ready to successfully carry out any mission given to it, be it in general, limited, or cold war. Be it in war or in peace, the Special Forces medics are a great asset in winning friends for our forces and for our country.

The USSOCOM Surgeon's Office does not endorse any of the below listed private contractors who provide medical training nor does the USSOCOM Surgeon's Office vouch for the competence of the instructors providing the training. This listing of education opportunities is simply to help our readers in the event some would like to further their continuing medical education.

Special Operations Medical Association Conference (SOMA)

Alan L. Moloff, COL (RET) MC President, SOMA

The SOMA meeting will be held 28 Nov – 1 Dec 06 at the Marriott Waterside Hotel (hotel phone # is 813-221-4900). The rooms for the conference and post-conference component command updates are available at the military rate of $93 per night. Conference registration is available on-line or in person. The SOMA staff has been working hard for the last year recruiting and selecting the speakers for our annual international meeting. This meeting will again focus on challenges and solutions of the Special Operations "first responder" and "first receiver". There will be many more NCOs presenting and more presentations on Combat Lessons Learned. On the last day we have scheduled a "round robin" of hands-on sessions. On Mon, 27 Nov, the VA will host the 3rd Annual Blast Injury Conference at the same site.

The web site has not worked as well as we thought it would and we are making changes to fix this. The address is: www.somaonline.org or www.tacticalmedic.org (these both take you to the same site). To log in, if you are a member, use the first letter of your first name and your last name. For example Joe Smith would log on as "jsmith". The password for everyone is password1. Both the log on and password are in lower-case. This site also includes a section to update your address for future mailings as well as means to correspond to the SOMA officers and conference coordinator.

If you are a SOMA member and have not received the last issue of JSOM (Summer 2006) or have moved since last Dec 05, please send an email with your current address to: Russ Justice at justicer@earthlink.net and April Porter at HELLzPrwln@aol.com. If you would like to become a life member contact Russ Justice now or at registration during the conference. Please note that SOMA is a private, tax-exempt organization.

Tactical Element Courses

For additional information on the following courses offered by Tactical Element, please visit online at www.tacticalelement.cc. Course announcements and course registration forms may be obtained by e-mailing info@tacticalelement.cc.

2006 Training Courses, Dates, and Locations

Tactical Emergency Medical Operator

10-16 DEC 06
Camp Blanding Joint Training Center
Starke, Florida
Mar, Jun, Sep, & Dec 07 dates and locations still to be determined.

Tactical Emergency Medical Operator (TEMO) is an intense 48 hour program of instruction preparing law enforcement officers, security specialist, fire fighters, and emergency medical services personnel assigned to and/or supporting law enforcement and/or military special operations in a multitude of urban, rural, austere, and remote environments. TEMO targets operators and support personnel of tactical operations or special operations teams, delivered in 48 hours of day and night operations comprised of classroom lecture and practicum, followed by field training exercises. TEMO continues forward regardless the weather. Course topics include but are not limited to: • Basic and Advanced Airway Techniques • Anti-Personnel Devices /Improvised Explosive Devices • Aspects of Ballistic Wounding • Operation / Command and Control (C2) • Movement / Patrolling • Urban Tactical Operations • Rural Tactical Operations • Medical Force Protection • Responsibilities of the Medical Operator • Load-out and Equipment Considerations • Mission Development / Threat Assessment • Tactical Combat Casualty Care.

S.E.R.T. Group International
Specialized Emergency Response Team

Scott Sheldon - President
P.O. Box 371231
Reseda, CA 91337-1231
Ph: 866/500-5465

SPECIAL OPERATIONS MEDICAL COURSES

Tactical Operations Medical Specialist

This high-speed, low-drag course covers the skills necessary to provide emergency medical care in the austere environment. Consisting of classroom, skills stations, and very realistic scenarios this course will provide a new tactical medical operator with the training necessary to support a SPECOPS team during operations and training. Course length is five days.

Curriculum Includes:
-Tactical Combat Casualty Care
-Role/Responsibility of TEMS Provider
-Medical Threat Assessment
-Ballistics
-Team Health
-Buddy Care
-Clan Labs
-Dental Care
-Pediatric Trauma
-Entry/Room Clearing Techniques
-Rescue Techniques
-Field Training Exercise

Special Operations Medical Provider

The course covers basic elements of providing operational emergency medical care in the austere environment. This offers the medical operator options for treating casualties in the tactical or combat environments. Course length is three days.

