PERHAPS THE MOST HIGHLY structured and extensive residency program in dentistry is oral and maxillofacial surgery. OMFS is a rather curious specialty with strong connections to dentistry and to some of the surgical specialties in medicine. As such, it is easy to understand why OMFS occupies an important place in both the private practice setting and in hospital-based care.

With the specialty’s early prominence in exodontias, and leading up to the new vistas in facial and jaw reconstructive surgery and surgical implant procedures, we have witnessed a rapid development in both the scope of OMFS practice and in the educational structure of the specialty. Oral and maxillofacial surgery residencies occupy a minimum of four years. There are a number of OMFS programs which have a six-year residency requirement that are combined with the conferring of an M.D. degree upon completion of the residency.

Surgical techniques, hard- and soft-tissue response to a variety of environments, pathology, anesthesia, growth and development, internal medicine, oral medicine, bioengineering, sophisticated imaging modalities, dentofacial esthetics, psychology and many other important areas in both medicine and dentistry are subjects that the oral and maxillofacial surgeon must draw upon to enable him or her to practice the art and science of modern oral and maxillofacial surgery.

Oral surgeon Joel Friedman is guest editor of this issue of The NYSDJ, which is devoted to topics in oral and maxillofacial surgery. Dr. Friedman is a highly respected clinician, educator, and a strong advocate and leader in organized dentistry. He has enlisted several prominent oral and maxillofacial surgeons to contribute articles to this issue.

We hope that you enjoy this special edition of The NYSDJ, as we continue to appreciate and celebrate the evolution and contributions of the oral and maxillofacial surgery specialty to the dental and medical professions.
Delegates Choose Kathleen Roth to Head ADA in 2007

A WISCONSIN GENERAL dentist has been tapped to head the ADA in 2007. Kathleen S. Roth was elected president-elect for 2005-06 at the Annual Session of the ADA House of Delegates in October in Philadelphia. She is just the second woman in the history of the ADA to hold the top post. The first woman was Geraldine Morrow of Alaska, ADA President in 1991-92.

Dr. Roth has represented Wisconsin and Michigan (9th District) on the ADA Board of Trustees since 2001. At the ADA, she has chaired committees on diversity and information technology, and was senior trustee on the ADA Strategic Planning Committee.

A 1974 graduate of Marquette University School of Dentistry in Milwaukee, Dr. Roth is a past president of the Wisconsin Dental Association. She and her husband, Daniel, also a dentist, were guests at the NYSDA Semi-Annual Meeting in June in Buffalo. While there, she participated in ceremonies marking the founding of the ADA in 1859 in Niagara Falls.

Correction
An article introducing candidates for the post of ADA Second District Trustee that appeared in the October NYSDA News incorrectly reported that the current trustee, G. Kirk Gleason, would be leaving his office at the end of this year. It should have said that Dr. Gleason will complete his four-year term at the close of the ADA Annual Session next October in Las Vegas. We regret the error.
Welcome to My Life

The clinical world of today’s oral and maxillofacial surgeon is vast and varied.

I SPENT MANY WEEKS contemplating what I would say as the guest editor of this special issue of The New York State Dental Journal. I thought I could begin by paraphrasing an old Saturday Night Live line and say, “Oral surgery has been berry, berry good for me.” But that doesn’t do justice to what is and has been a most incredible and productive specialty of dentistry.

Not too long ago, mock OMFS Boards were administered at Columbia University Medical Center/New York Presbyterian Hospital. Residents and attendings from many of the local hospital residency programs participated. A review of the topics that were included in the exercise defines the scope of modern oral and maxillofacial practice. Topics were: routine dento-alveolar surgery; implants; bone grafting; clefts; treatment planning; and concomitant medical problems and how they impact treatment. Additional topics were: trauma; surgical treatment of craniofacial defects; rhinoplasty; facial cosmetics; the treatment and recognition of cardiac, respiratory, endocrine and immunocompromised patients; anatomy; nerve injury and repair; and the temporomandibular joint.

Just reading this list of topics gives an enhanced appreciation of the breadth and complexity of the procedures today’s oral surgeon is capable of performing.

This issue of The NYSDJ is intended to provide further insight into what the OMFS is doing pretty much routinely. To assemble it, I invited leaders in our field to contribute manuscripts that speak to the variety inherent in the OMFS specialty. Therefore, you will find articles on orofacial infections, implantology and advanced imaging techniques, as they relate to clinical practice, in the pages ahead. We’ve also included an article on Hugo Obwegeser, OMFS pioneer and a revered figure among oral surgeons.

Dr. Friedman is associate clinical professor of oral and maxillofacial surgery at Columbia University School of Dental and Oral Surgery and associate clinical professor of dentistry at Albert Einstein College of Medicine. He practices in Riverdale. He is a NYSDA Governor and a member of the Board of Directors of the New York State Society of Oral and Maxillofacial Surgeons.
Evolution of a Dental Implant Practice

The Camlog Implant System

Charles A. Babbush, D.D.S., M.Sc.D.

