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THESIS APPROVAL PAGE FOR MASTER OF SCIENCE IN ORAL BIOLOGY

Title of Thesis: Assessing the military orthodontist's role in oral and maxillofacial surgeon preparation for battlefield surgical intervention

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Master of Science Degree
January 20, 2023

THESIS/MANUSCRIPT APPROVED: DATE:

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Assessing the military orthodontist's role in oral and maxillofacial surgeon preparation for battlefield surgical intervention

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ABSTRACT:

Introduction

Timely surgical intervention by oral and maxillofacial surgeons is critical to preserving life and sustaining the fighting force when battlefield injuries to the head and neck are sustained. Preparation for timely battlefield surgical intervention comes in the form of training in controlled operating environments, in the same space in which common facial battlefield injuries occur. Orthognathic surgery procedures are one means by which military oral and maxillofacial surgeons gain experience and prepare for battlefield surgical intervention. Collaboration between orthodontist and surgeon is paramount to successful orthognathic surgery outcomes. The purpose of this study is to quantify the contribution of the military orthodontist to military oral and maxillofacial surgeon preparation for battlefield surgical intervention by summing and comparing orthognathic surgery data over a 9-year period.

Materials and Methods

A subset of American Board of Oral and Maxillofacial Surgery (ABOMS) surgical procedure encounters and orthodontic evaluation and treatment procedure encounters from 2012-2020 were obtained from the military's legacy primary dental patient management database, Corporate Dental System (CDS). Patient pseudo-identifiers and dates of service were examined to determine where a collaborative (or referring) relationship existed. Totals for all surgical cases and procedures, to include all orthognathic cases and procedures, were summed and compared.

Results

Oral and maxillofacial surgeons performed 11,747 total surgical procedures from the selected ABOMS procedure list over the designated period. 6,935 (59%) of all procedures, were orthognathic surgery procedures, distributed across 3,100 patients. 2,505 (81%) of those patients had codes for both orthognathic surgery and an orthodontic evaluation or treatment, constituting a collaborative orthodontic/surgery relationship or referral from a military orthodontist to the oral surgeon.

Conclusions

The collaborative relationship between military orthodontists and military oral and maxillofacial surgeons does contribute to the surgeon's preparation for battlefield surgical interventions.

Introduction

As war and weapons of war have progressed over time, so has military medicine and the approach to treating the wounded. From the introduction of the tourniquet by Jean Louis Petit in 1718 to the development and implementation of life-saving techniques like triage, casualty evacuation, and multiple echelons of care, the art of caring for the wounded in war has advanced significantly. [1, 2] Chances of survival after sustaining battlefield injuries has increased to over 90% in recent wars.[3] Survivability can in part be attributed to improved body armor, however, the extremities and head and neck remain vulnerable to injury.[4]

Timely surgical intervention is a means by which battlefield medicine has improved over time to reduce the mortality of wounded Service Members.[4-6] Various sources estimate that 26-42% of patients evacuated out of theater during Operation Iraqi Freedom and Operation Enduring Freedom sustained craniomaxillofacial battle injuries to the head and neck.[7, 8] Keller et. al. reported that 46% of injuries sustained from 2004-2010 in Iraq and

Afghanistan involved at least one facial fracture, and that reduction of those fractures in theater was safer than delaying treatment.[9] Battlefield injuries to the face can range from soft tissue lacerations to comminuted fractures to penetrating shrapnel and bullet wounds.[10] High- and low-velocity missiles, to include bullets and improvised explosive device (IED) blasts, are the cause of most facial injuries.[7, 11, 12]

Surgeons must respond with decisive action in minutes to preserve life when facial combat injuries present themselves, and especially in cases of airway compromise or hemorrhage, when "hazard is in hesitation, not in the action."[13] Additionally, secondary reconstruction of the midface can become more difficult if primary treatment is not performed in a manner which restores esthetics and function.[14] Military medical personnel, to include oral and maxillofacial surgeons, must be prepared to manage traumatic facial injuries efficiently to reduce mortality and to sustain the fighting force.[15] Preparation comes in the form of training in controlled operating environments, in the same anatomical space in which common facial battlefield injuries occur.