Curriculum Includes:
-Tactical Combat Casualty Care
-Medical Threat Assessment
-Ballistics
-Team Health
-Buddy Care
-Rescue Techniques

Pediatric Trauma in Tactical Operations

Prerequisite: **Assignment or intent to provide medical care in tactical operations.**

This course addresses the unique medical needs of the pediatric trauma victim. As noted in Operation Iraqi Freedom, kids pose a unique challenge to medical providers. Following the axiom that "kids are not small adults," this course will present assessment and treatment options for those children injured during tactical or combat operations.

Curriculum Includes:
-Kids and Combat Operations - A Primer
-The PALS Paradigm
-Patterns of Injury
-Treatment Options
-Skills
-Real World Scenarios

JTM Training Group

Military SOF Medic Refresher Course (9-Day)
Certifications Achieved: BLS/CPR, ACLS, PHTLS, PALS/PEPP
Tactical Combat Casualty Care (TCCC) doctrine is deeply imbedded into all facets of this course

Dates:
Dec 7-15, 2006; Jan 4-12, 2007; Feb 1-9, 2007; March 1-9, 2007

Location: Nellis AFB, Las Vegas, NV. One of the main attractions of training in the Las Vegas desert is that it duplicates the terrain in which current Operators currently deploy. The students train in the jagged cliffs of nearby mountains and dry air of the high-desert.

Curriculum: This is a 100+ contact hour school. *Contact hours = Actual instruction time in the classroom and on the range.*

This comprehensive block of training meets all of the certification requirements for the Nat'l Registry of EMT's Basic, Intermediate or Paramedic. Students do not need any additional training or continuing education hours for the recertification period.

Classroom: Approximately 60 contact hours will be spent in the classroom. Subjects will include, but not limited to:
- Basic Life Support/CPR
- Pharmacology & Standard medications
- Extended care transport
- Non-traumatic abdomen
- Tactical Combat Casualty Care
- Triage
- Weapons of Mass Destruction
- Environmental injuries
- Allergic reactions
- Ocular injuries
- Pre-hospital Trauma Life Support
- Advanced Cardiac Life Support
- Pediatric Emergency Pre-hospital Provider & Pediatric Advanced Life Support

Skills Labs/TCCC scenarios: Approximately 20 hours will be spent performing hands-on skills during our 'labs' and TCCC based training scenarios. Subjects will include, but not limited to:
- Hospital based human cadaver lab (day/night)
- Field based human cadaver lab
- Motor vehicle & Confined space extraction
- High-angle rope access
- Military Operations in Urban Terrain & "Street" medicine
- Care Under Fire & Tactical Field Care
- CASEVAC
- Exfiltration problems
- Convoy operations
- Teamwork in problem solving

Range: Approximately 20 contact hours will be spent on the weapons training ranges. Subjects will include, but not limited to:
- Combat mindset; Team maneuver; Field evacuation; Communication; & Roles/responsibilities

EMT Recertification
(Basic, Intermediate or Paramedic): Upon class completion, we will provide ALL necessary paperwork for successful recertification to include BLS/CPR, ACLS, PHTLS, and PALS/PEPP. If required, all Nat'l Registry Skill and CME sheets will be endorsed by our medical director

Contact
Website: www.jtmlasvegas.com
Email: registration@jtmlasvegas.com
Phone: (702) 759-5075

The following is a list of information resourses for contining education.

Casualty Care Research Center
Office: (301) 295-6263
Web Site: www.casualtycareresearchcenter.org

CERTAC
Office: (970) 214-9355
Web Site: www.certac.com

Counter Force Training
Office: (888) 660-3442
Web Site: www.counterforcetraining.org

Cypress Creek Advanced Tactical Team
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Med Quiz

Picture This....

Lynden Bowden, MD, MPH

You are deployed to a tropical island in the South Pacific and serving as the top SOF medical professional. You encounter the organism pictured in images one and two below at least two times; once while running on a dirt track that surrounds your compound, and once at night while in the motorpool. Later, a Soldier comes to see you because this organism crawled over his wrist while he was moving some rocks. He has a "burn" as pictured in image 3. He also notes some "itching and tingling in the area." He is now concerned that he might become ill. Can you identify this organism? Use your *SOF Medical Handbook* to describe the primary morphology of the "burn" lesion present on the wrist. Should the Soldier be concerned? What other signs or symptoms might you expect to see in this Soldier? What treatment should you provide, if any?