Abstract

After extensive experience with a variety of implant systems, dating back to the late 1960s, the author has begun placing Camlog implants, developed by Dr. Axel Kirsch. The design of this system eliminates the risk of rotation and screw-loosening, while at the same time offering extraordinary ease of use. The treatment of three patients with Camlog implants is described.

SINCE PLACING MY FIRST IMPLANT in 1968, I have continually searched for a technology that would provide the best rehabilitation, risk/benefit ratio and long-term success rates for patients. Over the years, I have been involved with a number of different implant systems. In the late 1970s, I used the ITI Straumann® and Lederman TPS Swiss Screw® implant systems. In the early 1980’s, Dr. Paul Mentag and I were instrumental in introducing the IMZ system3-5 to the United States. Later, I worked with the SteriOss and Replace/Replace Select technology, the latter conceptualized by Dr. Jack Hahn.6-7 Now Dr. Axel Kirsch has created the Camlog implant system,8-10 and I have placed more than 200 Camlog implants.

This article describes the cutting-edge technology of the Camlog implant system and offers examples of my use of it in treating three patients.

Camlog Overview

The Camlog implant system is based on 10 years of implant research and clinical use and features a unique implant-abutment connection. A minimum number of components are required to use this implant. It is extremely user-friendly from the perspective of both clinician/technicians and dental auxiliaries. The system addresses and solves the persistent problem of screw-loosening. It is mechanically stable and incorporates components designed to eliminate any rotation. It has the deepest (5.4 mm long) and strongest precision internal connection in the global implant marketplace.

The Camlog implant system’s state-of-the-art characteristics include the following:

- A roughened surface (Promote™)
- Both straight-walled and tapered designs
- A variety of lengths and platform sizes
- Immediate placement capability
- Open- and closed-tray impression techniques
- A bio-sealed bevel
- Built-in biological height
- Zero degree of abutment rotation
- Multiple prosthetic options
- Temporization capabilities

The system includes four different implant geometries to give clinicians maximum flexibility in treating different anatomical situations. These geometries are:

- Screw cylindrical implants (with self-tapping threads)
Root-form implants (with self-tapping threads)

Press-fit cylindrical implants

Screw-line implants

All of the platforms are identical and, hence, all components are interchangeable. All surgical and prosthetic components are color coded. All the designs also include a 1.5 mm polished collar that allows for good biological height yet ensures a shallow emergence. The shallow profile makes for easy restorative management with little or no sulcus collapse and superb esthetic results. Immediately apical to the polished collar is a textured, machine-finished, 45-degree bevel that is 0.5 mm tall. This Bioseal Bevel™ ensures that the region of osseointegration is securely sealed even if the bony channel is slightly eccentric.

Below the bevel, the screw cylindrical, screw-line and root-form implants have a blasted acid-etched Promote™ surface that appears to foster rapid osseointegration by means of the uptake of blood cells immediately onto the implant surface. The press-fit cylinders have a traditional titanium, plasma-sprayed (TPS) surface.

To prevent rotation and micro-movement, the Camlog implants incorporate a three-position lock with intimate engagement of the Camlog cams. This connection results in the smallest degree of rotation of any two-part system on the market. The walls of the cams are parallel and are 1.2 mm in depth, rather than rounded, producing a form/base connection. The depth of the internal tube is 5.4 mm, giving the abutment extraordinary strength and stability. The cams also allow angled abutments to be placed with extreme precision. The rotational stability eliminates micro-movement of prosthetic components and, therefore, eliminates the risk of screw loosening.

The Camlog root-form implant allows for immediate prosthetic loading. The tapered shape fits precisely into extraction sites and accommodates adjacent convergent roots or concavities on the adjacent labial/buccal bone. The impression for the final fabrication of the prosthesis can be taken at the time of surgery, to provide outstanding treatment options.

Whether the implant is to be immediately loaded or has already
Figures 6A, B: 5.0 mm x 16 mm Camlog root-form implant was removed from sterile package and inserted into receptor site.

Figure 7: Postoperative panoramic radiograph demonstrating position of 5.0 mm x 16 mm Camlog root-form implant.

Figure 8: Clinical view with immediate post-surgical transitional prosthesis in place.

Figure 9A: View of internal aspect of Camlog implant at four months post-insertion.

Figure 9B: Occlusal view of impression post in position.

Figure 10A: Clinical view of try-in of impression tray.

Figure 10B: Impression tray and material in oral cavity.

Figure 10C: .050 wrench removing impression post screw from assembly.

Figures 11A, B: Soft-tissue master model.

Figures 12A, B: Completed porcelain-fused-to-metal individual crowns.

Figure 13: View of internal aspect of Camlog implant with surrounding healthy soft tissue of gingival sulcus.

Figure 14: Clinical occlusal view of individual crowns cemented into position.
Figure 15: Clinical view of facial aspect of final prosthesis.

Figure 16: Final panoramic radiograph with prosthesis in position.