Collaborative efforts between orthodontists and surgeons in correction of facial skeletal deformities have been consistent and progressive since the mid 20th century.[16] Orthognathic surgery, to include LeForte 1 osteotomy via down fracture and bilateral sagittal split osteotomy (BSSO) of the mandibular ramus to advance the lower jaw are among the surgeries most commonly performed to correct skeletal and dental jaw relationships.[17-19] Orthognathic surgery requires careful planning and collaboration between orthodontist and surgeon to achieve successful outcomes. Per the Commission on Dental Accreditation (CODA), an oral and maxillofacial surgery resident is required to complete a minimum of 20 orthognathic surgery cases during residency involving the correction of deformities in the mandible and the middle third of the facial skeleton.[20] It has also been shown that improved esthetics and function can be achieved when cases of multiple maxillofacial fractures are managed jointly by orthodontics and oral and maxillofacial surgery.[21] The collaborative relationship between orthodontist and oral and maxillofacial surgeon is paramount to an oral surgeon achieving surgical competency, achieving successful orthognathic outcomes, and providing the repetition necessary to increases the surgeon's familiarity with the anatomy and procedures required to access areas of the head and neck that are often affected by battlefield injuries.

This study aims to quantify the military orthodontist's contribution to the military oral and maxillofacial surgeon's continued practice in orthognathic surgery and preparation for battlefield surgical intervention. The objectives included identifying orthodontic procedures associated with orthognathic cases, identifying total number of orthognathic cases performed by military oral surgeons, and calculating the proportion of collaborative orthodontic-orthognathic cases. Additionally, comparisons will be made between collaborative orthognathic cases referred from military orthodontists and a select number of surgical procedures commonly performed by military oral and maxillofacial surgeons across the Department of Defense.

Materials and Methods

A query was run against the military's legacy primary dental patient management database, Corporate Dental System (CDS), for the years 2012-2020. The date range was selected to include years in which all three branches of service (Army, Navy, and Air Force) used CDS exclusively to manage patient appointment and procedure code data and would have comprehensive data for the entirety of each year. Queries were designed to return patient records with any associated surgical code found in Table 4. Returned records were further analyzed to determine which records had an orthodontic evaluation or treatment code (Table 3) associated in addition to a surgical procedure. The columns requested and returned were patient name, patient identifier, date of service, beneficiary category, branch of service, and base name.

Chronology of procedures was important in determining whether a military orthodontist or a military oral and maxillofacial surgeon treated the patient first, defining the initiation of the collaborative relationship as either traditional (orthodontics prior to orthognathic surgery) or surgery first. Where no orthodontic codes were present prior to or after orthognathic surgery codes in a record, it was assumed that orthodontic care before and after surgery were provided by a civilian, non-military orthodontist. If a patient was treated with orthodontics by a military orthodontist prior to undergoing orthognathic surgery with a military surgeon, then that patient was

counted as referred for orthognathic surgery by a military orthodontist. The total number of collaborative orthognathic cases was compared to the total number of surgical procedures performed by OMFS providers from Table 4. Some codes taken in CDS were not input by an Active Duty orthodontist, and further explanation of this exception follows in the discussion section.

Results

Patients/Cases

The CDA query returned 16,834 individual encounters distributed across 8,160 unique patients. 5,846 (71.6%) of all patients were Active Duty and 2,314 (28.4%) were non-Active Duty. When analyzed by branch of service, the Army treated 3,323 Active-Duty Service Members and 1,124 non-Active Duty persons, the Navy treated 1,343 Active Duty Service Members and 737 non-Active duty persons, and the Air Force treated 1,180 Active Duty Service Members and 453 non-Active Duty persons. The Navy treated significantly more non-Active duty persons than any other branch (X^2(2, N=16,834) = 108.97, p = <.001).

3,100 (38.0%) of all patients were orthognathic patients, of which 2,631 were Active Duty and 469 (15.1%) were non-Active Duty. Military orthodontists referred 2,505 (80.8%) of the total orthognathic cases to OMFS. 595 (19.2%) of all orthognathic cases were either referred by a civilian orthodontist or were surgery-first orthognathic cases. Of those referred by military orthodontists, 2,166 (69.9%) were Active Duty, and 339 (30.1%) were non-Active Duty.