Image 1

Image 2

Image 3

Answers

Image 1: A ~20cm long, brown, worm-like arthropod. This organism is likely a millipede of the order Spirostrepdidia or Spirobolida.[1,2] Millipedes are typically brown, black, or gray. They range in size from microscopic up to 30cm. They are slow moving, nocturnal herbivores. These arthropods are found in areas of high humidity, usually in soil, under leaves or rocks, and in decaying wood. They sense with antennae and have poor eyesight. Their primary means of defense is to coil up in a ball and hide when threatened.[3]

Image 2: A close-up view of the millipede's head and front segments. Note the absence of biting mouth parts, pinchers, fangs, claws, or stingers. Also note two pairs of legs on most body segments. A closer look reveals that some of the front segments only have one set of legs. This variation (among others) helps determine a millipede's taxonomy.[2,4] Larger millipedes have up to 300 pairs of legs.[3]

Image 3: The primary morphology is an slightly erythematous serpentine boardered patch over the contact area of the the volar aspect of Soldier's left wrist. The patient has already applied some Bacitracian® ointment illustrated by the shiny appearance. He has a linear-appearing papularvesicular rash.

Discussion

Millipedes (class: Diplopoda) and centipedes (class: Chilopoda) are often discussed together, and important differences exist between the two classes besides the number of legs per body segment (the latter having one pair of legs on most body segments). Centipedes are found in a variety of colors to include red, yellow, black, and blue.[5] Additionally, centipedes are carnivores and their first set of legs are replaced by fangs.[5] Centipedes bite and envenomate their prey. Even though millipedes are docile compared to centipedes and do not inject venom into their victims, they are still medically relevant because they secrete or eject noxious substances from glands in their body segments.[4,6,7] When millipedes are threatened they will coil up and release their noxious fluids.[6,8] These substances include benzoquinones, hydrocyanic acid, phenols, aldehydes, nitroethylbenzenes, and terpenoids depending on the species of millipede.[4,9,10] Interestingly, nitroethylbenzenes have antibacterial, antifungal, and insecticidal properties.[10] The millipede's natural predator – the ant – is repelled by nitroetthylbenzenes.[10] Until recently, it was thought that nitroethylbenzenes were only found in nature as a result of environmental pollution.[10] When benzoquinones are absorbed by the skin, they produce a purple or "mahogany-brown" skin discoloration due to oxidation (similar to an iodine stain) that may persist for months.[6,8,9] It is believed that millipedes of the genus *Spirostrepdidia* do excrete benzoquinones,[7] however, skin discoloration was not a feature in this patient.

Literature Review and Epidemiology

A literature review using MEDLINE in September 2006 of human-millipede encounters (search term: millipede, limit: humans, date: 1966 to present) revealed only nine articles.[4,6,8,9,11-15] Seven articles were case reports or case series articles,[4,6,8,9,12,14, 5] two were technical reports,[11,13] and two articles presented the same cases.[14,15] Of the 15 total cases that have been reported; none of the articles reported death due to millipede exposure. Table 1 is a summary of the cases found. The median age is four years, and 62 percent of cases occured with males. Table 2 is a compilation of symptoms experienced by the 15 cases (note: each patient may have multiple symptoms). Millipedes affect mainly the skin and eyes. The most sensational case reported describes a 14 year-old boy in Turkey who experienced abdominal pain with vomiting and defecation of millipedes after he had been unsuccessfully treated for an intestinal nematode infection for two years.[4] Eight cases involving the eyes were found in a retrospective study of 14,000 ophthalmology clinic records at a hospital in Papua New Guinea (PNG) over a six year period (cumulative incidence of 5.7 per 10,000).[12] At least one article claims that blindness may result from a millipede "burn" to the eye.[14] However, in another retrospective study in PNG, 199 cases of blindness in 13,327 patients were documented; none of those cases of blindness was due to a millipede burn.

Table 1: Summary of Reported Millipede Exposures			
Case	**Age (yr)**	**Sex**	**Reference**
1	4	Female	Hendrickson (9)
2	14	Male	Ertek (4)
3	0.8	Male:	Hudson (12)
4	2	8	
5	2.5		
6	4	Female:	
7	4	3	
8	6		
9	7		
10	25		
11	3	F	Mason (8)
12	8	M	Shpall (6)
13	0.9	Unknown	Radford (14,15)
14	2	Unknown	Radford (14,15)
15	3	M	Radford (14,15)