Figure 17: Preoperative panoramic radiograph.

Figure 18: 2.0 mm pilot drill in position.

Figure 19A: 3.8 mm x 13 mm (yellow) form drill as it creates final preparation of length and diameter of receptor site.

Figure 19B: 3.8 mm thread cutter is ready to complete threading process at speed not to exceed 50 RPM's.

Figure 20A: Final osseous receptor site.

Figure 20B: Camlog 3.8 mm x 13 mm (yellow) Smart Pac with implant, mounted placement head and blue handgrip.

Figure 21: Implant and handgrip in final position in mouth.

Figure 22: Postoperative panoramic radiograph demonstrating implant in maxillary left first bicuspid position.

Figure 23: Parallel wall cylinder 3.8 mm x 4.0 mm healing abutment in position, following recontouring of soft tissue with electrosurgical loop at Stage II.

Figure 24A: Panoramic radiograph and clinical view of final prosthesis.

Figure 24B: Preoperative clinical view of left posterior edentulous maxilla.

Figure 25: Preoperative panoramic radiograph showing edentulous posterior left maxillary area.
Case I

The 71-year-old female patient sustained a fracture of the maxillary right second bicuspid. The tooth was considered non-restorable. Her past medical history was essentially non-contributory. The treatment plan recommended to this patient consisted of extraction followed by immediate placement of an implant and a provisional prosthesis (Figures 1-2B).

The procedure was carried out under intravenous sedation and local anesthesia. The tooth was surgically removed in an atraumatic fashion, without any loss of adjacent hard or soft tissue (Figures 3-4A). A Camlog root-form implant, 5.0 mm wide by 16 mm long, was placed using the standard surgical protocol. Once the implant was in its final position, a standard cylinder (parallel-walled) healing abutment (5.0 mm x 4.0 mm) was placed instead of the standard surgical healing screw (Figures 4B-7). A temporary heat-processed provisional prosthesis was placed immediately postoperatively (Figure 8). Four months later, the final porcelain-fused-to-gold individual crown was cemented in place on a standard Camlog abutment, using Improv cement (Figures 9-16).

Case II

The 47-year-old female originally presented with three retained deciduous teeth. She first chose to have the two that were located in the right maxilla extracted and restored with root-form endosteal implants. Very pleased with those results, she then chose to move...
Figure 26B: Surgical template on diagnostic model.

Figure 26C: Surgical template in position over edentulous left maxilla.

Figure 27A: Mucoperiosteal flaps are reflected to expose surgical site. 3.0 mm silk suture is used to maintain palatal flap and is tied cross-arch to residual dentition.

Figure 27B: 2.0 mm pilot drill passing through surgical template to mark proper position for most-anterior implant receptor site.

Figure 27C: Clinical view demonstrates several of pilot holes once surgical template is removed.

Figure 28A: 5.0 mm x 13mm (blue) shape drill is used to complete posterior osseous receptor site.

Figure 28B: All four osseous implant-receptor sites have been created.

Figure 29A: 5.0 mm x 13mm (blue) root-form implant is ready for insertion in left posterior maxilla.

Figure 29B: All four implants in final position in left maxilla.

Figure 30A: Final four implants in position with mounted placement heads removed.

Figure 30B: Color-coated sealing screws in place in each implant: yellow (3.8 mm), red (4.3 mm) and blue (5.0 mm).

Figure 31: Mucoperiosteal flaps have been repositioned and sutured with 4-0 chromic interrupted sutures.

Figure 32: Immediate postsurgical panoramic radiograph showing position of four root-form implants.

Figure 33A: Four-month post-implant-insertion appearance of healed soft tissues.

Figure 33B: Crestal incision made at Stage II to expose implants (mirror view).
Figure 34: All four implants are exposed. Notice scalloped palatal tissue created with electrosurgical loop to improve soft-tissue architecture.

Figure 35A: .050 mm wrench engaging a 4.3 mm wide-body, tapered, second-stage healing screw.

Figure 35B: All four healing abutments are in position, and soft tissue is sutured.

Figure 36: Articulated model.

Figure 37A: Soft-tissue master laboratory model with root-form implant analogs in position.

Figure 37B: Camlog standard abutments in position on master model.

Figures 38A,B: Prepared abutments on model and articulator.

Figures 39A,B,C: Prepared labial/buccal surfaces and castings of four individual crowns.

Figure 40: Final individual crowns cemented over implant abutments.

Figure 41: Final panoramic radiograph of completed case.
This procedure was carried out under intravenous sedation and local block and infiltration anesthesia. The deciduous tooth was surgically removed, with good preservation of the surrounding hard and soft tissue. A Camlog root-form implant, 3.8 mm wide by 13 mm long, was placed using the standard surgical protocol (Figures 18-22). The patient did not desire a temporary prosthesis.

Four months later, second-stage surgery was carried out using a standard 3.8 mm x 2.0 mm cylindrical healing abutment (Figure 23). Subsequently, the patient was restored with a porcelain-fused-to-gold crown, which was secured with resin cement on a standard Camlog abutment (Figure 24).