Procedures & Location of Treatment

Oral and maxillofacial surgeons coded for 11,747 total procedures from Table 4, of which 6,935 (59%) were orthognathic procedures.. There were 104 installations where surgeries from Table 4 were performed. The majority (64.1%) of orthognathic surgery cases were treated at installations with OMFS training programs (see Table 2 for training locations).

Discussion

Orthognathic surgery referrals from orthodontist to surgeon do not follow the traditional course of a medical or dental specialty referral. Rather than identifying a diagnosis or problem that requires another specialty's expertise and sending the patient for evaluation and treatment immediately, an orthodontist (if first to encounter a patient with orthognathic needs) initiates treatment with comprehensive orthodontics. After approximately 12-18 months of orthodontic care, when the appropriate leveling, aligning, space management, and dental decompensations are completed and the patient is ready for surgery, the patient is referred to oral surgery for consultation and planning for orthognathic surgery. The surgeon and orthodontist then collaboratively plan the surgery to ensure appropriate placement of the jaws and dentition. After surgery is complete, the patient returns to the orthodontist for several months of detailing and finishing of the patient's occlusion, prior to removal of orthodontic appliances. The term collaborative was used in this study with the aim of capturing this unique referring relationship, though any references to a referral for orthognathic surgery by a military orthodontist should be considered the same.

It is because of this unique collaborative relationship between orthodontist and oral surgeon that chronology of procedures was important to the data analysis. A knowledge of which procedures occurred first allowed the authors to determine where the patient started care and how care progressed. The distinction between total orthognathic cases and collaborative cases is how it was determined whether patients were referred for orthognathic surgery by a military orthodontist (orthodontic evaluation or treatment code prior to orthognathic code), a civilian provider (orthognathic code without any orthodontic evaluation or treatment code), or received directly by oral surgery (orthognathic code preceding any orthodontic evaluation or treatment code).

Initially, the dental code D0160 (detailed and extensive oral evaluation, problem focused), was to be used in determining whether a patient had been evaluated by an orthodontist prior to receiving orthognathic surgery. After initial analysis, the study highlighted that there were variations in documentation of orthodontic workloads and that in particular, the D0160 code was underutilized by orthodontic providers. The discovery of these

variations in documentation presents an opportunity to ensure accurate coding practices are incorporated in new electronic health record workflows. To better capture the collaborative relationship between military orthodontist and oral surgeon, it was determined that use of any comprehensive or limited orthodontic treatment code in Table 3 taken prior to orthognathic surgery would constitute a referral from orthodontics to oral surgery.

Though it is implied that all military collaborative relationships between orthodontics and oral surgery could be deduced from the presence or absence of codes in CDA, there is an exception that should be noted. The Army contracts civilian orthodontists at Fort Gordon, GA, Joint Base Lewis McChord, WA, West Point, NY, Baumholder Germany, and Wiesbaden Germany. The contributions of these contract orthodontists are included in the data for referred orthognathic cases by Active Duty providers, though the providers are not Active Duty themselves.

CODA standards for advanced dental education programs in orthodontics and dentofacial orthopedics state that an orthodontist candidate's "experience must include treatment of all types of malocclusions, whether in the permanent or transitional dentitions, and should include treatment of the primary dentition when appropriate."[22] A portion of each service's treatment of non-Active Duty persons can be attributed to the Tri-Service Orthodontic Residency Program's (TORP) requirement as a CODA accredited program to treat persons of all ages, in primary, mixed, and permanent dentitions. Additionally, many Service Members in all branches of service are called upon to serve overseas assignments outside the continental United States with authorization to be accompanied by dependent family members. Though orthodontists at most duty locations in the continental U.S. are not permitted to treat dependents, the variations in standards of care in foreign countries makes it necessary for military orthodontists to support overseas Service Members and their families by treating dependents. This explains why a portion of all patients treated in this study were non-Active Duty persons.