Table 2: Symptoms of Millipede Exposure		
Symptoms	**No. Cases**	**Percentage**
Dermatologic		
Burning/stinging	2	13%
Discoloration	4	27%
Itching	1	7%
Pain	1	7%
Blister formation	1	7%
Gastrointestinal		
Burning of mucus membranes	2	13%
Abdominal pain	1	7%
Opthalmologic		
Periorbital "burn"	9	60%
Periorbital edema	3	20%
Acute conjunctivits	3	20%
Keratitis	1	7%
Corneal ulcer	1	7%

Patient Management

The Soldier should not be overly concerned that he will become acutely ill. However, the medic should counsel the Soldier that the corrosive benzoquinones excreted by the millipede may cause skin changes to include brown streaking of the skin, erythema, edema, and blister formation.[2] These changes could later progress to cracking and sloughing of the skin before healing. Of concern is the possibility that some of the corrosive substance will be transferred to the eye through hand-to-eye contact. If this occurs, the Soldier may develop conjunctivitis, keratits, and possibly corneal ulceration.

Immediate treatment of the skin includes thoroughly cleaning the hands to remove any toxin.[6,9,16] The goal of treatment is to prevent secondary bacterial infection of the skin by maintaining the epidermal barrier of the involved area. Duoderm or another occlusive dressing will speed healing once the area has been cleaned of irritant. If pain occurs, provide supportive therapy to include ice, and non-steroidal anti-inflammatories medicine. Hydrocortisone cream or aloe Vera may be applied to the skin to reduce the inflammation. If the eyes become affected, irrigate them with saline. Do not apply steroids or anesthetic to the eyes. The Soldier may require evacuation if the condition of the eyes worsens to the point where they develop a large and/or non-healing ulcer.[2,13]

If you are deployed and have a concern about a puzzling skin lesion, you can email your clinical photos and, with the aid of your SOF manual, a concise morphologic description of the difficulty to our Operational Teledermatology site at derm.consult@us.army.mil or to Daniel.Schissel@US.Army.Mil. If you are interested in publishing your clinical case contact Dr Schissel at the address above.

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MAJ Lynden "Pete" Bowden graduated from Creighton University in 2000. He completed a transitional internship at Tripler Army Medical Center. Dr. Bowden served as a Brigade Surgeon and deployed with 3BCT, 1AD to Iraq in 2003. He graduated from the Uniformed Services University of the Health Sciences with a Masters of Public Health in 2004, and completed a residency in Preventive Medicine at Madigan Army Medical Center in 2005. Dr. Bowden's current assignment is Battalion Surgeon for the 96th Civil Affairs Battalion (Airborne).

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LTC Daniel Schissel originated "Picture This" for the MED Quiz. He is a 1993 graduate of the Uniformed Service University of the Health Sciences and completed his internship with the family practice department at Fort Bragg in 1994. He then served as the 2/10th Special Forces Group (Airborne) surgeon and followed on as the 10th SFG(A) Group Surgeon. He completed his residency training in dermatology at the Brooke Army Medical Center in 1999. LTC Schissel is presently station in Heidelberg, Germany as a staff physician and the European Regional Medical Command Dermatology Consultant. He has authored the dermatology section of the new SOF manual, serves on the USSOCOM Medical Curriculum and Examinations Board, and is the U.S. Army Aviation Dermatology Consultant.

Human Performance Forum

HMCM Glenn Mercer

Forum Introduction

This forum is intended to serve as a clearinghouse for Human Performance (HP) issues, information and developments related to operators and the HP professionals, medics, and coaches that train the SOF Weapons System. We solicite and welcome editorial input in this new JSOM section. As human performance and rehabilitation become more and more of a high value tool in SOF, the need exists to broaden our horizons. The SOCOM SEMA will host and moderate this section of the JSOM.

The first section of interest is a current glossary of terms and nomenclature that is emerging within SOF. These definitions are found with a high frequency in the civilian sector and have taken on military overtones in the last few years. However the core concepts remain the same. Submitted for your review in this issue are:

Warrior Athlete (WA)

The concept that SOF Operators retain characteristics, capabilities, and qualities of both elite athletes and premier military combatants. As such, the WA creates an unusual and SOF specific challenge to effectively employ a staff that can train them athletically and to support their combat arms specialties.

Professional Sports Model (PSM)

The staffing model that provides athletic and personal services to elite athletes in collegiate, semi-pro, and professional athletics. This includes the line leadership aspects of any program (e.g., head coach, athletic director, etc.)

Methodology

The collective body of scientific conditioning principles that agencies use to train athletes. The best programs with evidenced-based outcomes use unified, integrated, and time tested methodologies to perpetuate their programs.