**Case III**

The 79-year-old male patient had functioned for some time with a maxillary removable partial denture that supplied him with replacement of his posterior left dentition. He chose to continue using this when he had the right mandibular posterior region restored with root-form implants. The results of that reconstruction were so satisfactory that the patient decided to replace his partial denture with four Camlog root-form implants and a tooth-for-tooth prosthetic restoration (Figure 25).

Under intravenous sedation and local block and infiltration anesthesia, four Camlog root-form implants were placed using the standard surgical protocol (Figures 26-31). The sizes of the implants were, from anterior to posterior, 3.8 x 16 mm, 3.8 x 16 mm, 4.3 x 16 mm, and 5.0 x 16 mm (Figure 32). Because the patient chose not to have a provisional prosthesis fabricated, the case was carried out as a classic two-stage procedure.

The second stage was carried out four months after implant placement under local infiltration anesthesia. The palatal soft tissue was sculptured, using an electrosurgical loop to create a more favorable soft-tissue architecture. The Camlog wide-body, tapered, second-stage healing abutments (all 4.0 mm in length) were placed (Figures 33-35). Final impressions were obtained two weeks after Stage II, and four porcelain-fused-to-metal crowns were fabricated on three of the implants (Figures 36-39). An all-gold crown was used on the most distal implant. The crowns were cemented individually over Camlog standard abutments (Figures 40-41).

**Summary**

My experience with the Camlog implant system to date has been overwhelmingly successful. Two hundred and seven implants have been placed in a total of 86 patients, 36 male and 50 female. Eighty-five were extraction, immediate implant placement, and 122 were non-extraction, with 159 of those implants receiving some form of augmentation bone grafting and 48 no grafting procedure. Sixty-four of the implants placed were single-tooth indications. Only one failure implant in this series occurred in a seven-implant maxillary reconstruction with no negative outcome.

In reviewing outcomes, Dr. Kirsch reports outstanding clinical results with Kaplan-Meir statistical analysis six-year success rates in excess of 99% in the maxilla and five-year success rates in excess of 97% in the mandible. When all cases are combined, maxilla-mandible, anterior and posterior aspect of the oral cavity, the success rate exceeds 98%.

I would like to thank Drs. Evan Telelman, Richard Streem and Gary Resnik for the prosthetic reconstruction on Cases I, II and III, respectively.

**REFERENCES**

Role of Computerized Tomography in Management of Impacted Mandibular Third Molars

Thomas B. Dodson, D.M.D., M.P.H.

Abstract

Nerve injury following mandibular third molar (M3) removal is a rare but serious complication. The purpose of this article is to review the role of currently available imaging technologies to facilitate clinical decision-making in the setting of M3 surgery. Given findings suggestive of high risk for inferior alveolar nerve (IAN) injury, the clinician should consider additional imaging to assess better the anatomic relationship of the IAN and M3.

The OPERATIVE MANAGEMENT of impacted third molars (M3s) is a predictable procedure characterized by minimal morbidity. Injuries to the trigeminal nerve, that is, lingual or inferior alveolar nerve (IAN), are uncommon but serious complications of M3 surgery. Anatomy is destiny. Trigeminal nerve injury following M3 surgery is frequently the direct result of an intimate anatomic relationship between the nerve and the impacted M3.

Currently, there are no predictable ways to assess, preoperatively, the relationship of the lingual nerve to the impacted M3. Prevention of lingual nerve injuries is a function of careful operative technique, for example, incision placement, avoiding perforation of the lingual plate with a bur and limiting the soft tissue dissection of the lingual soft tissue.

The anatomic relationship of the IAN canal and the M3 can be ascertained preoperatively with readily available imaging techniques. The purpose of this article is to review briefly imaging technology to facilitate clinical decision-making in treatment planning M3 surgery. The two specific aims of this article are: 1. to review the role of the panoramic radiograph to assess IAN injury risk; and 2. to demonstrate the role of computerized tomography (CT) in the setting of M3 surgery given high-risk findings on panoramic imaging.

The IAN canal can be readily visualized using panoramic radiographs. Rood, et al. reported on radiographic findings associated with an increased risk for IAN injury. These findings include superimposition of the IAN canal and the M3 with narrowing of the IAN canal, darkening of the M3 root, diversion of the IAN canal or loss of the white cortical outline(s) of the IAN canal. When one or more of these findings are present, the risk of IAN injury ranges from 1.4% to 12%, with the baseline risk of IAN injury averaging about 1%. If one or more high-risk radiographic findings are evident on a panoramic radiograph, there may be a role for additional imaging to ascertain better the anatomic relationship of the IAN canal and the impacted M3. Suggested imaging alternatives include periapical films or tomography. Conversely, absent any of the radiographic signs noted above, the risk of IAN injury is very low (<1%). Additional imaging studies beyond the panoramic radiograph are of little incremental value. If one or more high-risk radiographic findings are evident on a panoramic radiograph, there may be a role for additional imaging to ascertain
better the anatomic relationship of the IAN canal and the impacted M3. Suggested imaging alternatives include periapical films or tomography.