Limitations

Care was taken to select ABOMS codes for the data query that best represented surgical procedures routinely performed in an operating room under similarly controlled conditions to those in which orthognathic surgeries would be performed. As OMFS practices vary from hospital to hospital and surgeon to surgeon, the authors recognize that the list in Table 4 is not comprehensive or entirely reflective of each individual surgeon's or surgical program's surgical workload. Further analysis using additional trauma, reconstructive, pathology, and infection ABOMS procedures/codes for comparison to the data set selected in this study may be valuable.

Not all procedures in the comprehensive ABOMS code list, or in Table 4, prepare a surgeon equally for battlefield maxillofacial injury interventions. The number of collaborative orthognathic surgeries compared to all possible ABOMS procedures (including those in Table 4) likely would not represent the military orthodontist's contribution to the military oral surgeon's preparation for battlefield interventions accurately as procedures can vary significantly in scope, difficulty, and anatomical structures involved. Orthognathic surgery is thought to be a suitable preparatory surgery due to its nature, location, and anatomical structures involved, and was thus analyzed in this study. Future analysis should likely include a system for weighting individual procedures to categorize by relevance, difficulty, time spent in the operating room, anatomical structures involved, and other factors that more accurately categorize the relevance and significance of individual procedures to battlefield surgical intervention preparation. Further analysis could then more accurately show the significance of orthognathic surgery referrals on oral surgeon battlefield surgical intervention preparation.

Procedures were grouped by installation to show where the greater number of orthognathic surgery cases are performed and from where they are referred throughout the Department of Defense. Analysis of this data shows that the greatest number of orthognathic surgery cases occurs at OMFS training sites. Stratifying by installation highlighted that certain groups' procedure codes were not appropriately attributed to their installation or organization in CDA. Most apparent were the orthodontic procedure numbers associated with the TORP, where a significant underrepresentation of referrals was shown. It is likely in this instance that the codes associated with pre-surgical orthodontic care are attributed to either Lackland AFB or Fort Sam Houston. It is possible that other installations may be similarly underrepresented due to proximity to another installation or hospital.

This study does not take into consideration the quality of pre-surgical orthodontic setups for orthognathic surgery of either military or civilian referring orthodontists. A future survey of military oral and maxillofacial surgeons could shed light on the quality of pre-surgical setups from each group and further contribute to this study's findings.

Conclusion

- Military orthodontists referred the majority of all orthognathic surgery cases that were performed by military oral and maxillofacial surgeons during the time period studied.
- Orthognathic surgery cases accounted for more than one third of all surgical cases in the data set.
- Military orthodontists contribute to oral and maxillofacial surgeon orthognathic surgery caseloads and therefore contribute to battlefield surgical intervention preparation.
- The majority of all surgery cases as well as all orthognathic cases were performed on Active Duty Service Members.

Acknowledgments

Dr. Jacob L. Kitson, LTC, USA, DC – Tri-Service Orthodontic Residency Program Research Director; Dr. Kraig S. Vandewalle, Col(ret), USAF, DC – Air Force Consultant in Dental Research

Funding

None declared.

Conflict of Interest Statement

None declared.

Data Availability Statement

The data underlying this article cannot be shared publicly due to personally identifying information and the protections provided under HIPAA. The data will be shared with PII redacted on reasonable request to the corresponding author.

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TABLE 1

Unique patients	8,160	
5,846 (71.6%) were Active Duty		
2,314 (28.4%) were non-Active Duty		
Orthognathic cases (patients with orthodontic and orthognathic codes)	3,100	[38.0% of all patients]
2,631 (84.9%) were Active Duty		
469 (15.1%) were non-Active Duty		
Orthognathic cases initiated by military orthodontics (patients with orthodontic code *preceding* any orthognathic code)	2,505	
80.8% of all orthognathic cases		
30.7% of all patients		
2,166 (69.9%) were Active Duty		
339 (30.1%) were non-Active Duty		
Orthognathic surgery cases treated at OMFS training locations	1,606	
64.1% of all orthognathic cases		
Orthognathic surgery cases treated at non-OMFS training locations	899	
35.9% of all orthognathic cases		
Total surgery procedures	11,747	
Total orthognathic surgery procedures	6,935	
59.0% of all surgery procedures		