Athlete Services

The specific fundamental services that function as supporting pillars to all PSMs. Within this fundamental block, areas of concentration serve to enhance or optimize the core principles of military performance. In medical services these would be analogous to an ancillary services division (e.g., Performance Registered Dietitians or Nutritionists.)

Evidence-based Outcomes

The concept that outcomes and claims are supported by metrics, standards, and science. The concept is used frequently as a standard of dialogue about performance; the civilian sector is flush with claims of excellence and achievements that are unsubstantiated. Subjective review and feedback are valid but only after all agree upon a standard to advance the dialogue about any issue.

Human Performance Point Paper

Postscript to JSOM article, **Introduction of Functional Physical Training Into Special Operations Units** in Vol 5 Edition 1 / Winter 05 pp 54-59.

Having recently completed my 3rd year as the Program Director of the NAVSPECEWARGRU4 SWCC Conditioning Program these are my observations on the critical aspects of success. While not every concept we tried was a winner, the plurality of operating tenets we applied had significantly higher performance yields than conventional or COTS PT applications. This program centrally trained, tracked, and tested in excess of 487 military athletes (SWCC & SEAL) from 2003 to 2006. From this, three core concepts emerged. Without adherence to these pillars, strength and conditioning programs in military environments are historically untenable by any measure of professional success.

Updated Program Mission: Establish and maintain peak human performance, suppress occupational injury rates, and mitigate shock.

C1. The *collection, comprehension, and application of medical end state data.* It is not enough to just collect and quote statistics. Their existence provides the de facto mission for medical departments and human performance (HP) divisions. Restoration of the operational force for line commanders was, is, and should continue to be our preeminent reason for existence. Improvements in "end state" data are the barometer for measurable success. Unless this data exists in a cogent state; effective future human capital strategies will be inherently flawed. Objective data must be precedent to subjective, anecdotal, or narrative input to validate HP successes as evidenced based.

C2. Use of and adherence to the *civilian professional sports model* (PSM). It is a commonly accepted assumption that SOF has no exact or immediate sport parallel. However, cutting edge methodology that is used to train the worlds best athletes is immediately adaptable and appropriate for our needs. SOF demands are unique both functionally and tactically in an asynchronous environment. Conventional PT models are unable to mitigate, and in fact contributory to the adverse trends described in C1. The PSM was used exclusively for the last 39 months in the SWCC program providing synchronicity and fusion for all human resources that support and train the Operator. The PSM is the best, proven method of those available now.

C3. The use, adherence, and promotion of a simple distilled objective. Our communal HP mission should be the attainment of *terminal athleticism.* While vague on paper it is a qualified and quantified practical concept. Athleticism is germane to 99% of every physical task, condition, and standard that can be defined in SOF. The warrior athlete requires broad based fundamentals from which they can achieve excellence.

Distribution and implementation of these three concepts at the strategic level will have immediate, measurable, and undeniable impact on pre-deployment force readiness levels. Appropriate staffing of these concepts will yield proportional preservation of human capital. Fractional or compartmented improvements are not enough. Our organization has a unique and inherent ability to change; to do this we must be able to assess our past performance with candor and reciprocity. I believe this programming has revealed common to all generic benchmarks and is ready for formal exportation to larger elements of USSOCOM.

Dedication

Daniel E. Holland, DVM
LTC, VC, USA

U.S. Army veterinarian, Daniel E Holland from San Antonio, Texas died in Baghdad, Iraq, 18 May 2006 along with three other Soldiers and a civilian interpreter of injuries sustained that day when an improvised explosive device detonated near their Humvee during combat operations in Baghdad. LTC Holland, 43, was serving on a Civil Affairs humanitarian mission in support of Operation Iraqi Freedom while assigned to the 352nd Civil Affairs Command, based out of Fort Bragg, N.C. He is the only member of the Veterinary Corps to die in a combat setting in recent years. LTC Holland was an Army veterinarian, assigned to South Plains District Veterinary Command at Ft. Hood, TX, attached to the 352nd Civil Affairs Command at Fort Bragg, NC, further attached to the 4th Infantry Division as the Chief of the Public Health and Functional Specialty Teams for Civil Affairs. LTC Holland is survived by his wife, son, daughter, parents, four brothers, and five sisters. Daniel was born in Munich, Germany on April 5th, 1963, the youngest of 10 children, into a military family. He graduated from Marlow High School in 1981, where he was selected to give the commencement address, entered Oklahoma State University on an ROTC scholarship, transferring after three years into OSU's College of Veterinary Medicine. His dreams were realized when he was commissioned as an officer in the United States Army in 1984 and when he received a DVM degree in 1988. LTC Holland's 21-year career in the military included tours in Germany, Bosnia, Honduras, and Haiti, where he was able to use his Master's Degree in Public Health. His love for animals and his compassion for people of all nations were profound. His career postings included Fort Benjamin Harrison in Indiana, Fort Knox in Kentucky, Fort Sill in Oklahoma, Giebelstadt Army Air Field in Germany, and Fort Sam Houston in San Antonio.