Given high-risk findings on panoramic imaging, CT radiography is my preferred imaging choice. CT imaging is readily available; the images can be reformatted in multiple planes of space, for example, axial, sagittal and coronal; and they consistently demonstrate the anatomic relationship of the IAN canal and M3. When indicated, the information provided by CT imaging is invaluable for making decisions regarding M3 management, that is, operative or nonoperative (see Cases Two and Three below), or planning the operation to decrease the risk of inadvertent IAN injury (see Cases One and Two below).

**Case One**

The patient was a 24-year-old female who presented for evaluation of her impacted teeth. She had a history of intermittent pain associated with her M3s. There was moderate pericoronal inflammation associated with the lower left M3. The lower right M3 was unerupted, but could easily be probed with a periodontal probe.

On panoramic radiograph (Figure 1), there was superimposition of the IAN canal and the mandibular right M3, with loss of the white cortical margins of the IAN canal. To ascertain better the relationship between the IAN canal and M3, the patient was scheduled for CT imaging, with the images reformatted to be compatible with Simplant® (Materialise, Inc, Glen Burnie, MD), one of several commercially available interactive software programs for viewing CT images.

Figure 2 demonstrates the reformatted CT images with the IAN passing to the buccal of the mandibular right M3 root apex. The IAN canal is clearly separate and distinct from the roots of the M3 and, as such, the risk for IAN injury is low. Intraoperatively, following M3 removal, the IAN was not visualized. Postoperatively, the patient's neurosensory examination was normal.

**Case Two**

The patient was a 22-year-old female who presented for evaluation of her impacted M3s. She had no complaints regarding her M3s. The mandibular left M3 was partially erupted and associated with mildly inflamed pericoronal tissues. The mandibular right M3 was unerupted and could not be probed with a periodontal probe.

On panoramic radiograph, the mandibular left M3 had no positive radiographic high-risk finding, suggesting an increased risk for IAN injury following M3 extraction. The mandibular right M3 demonstrated superimposition of the IAN canal and M3 root and darkening of the root where it was crossed by the IAN canal (Figure 3).

The patient was referred for CT imaging, and the images were reformatted to be compatible with an interactive CT image-viewing program (Simplant®, Materialise, Inc., Glen Burnie, MD). In the CT images
(Figure 4), the IAN canal is adjacent to the lingual aspect of the M3 root surface with no clear distinction between the cortical margin of the canal and the root surface. Based on the history and physical and radiographic findings, I recommended that the mandibular left M3 be removed and the mandibular right M3 be monitored.

To date, the mandibular right M3 continues to be asymptomatic by history and physical and radiographic examinations, and there are no abnormal signs noted on physical or radiographic examination.

**Case Three**

The patient was a 26-year-old female who presented for evaluation of her M3s. She had no complaints regarding her M3s. On physical examination, none of the M3s was erupted. The mandibular right M3 could be probed with a periodontal probe, but the left mandibular M3 could not be probed.

On panoramic radiographic examination (Figures 5 and 6), both mandibular M3s had radiographic findings associated with an increased risk for IAN injury following M3 removal. There was superimposition of the IAN canal and M3 roots, darkening of the roots where the IAN canal crossed and narrowing of the canal bilaterally.

To further assess the risk for IAN injury, the patient was scheduled for CT imaging with coronal and sagittal reformatting of the axial images. Figure 7 is an axial CT view demonstrating the IAN canal passing to the buccal of the M3, but there is a concavity in root surface to accommodate IAN canal. On the right side, IAN canal appears to pass through substance of M3.
appears to pass through the substance of the tooth. This observation is confirmed on the coronal (Figure 8) and sagittal views (Figure 9).

Based on the history and physical and radiographic findings, I recommended monitoring the mandibular M3s. In the event the mandibular right M3 needed to be treated operatively, I would recommend a coronectomy.

Discussion
Most patients undergoing M3 surgery do not need, nor would they benefit from, preoperative CT imaging. To obtain CT imaging for every M3 patient would be a wasteful use of resources. Between November 1999 and January 2004, the author ordered CT imaging for 30 subjects (one study every seven weeks). There is, however, a limited, well-defined role for CT imaging of M3s for patients with panoramic radiographic findings suggesting an increased risk for IAN injury following M3 surgery.

When evaluating a patient considered at increased risk for IAN injury based on the panoramic findings, CT imaging is invaluable for planning the operation. If M3 surgery is unavoidable because of symptoms or failure of medical management, CT imaging can demonstrate the location of the IAN canal relative to the M3. This information assists the operator in planning the procedure to minimize the risk of IAN injury. Specifically, if you know the IAN canal is located near the root apex on the lingual aspect of the M3, the operator can quickly and efficiently use a buccal approach, confident that there is little risk to the IAN.