**not all surgery procedure codes are equal in weight, value provided to patient, or impact on surgeon preparation for battlefield surgical intervention

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Extra – different way to visualize some of Table 1 data

Active Duty orthognathic patients	2,631	
84.9% of all orthognathic cases		
Active Duty orthognathic cases initiated by military orthodontics	2,166	
69.9% of all orthognathic cases		
Non-Active Duty cases initiated by military orthodontics	339	
30.1% of all orthognathic cases		

TABLE 2

Army OMFS Training Sites
Brook Army Medical Center + Lackland AFB (Wilford Hall)
Schofield Barracks
Joint Base Lewis McChord
Fort Bliss
Walter Reed National Military Medical Center
Fort Bragg
Fort Gordon

Navy OMFS Training Sites
Walter Reed National Military Medical Center
Naval Medical Center Portsmouth
Naval Medical Center San Diego

Air Force OMFS Training Sites
Brook Army Medical Center + Lackland AFB (Wilford Hall)
Travis AFB

TABLE 3

Orthodontic Evaluation/Treatment Codes	
D0160	Detailed and extensive oral evaluation, problem focused
D8010	Limited orthodontic treatment primary dentition
D8020	Limited orthodontic treatment transitional dentition
D8030	Limited orthodontic treatment adolescent dentition
D8070	Comprehensive orthodontic treatment transitional dentition
D8080	Comprehensive orthodontic treatment adolescent dentition
D8090	Comprehensive orthodontic treatment adult dentition