LTC Holland was the Joint Task Force Bravo veterinarian in Honduras and during Operation Uphold Democracy; he conducted an epidemiologic investigation of neurocysticercosis in Haiti. As deputy commander of the 72nd Medical Detachment (Veterinary Service) in Giebelstadt, he led the detachment (VS)(Forward) for six months in the Balkan theater of Bosnia, Croatia, and Hungary. Returning to the States in 1999, he was assigned to the Army Medical Department Center and School at Fort Sam Houston, where he

served as a branch chief in the Department of Veterinary Science and an instructor for the AMEDD Officer Basic and Advanced courses. His military honors consisted of the Bronze Star, Purple Heart, four awards of Meritorious Service Medal, Army Commendation Medal, Joint Service Achievement Medal, Army Superior Unit Award, National Defense Service Medal, Armed Forces Expeditionary Medal, Global War on Terror Service Medal, Armed Forces Service Medal, Humanitarian Service Medal, NATO Medal, Combat Action Badge, Expert Field Medical Badge, and Army Parachutists Badge. He will be awarded the Bronze Star and the Purple Heart posthumously. LTC Holland was a diplomat of the American College of Veterinary Preventive Medicine and a member of the Oklahoma VMA and American Association of Food Hygiene Veterinarians. He will be remembered for his warm and outgoing personality, his love of God and family, his dedicated service to our great country, and the way he always made people laugh. Memorials may be made to the Wounded Warrior Project, 711 5th St. N.E., Suite A, Roanoke, VA 24016, www.woundedwarriorproject.org. This project assists U.S. veterans severely injured during the conflicts in Iraq, Afghanistan, and other locations.

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13. **All articles written by USSOCOM members must be reviewed and pre-approved by your commander, component surgeon, and PAO prior to submission to the JSOM.**
14. Remember, the JSOM is your journal and serves as a unique opportunity for you to pass your legacy to the SOF medical community.

Take advantage of the opportunity

Special Forces Aidman's Pledge

As a Special Forces Aidman of the United States Army, I pledge my honor and my conscience to the service of my country and the art of medicine. I recognize the responsibility which may be placed upon me for the health, and even lives, of others. I confess the limitation of my skill and knowledge in the caring for the sick and injured. I promise to follow the maxim "Primum non- nocere" ("First, thou shalt do no harm"), and to seek the assistance of more competent medical authority whenever it is available. These confidences which come to me in my attendance on the sick, I will treat as secret. I recognize my responsibility to impart to others who seek the service of medicine such knowledge of its art and practice as I possess, and I resolve to continue to improve my capability to this purpose. As an American Soldier, I have determined ultimately to place above all considerations of self the mission of my team and the cause of my nation.

Pararescue Creed

I was that which others did not want to be. I went where others feared to go, and did what others failed to do. I asked nothing from those who gave nothing, And reluctantly accepted the thought of eternal lonliess ....should I fail. I have seen the face of terror; felt the stinging cold of fear, and enjoyed the sweet taste of a moment's love. I have cried, pained and hoped...but most of all, I have lived times others would say best forgotten. Always I will be able to say, that I was proud of what I was: a PJ It is my duty as a Pararescueman to save a life and to aid the injured. I will perform my assigned duties quickly and efficiently, placing these duties before personal desires and comforts.

These things I do,
"That Others May Live."

A Navy Poem

I'm the one called "Doc"... I shall not walk in your footsteps, but I will walk by your side. I shall not walk in your image, I've earned my own title of pride. We've answered the call together, on sea and foreign land. When the cry for help was given, I've been there right at hand. Whether I am on the ocean or in the jungle wearing greens, Giving aid to my fellow man, be it Sailors or Marines. So the next time you see a Corpsman and you think of calling him "squid", think of the job he's doing as those before him did. And if you ever have to go out there and your life is on the block, Look at the one right next to you...

I'm the one called "Doc".

~ Harry D. Penny, Jr. USN *Copyright 1975*

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