When the patient is completely asymptomatic by history and by physical and radiographic examinations, CT imaging can facilitate decision-making in terms of operative versus nonoperative management of the M3s. If CT imaging suggests a low-risk of IAN injury, for example, anatomic separation of the IAN canal and M3, the patient and clinician may elect to proceed with operative management. If, however, there is high risk for an IAN injury following operative management of the M3, annual monitoring of the M3 by physical and radiographic examinations may be the more prudent clinical decision.

REFERENCES
Orofacial Infections in the 21st Century

Stewart K. Lazow, M.D., D.D.S.

Abstract

In the 21st century, most orofacial infections are routinely managed with proper clinical assessment, selective diagnostic imaging, appropriate antibiotic therapy and timely surgical intervention. A thorough understanding of contemporary microbiology, pharmacology and surgical anatomy will enable the clinician to minimize the morbidity and mortality of orofacial infections.

IN THE 21ST CENTURY, most orofacial infections are managed routinely with proper clinical assessment, selective diagnostic imaging, appropriate antibiotic therapy and timely surgical intervention. These infections rarely develop into life-threatening complications, such as Ludwig's angina, necrotizing fasciitis, mediastinitis, cavernous sinus thrombosis or brain abscess. A thorough understanding of contemporary microbiology, pharmacology and surgical anatomy will enable the clinician to minimize the morbidity and mortality of orofacial infections.

Microbiology

With the advent of more sophisticated anaerobic culture techniques, we now know that most orofacial infections are polymicrobial synergistic aerobic and obligate anaerobic pathogenic processes. In one study of 27 dentoalveolar abscess specimens obtained by sterile extraoral aspiration, only three (11%) contained solely aerobic bacteria and seven (26%) solely anaerobic bacteria, whereas 15 (56%) yielded combined aerobic/anaerobic bacteria, while in two (7%), no organisms were seen.1

It is currently thought that most odontogenic infections initially present as a cellulitis caused by aerobic bacteria. The cellulitis, if untreated, produces a hypoxic, acidic environment favoring anaerobic ingrowth. As the infection becomes more severe, a mixed flora of aerobic/anaerobic bacteria proliferates. The anaerobic bacteria produce various proteolytic enzymes, endotoxins and exotoxins, with resultant tissue degradation, combined with the ingress of white blood cells, to lead to abscess formation and pus. Ultimately, if the host defense mechanisms are successful in containing the infection as a well-circumscribed abscess, only anaerobic bacteria survive in this milieu.

The early component of orofacial infections consists predominantly of aerobic gram+ cocci, such as the α-hemolytic Streptococcus viridans group—often implicated in subacute bacterial endocarditis—and the Streptococcus milleri group—often implicated in dental abscesses. Recently, Streptococcus pyogenes, a β-hemolytic streptococcus, has gained notoriety as the “flesh-eating streptococcus” in necrotizing fasciitis. Staphylococcus aureus is implicated in toxic shock, endocarditis in intravenous drug abusers, chronic osteomyelitis, postoperative wound infections and acute parotitis. Haemophilus influenza, an aerobic gram- bacillus, is found in acute sinusitis and otogenic infections.

The subsequent anaerobic component of orofacial infections includes anaerobic gram+ cocci, which have been reclassified as the Peptostreptococcus species, and anaerobic gram- rods, such as the Bacteroides and Fusobacterium species. To further complicate matters, the Bacteroides species has been reclassified into two separate taxonomic genera, Porphyromonas and Prevotella. The mixed aerobic/anaerobic combination of Streptococcus milleri and Fusobacterium has been implicated in severe lateral and retropharyngeal descending infections.
**Antibiotic Therapy**

Appropriate antibiotic strategy must now take into account an understanding of the microbiology and timing of the infection, antibiotic resistance, patient compliance and cost. As mentioned above, early outpatient pharmacologic management of orofacial, specifically odontogenic, infections must be directed at aerobic streptococcal pathogens. Since their clinical introduction in 1941, the penicillins have remained the most widely prescribed class of antibiotics. Fortunately, the reported penicillin-resistance rate among outpatient odontogenic infections remains low (6%-12%). In penicillin-allergic patients, erythromycin and the newer macrolide antibiotics, such as clarithromycin and azithromycin, may be substituted. Cephalosporins, such as the first generation cephalaxin or second generation cefaclor, are another reasonable alternative. However, the 10% cross-allergenicity between the cephalosporins and the penicillins must be considered.

In chronic or severe infection, coverage must be directed against anaerobic gram- rods, which are often penicillin resistant (25%-60%). Clindamycin is the empiric antibiotic of choice to cover both streptococcus and anaerobes. Metronidazole is also an excellent choice against anaerobes, in combination with ampicillin versus oral streptococci. Metronidazole remains the drug of choice to treat antibiotic-associated pseudomembranous colitis caused by Clostridium difficile.