TABLE 4

ABOMS codes used in study (orthognathic codes highlighted)	
Cleft	
Alveolar	
42205	Palatoplasty for cleft palate, with closure of alveolar ridge; soft tissue only
42210	Palatoplasty for cleft palate, with closure of alveolar ridge; with bone graft to alveolar ridge (includes obtaining graft)
Lip	
40700	Plastic repair of cleft lip/nasal deformity; primary, partial or complete, unilateral
40701	Plastic repair of cleft lip/nasal deformity; primary bilateral, 1-stage procedure
40702	Plastic repair of cleft lip/nasal deformity; primary bilateral, 1 or 2 stages
40720	Plastic repair of cleft lip/nasal deformity; secondary, by recreation of defect and reclosure
40761	Plastic repair of cleft lip/nasal deformity; with cross lip pedicle flap (Abbe-Estlander type), including sectioning and inserting of pedicle
42260	Repair of nasolabial fistula
Palate	
42200	Palatoplasty for cleft palate, soft and/or hard palate only
42215	Palatoplasty for cleft palate, major revision
42220	Palatoplasty for cleft palate; secondary lengthening procedure
42225	Palatoplasty for cleft palate; attachment pharyngeal flap
42226	Lengthening of palate, and pharyngeal flap
42227	Lengthening of palate, with island flap
42235	Repair of anterior palate, including vomer flap
42950	Pharyngoplasty (plastic or reconstructive operation on pharynx)
Craniofacial	
Osteotomies	
21137	Reduction forehead, contouring only
21138	Reduction forehead; contouring and application of prosthetic material or bone graft (includes obtaining autograft)
21139	Reduction forehead; contouring and setback of anterior frontal sinus wall
21150	Reconstruction midface, Lefort II; anterior intrusion (eg, Treacher Collins Syndrome)
21151	Reconstruction midface, Lefort II; any direction, requiring bone grafts (includes obtaining autografts)
21154	Reconstruction midface, Lefort III (extracranial), any type, requiring bone grafts (includes obtaining autografts); without Lefort I
21155	Reconstruction midface, LeFort III (extracranial), any type, requiring bone grafts (includes obtaining autografts); with Lefort I
21159	Reconstruction midface, LeFort III (extra and intracranial) with forehead advancement (eg, mono bloc), requiring bone grafts (includes obtaining autografts); without LeFort I
21160	Reconstruction midface, LeFort III (extra and intracranial) with forehead advancement (eg, mono bloc), requiring bone grafts (includes obtaining autografts); with LeFort I
21172	Reconstruction superior-lateral orbital rim and lower forehead, advancement or alteration, with or without grafts (including obtaining autografts)
21175	Reconstruction, bifrontal, superior-lateral orbital rims and lower forehead, advancement or alteration (eg, plagiocephaly, trigonocephaly, brachycephaly), with or without grafts (includes obtaining autografts)
21179	Reconstruction, entire or majority of forehead and/or supraorbital rims; with grafts (allograft or prosthetic material)
21180	Reconstruction, entire or majority of forehead and/or supraorbital rims; with autograft (includes obtaining grafts)
21181	Reconstruction by contouring of benign tumor of cranial bones (eg, fibrous dysplasia), extracranial
21182	Reconstruction of orbital walls, rims, forehead, nasoethmoid complex following intra- and extracranial excision of benign tumor of cranial bone, with multiple autografts (includes obtaining grafts); total area of bone grafting less than 40 sq cm
21183	Reconstruction of orbital walls, rims, forehead, nasoethmoid complex following intra- and extracranial excision of benign tumor of cranial bone, with multiple autografts (includes obtaining grafts); total area of bone grafting >40 sq cm, <80 sq cm
21184	Reconstruction of orbital walls, rims, forehead, nasoethmoid complex following intra- and extracranial excision of benign tumor of cranial bone, with multiple autografts (includes obtaining grafts); total area of bone grafting >80 sq cm
21260	Periorbital osteotomies for orbital hypertelorism, with bone grafts; extracranial approach
21261	Periorbital osteotomies for orbital hypertelorism, with bone grafts; combined intra- and extracranial approach
21263	Periorbital osteotomies for orbital hypertelorism, with bone grafts; with forehead advancement
21267	Orbital repositioning, periorbital osteotomies, unilateral, with bone grafts; extracranial approach
21268	Orbital repositioning, periorbital osteotomies, unilateral, with bone grafts; combined intra- and extracranial approach
21275	Secondary revision of orbitocraniofacial reconstruction
61557	Craniotomy for craniosynostosis; bifrontal bone flap
61559	Extensive craniectomy for multiple cranial suture craniosynostosis (eg, cloverleaf skull); recontouring with multiple osteotomies and bone autografts (eg, barrel-stave procedure) (includes obtaining grafts)
Esthetic	
Augmentation/Reduction Surgery	
21120	Genioplasty; augmentation (autograft, allograft, prosthetic material)
21125	Augmentation, mandibular body or angle; prosthetic material
21127	Augmentation, mandibular body or angle; with bone graft, onlay or interpositional (includes obtaining autograft)
21208	Osteoplasty, facial bones; augmentation (autograft, allograft, or prosthetic implant)
21209	Osteoplasty, facial bones; reduction
21270	Malar augmentation, prosthetic material
Orthognathic	
Genioplasty Osteotomies	