Other empirical antibiotic choices of this author include amoxicillin/clavulanate for sinusitis, sialadenitis, and animal or human bites. The fluoroquinolones, such as the original ciprofloxacin or newer once-a-day dosing derivatives, provide excellent coverage against staphylococcal wound infection or osteomyelitis. Fluconazole and ketoconazole are good antifungal agents.

Certainly, antibiotic management of persistent outpatient odontogenic infections or more major inpatient orofacial infections must be tailored to culture and sensitivity reports. Infectious disease consultation may be appropriate prior to initiating intravenous aminoglycosides, vancomycin, imipenem, etc.

**Radiology**

Diagnostic imaging has assumed a prominent role in the management of orofacial infections. Current armamentarium includes plain films, ultrasound, CT scan, MR imaging and radionuclide scanning. The information gleaned from these modalities is essential in accurately delineating the anatomic extent of the infectious process, demonstrating fluid collections to be drained, assessing airway patency and evaluating involvement of contiguous vital structures. Simply stated, plain radiographs are more than adequate to assess the vast majority of odontogenic infections. MR imaging, ultrasound and radionuclide scanning are worthwhile adjuvant modalities for select cases. Contrast-enhanced CT remains the gold standard for diagnosing major orofacial infections. Examples will be shown below.

**Surgical Management**

This section will attempt to provide an overview of the pertinent anatomy, likely etiology and surgical approach (Figure 1) for definitive drainage of orofacial, deep, fascial space infections. The reader is referred to the classic works of Grodinsky and Holyoke (1938) or Hollinshead (1968) on the deep fascial spaces of the head and neck (Figure 2). The ominous quintet of life-threatening complications of orofacial infections include Ludwig’s angina, cervicofacial necrotizing fasciitis, descending necrotizing mediastinitis, cavernous sinus thrombosis and brain abscess. Although rare, the
morbidity and mortality of these five infections remain significant even in the 21st century.

Clinically, airway evaluation and management is the priority in treatment of deep fascial space infections of the head and neck. The timing of surgical drainage of orofacial infections is controversial even among oral and maxillofacial surgeons. Some clinicians claim that these infections should be treated expectantly with antibiotics until frank pus is detected or there is evidence of rapid deterioration. It is the experience of this author and most colleagues that securing the airway, definitive drainage of all involved spaces and removal of the offending etiology are best accomplished as soon as possible. Hospitalization is certainly indicated if the orofacial infection patient presents with airway compromise (difficulty breathing, swallowing, voice changes, handling secretions), fever >102°F, leukocytosis, dehydration, need for sophisticated imaging or monitoring, or need for inpatient management of systemic disease.

Ludwig’s angina is classically described as a brawny cervicofacial cellulitis with elevation of the floor of the mouth involving five fascial spaces, including bilateral submandibular, bilateral sublingual and the submental space (Figure 3). Airway obstruction and overwhelming sepsis were the causes of a 40% to 50% mortality in the preantibiotic era. In the 1940s Dr. Walter Guralnick of Massachusetts General Hospital used a protocol of immediate airway control, aggressive early surgery and penicillin to decrease the mortality rate to 10%.

Current diagnostic management of Ludwig’s angina includes prompt clinical evaluation and CT scan of the neck (if tolerated) to determine airway patency or deviation and fluid collections. The airway must be secured in a controlled operating room setting, which may necessitate nasal intubation via fiberoptic laryngoscopy or tracheotomy. Bilateral extraoral submandibular incisions and a midline submental incision are connected with through and through drains to insure adequate drainage of all five involved spaces. High-dose penicillin or clindamycin is started empirically until definitive culture and sensitivity reports are available.

Cervicofacial necrotizing fasciitis (CFNF) is a fulminant bacterial infection that causes necrosis of the fascial planes superficial and deep to the platysma muscle, along with concurrent systemic toxicity leading to a 30% mortality rate, even in the antibiotic era. Necrotizing fasciitis was first described in 1871 by Joseph Jones, a Confederate Army surgeon who referenced more than 2,600 cases of “hospital gangrene” with a 46% mortality rate. Most commonly, necrotizing fasciitis presents in the extremities, trunk and perineum; the head and neck account for only 3% to 4% of all cases.

The original etiology is usually minor trauma in 75% of cases, with only 25% of odontogenic or peritonsillar origin. Predisposing concomitant medical conditions include diabetes mellitus, obesity, malnutrition, alcoholism and chronic renal failure. CFNF is not age specific, and there is no race or sex predilection.

The pathognomonic sign of CFNF is a dusky discoloration of the skin with small, ill-defined purplish patches. Crepitation may
be palpable, caused by the presence of subcutaneous gas in over one-third of cases as seen on CT scan (Figure 4). Untreated, the infection progresses to frank cutaneous gangrene that forms a superficial slough, beneath which can be seen fat liquefaction and necrosis of the fascia. The patient decompensates in remarkably rapid fashion with fever, weakness, apathy, confusion, leukocytosis, anemia and hypocalcemia. The microbiologic composition of CFNF includes Streptococcus pyogenes or Staphylococcus aureus, often in synergy with an obligate anaerobe.