21121	Genioplasty; sliding osteotomy, single piece
21122	Genioplasty; sliding osteotomies, 2 or more osteotomies (eg, wedge excision or bone wedge reversal for asymmetrical chin)
21123	Genioplasty; sliding, augmentation with interpositional bone grafts (includes obtaining autografts)
Mandibular Osteotomies	
21193	Reconstruction of mandibular rami, horizontal, vertical, C, or L osteotomy; without bone graft
21194	Reconstruction of mandibular rami, horizontal, vertical, C, or L osteotomy; with bone graft (includes obtaining graft)
21195	Reconstruction of mandibular rami and/or body, sagittal split; without internal rigid fixation
21196	Reconstruction of mandibular rami and/or body, sagittal split; with internal rigid fixation
21198	Osteotomy, mandible, segmental;
21199	Osteotomy, mandible, segmental; with genioglossus advancement
Maxillary Osteotomies	
21141	Reconstruction midface, LeFort I; single piece, segment movement in any direction (eg, for Long Face Syndrome), without bone graft
21142	Reconstruction midface, LeFort I; 2 pieces, segment movement in any direction, without bone graft
21143	Reconstruction midface, LeFort I; 3 or more pieces, segment movement in any direction, without bone graft
21145	Reconstruction midface, LeFort I; single piece, segment movement in any direction, requiring bone grafts (includes obtaining autografts)
21146	Reconstruction midface, LeFort I; 2 pieces, segment movement in any direction, requiring bone grafts (includes obtaining autografts) (eg, ungrafted unilateral alveolar cleft)
21147	Reconstruction midface, LeFort I; 3 or more pieces, segment movement in any direction, requiring bone grafts (includes obtaining autografts) (eg, ungrafted bilateral alveolar cleft or multiple osteotomies)
21188	Reconstruction midface, osteotomies (other than LeFort type) and bone grafts (includes obtaining autografts)
21206	Osteotomy, maxilla, segmental (eg, Wassmund or Schuchard)
Pathology	
Lesion Excision / Resection Bone Benign	
20615	Aspiration and injection for treatment of bone cyst
21025	Excision of bone (eg, for osteomyelitis or bone abscess); mandible
21026	Excision of bone (eg, for osteomyelitis or bone abscess); facial bone(s)
21029	Removal by contouring of benign tumor of facial bone (eg, fibrous dysplasia)
21030	Excision of benign tumor or cyst of maxilla or zygoma by enucleation and curettage
21040	Excision of benign tumor or cyst of mandible, by enucleation and/or curettage
21046	Excision of benign tumor or cyst of mandible; requiring intra-oral osteotomy (eg, locally aggressive or destructive lesion[s])
21047	Excision of benign tumor or cyst of mandible; requiring extra-oral osteotomy and partial mandibulectomy (eg, locally aggressive or destructive lesion[s])
21048	Excision of benign tumor or cyst of maxilla; requiring intra-oral osteotomy (eg, locally aggressive or destructive lesion[s])
21049	Excision of benign tumor or cyst of maxilla; requiring extra-oral osteotomy and partial maxillectomy (eg, locally aggressive or destructive lesion[s])
21295	Reduction of masseter muscle and bone (eg, for treatment of benign masseteric hypertrophy); extraoral approach
21296	Reduction of masseter muscle and bone (eg, for treatment of benign masseteric hypertrophy); intraoral approach
41825	Excision of lesion or tumor (except listed above), dentoalveolar structures; without repair
41826	Excision of lesion or tumor (except listed above), dentoalveolar structures; with simple repair
41827	Excision of lesion or tumor (except listed above), dentoalveolar structures; with complex repair
41850	Destruction of lesion (except excision), dentoalveolar structures
Lesion Excision / Resection Malignant	
11620	Excision, malignant lesion including margins, scalp, neck, hands, feet, genitalia; excised diameter 0.5 cm or less
11621	Excision, malignant lesion including margins, scalp, neck, hands, feet, genitalia; excised diameter 0.6 to 1.0 cm
11622	Excision, malignant lesion including margins, scalp, neck, hands, feet, genitalia; excised diameter 1.1 to 2.0 cm
11623	Excision, malignant lesion including margins, scalp, neck, hands, feet, genitalia; excised diameter 2.1 to 3.0 cm
11624	Excision, malignant lesion including margins, scalp, neck, hands, feet, genitalia; excised diameter 3.1 to 4.0 cm
11626	Excision, malignant lesion including margins, scalp, neck, hands, feet, genitalia; excised diameter over 4.0 cm
11640	Excision, malignant lesion including margins, face, ears, eyelids, nose, lips; excised diameter 0.5 cm or less
11641	Excision, malignant lesion including margins, face, ears, eyelids, nose, lips; excised diameter 0.6 to 1.0 cm
11642	Excision, malignant lesion including margins, face, ears, eyelids, nose, lips; excised diameter 1.1 to 2.0 cm
11643	Excision, malignant lesion including margins, face, ears, eyelids, nose, lips; excised diameter 2.1 to 3.0 cm
11644	Excision, malignant lesion including margins, face, ears, eyelids, nose, lips; excised diameter 3.1 to 4.0 cm
11646	Excision, malignant lesion including margins, face, ears, eyelids, nose, lips; excised diameter over 4.0 cm
17270	Destruction, malignant lesion (eg, laser surgery, electrosurgery, cryosurgery, chemosurgery, surgical curettement), scalp, neck, hands, feet, genitalia; lesion diameter 0.5 cm or less
17272	Destruction, malignant lesion (eg, laser surgery, electrosurgery, cryosurgery, chemosurgery, surgical curettement), scalp, neck, hands, feet, genitalia; lesion diameter 1.1 to 2.0 cm
17273	Destruction, malignant lesion (eg, laser surgery, electrosurgery, cryosurgery, chemosurgery, surgical curettement), scalp, neck, hands, feet, genitalia; lesion diameter 2.1 to 3.0 cm
17274	Destruction, malignant lesion (eg, laser surgery, electrosurgery, cryosurgery, chemosurgery, surgical curettement), scalp, neck, hands, feet, genitalia; lesion diameter 3.1 to 4.0 cm
17276	Destruction, malignant lesion (eg, laser surgery, electrosurgery, cryosurgery, chemosurgery, surgical curettement), scalp, neck, hands, feet, genitalia; lesion diameter over 4.0 cm
17280	Destruction, malignant lesion (eg, laser surgery, electrosurgery, cryosurgery, chemosurgery, surgical curettement), face, ears, eyelids, nose, lips, mucous membrane; lesion diameter 0.5 cm or less

17281	Destruction, malignant lesion (eg, laser surgery, electrosurgery, cryosurgery, chemosurgery, surgical curettement), face, ears, eyelids, nose, lips, mucous membrane; lesion diameter 0.6 to 1.0 cm
17282	Destruction, malignant lesion (eg, laser surgery, electrosurgery, cryosurgery, chemosurgery, surgical curettement), face, ears, eyelids, nose, lips, mucous membrane; lesion diameter 1.1 to 2.0 cm
17283	Destruction, malignant lesion (eg, laser surgery, electrosurgery, cryosurgery, chemosurgery, surgical curettement), face, ears, eyelids, nose, lips, mucous membrane; lesion diameter 2.1 to 3.0 cm
17284	Destruction, malignant lesion (eg, laser surgery, electrosurgery, cryosurgery, chemosurgery, surgical curettement), face, ears, eyelids, nose, lips, mucous membrane; lesion diameter 3.1 to 4.0 cm
17286	Destruction, malignant lesion (eg, laser surgery, electrosurgery, cryosurgery, chemosurgery, surgical curettement), face, ears, eyelids, nose, lips, mucous membrane; lesion diameter over 4.0 cm
21015	Radical resection of tumor (eg, sarcoma), soft tissue of face or scalp; less than 2 cm
21034	Excision of malignant tumor of maxilla or zygoma
21044	Excision of malignant tumor of mandible;
21045	Excision of malignant tumor of mandible; radical resection
21557	Radical resection of tumor (eg, sarcoma), soft tissue of neck or anterior thorax; less than 5 cm
40500	Vermilionectomy (lip shave), with mucosal advancement
40510	Excision of lip; transverse wedge excision with primary closure
40520	Excision of lip; V-excision with primary direct linear closure
40530	Resection of lip, more than one-fourth, without reconstruction
41120	Glossectomy; less than one-half tongue
41130	Glossectomy; hemiglossectomy
41135	Glossectomy; partial, with unilateral radical neck dissection
41140	Glossectomy; complete or total, with or without tracheostomy, without radical neck dissection
41145	Glossectomy; complete or total, with or without tracheostomy, with unilateral radical neck dissection
41150	Glossectomy; composite procedure with resection floor of mouth and mandibular resection, without radical neck dissection
41153	Glossectomy; composite procedure with resection floor of mouth, with suprahyoid neck dissection
41155	Glossectomy; composite procedure with resection floor of mouth, mandibular resection, and radical neck dissection (Commando type)
Prosthetic / Pre	
Implants	
21244	Reconstruction of mandible, extraoral, with transosteal bone plate (eg, mandibular staple bone plate)
21245	Reconstruction of mandible or maxilla, subperiosteal implant; partial
21246	Reconstruction of mandible or maxilla, subperiosteal implant; complete
21248	Reconstruction of mandible or maxilla, endosteal implant (eg, blade, cylinder); partial
21249	Reconstruction of mandible or maxilla, endosteal implant (eg, blade, cylinder); complete