Successful treatment demands early recognition, prompt airway management, aggressive surgical debridement, appropriate intravenous antibiotics, supportive intensive care and, possibly, hyperbaric oxygen. The initial debridement often extends well beyond the gross limits of CFNF to healthy, bleeding tissue. This often necessitates an apron neck incision with “bear claw” fasciotomy incisions. The hallmark of CFNF is the ease with which blunt finger dissection passes along the involved fascial sheath through gray, foul-smelling “dishwater” exudate well beyond the skin demarcation. The wound is packed open; multiple secondary debridements are the rule. Ultimately, skin grafts or flap reconstruction is undertaken. Grave complications include internal jugular vein thrombosis, carotid artery erosion and disseminated intravascular coagulation. Death results from overwhelming sepsis and multi-organ failure.

Mediastinitis is a life-threatening infection involving the

Figure 4. Axial CT scan of fulminant CFNF. Note subcutaneous gas.
best accomplished via a vertical neck incision as described by Mosher at the anterior border of the sternocleidomastoid muscle. This incision may be extended across the midline over the suprasternal notch to allow for transcervical blunt finger dissection of the anterior, superior mediastinum. Most thoracic surgeons agree with Estrera, who recommended formal posterolateral thoracotomy if the mediastinitis spreads inferior to the carina anteriorly or the fourth thoracic vertebra posteriorly. DNM retains a 30% to 40% mortality rate. Grave comorbidities include pleural and pericardial effusions, pyopneumothorax, thoracic empyema, pericarditis, vena cava compression, cardiac tamponade, great vessel rupture, bronchial erosion, esophageal rupture and multisystem organ failure.

The two most dreaded intracranial complications of orofacial infection are cavernous sinus thrombosis (CST) and brain abscess. It is well documented that odontogenic infections may spread to the cavernous sinus via an anterior and posterior pathway. The anterior route involves a retrograde septic thrombophlebitis of the valveless veins coursing through the infraorbital (canine) space from the angular vein to the inferior ophthalmic vein through the inferior orbital fissure into the cavernous sinus. The posterior route involves buccal or infratemporal space infections (maxillary molars) that may pass via emissary veins from the pterygoid venous plexus to the inferior petrosal sinus into the cavernous sinus.

The patient with CST may present with fever, headache, nausea, vomiting, supraorbital paresthesia, ophthalmoplegia, proptosis, chemosis, photophobia and eye pain. Classically, the abducens nerve VI is the first cranial nerve affected. Swift, definitive drainage of the infraorbital or infratemporal spaces and treatment of the original etiology are essential. High-dose antibiotics that cross the blood brain barrier, such as third generation cephalosporins, nafcillin, or chloramphenicol, are indicated. Steroids and anticoagulation remain controversial.

It is postulated that only 1% to 2% of all brain abscesses are of documented dental origin. Pathogens can reach the brain by hematogenous spread or by direct extension from contiguous spaces. Most brain abscesses are rhinogenic by direct extension from the paranasal sinuses to the frontal lobe or otogenic from the middle ear and mastoids to the temporal lobe. Postmortem examinations have revealed multiple routes of orofacial infection along fascial planes to the cranial base. These include: mandibular molar infections along cranial nerve V3 through the foramen ovale to the temporal lobe, maxillary molar infections through the maxillary sinus into the orbit and onto the frontal lobe, and mandibular

**Figure 5.** PA chest radiograph of DNM. Note widened mediastinum and right pleural effusion.

connective mediastinal tissue that fills the interpleural space and surrounds the median thoracic organs. The most lethal form of mediastinitis, with a 40% mortality rate, is descending necrotizing mediastinitis (DNM). Delay in diagnosis, reported to average over two days after initial presentation, contributes to the high mortality rate. The descending infection spreads from an oropharyngeal source, either odontogenic or peritonsillar, through the retropharyngeal space into the danger space (space 4 of Grodinsky and Holyoke) between the alar and prevertebral fascia to gain access to the posterior mediastinum. This necrotizing infection is often polymicrobial and gas producing; streptococcus and fusobacterium have been implicated.

DNM is predominantly a disease of healthy young men. The patient with DNM presents with high fever, tachycardia, tachypnea, hypotension and leukocytosis. Pleuritic chest pain, dyspnea and retrosternal discomfort may be elicited from the patient. Brawny induration of the neck and chest may be visible and crepitus may be palpable. The chest radiograph (Figure 5) will typically show widening of the mediastinum, pneumomediastinum, pleural effusion, and obliteration of the retrosternal or retrocardiac clarity. CT scan of the neck and chest may reveal a widened retropharyngeal space, mediastinal fluid collections, with or without gas bubbles, pericardial effusion and empyema.

Treatment of DNM is based on early recognition, prompt airway control, aggressive surgical intervention, appropriate antibiotics, intensive supportive care and, possibly, hyperbaric oxygen. Definitive surgical drainage of the retropharyngeal component is
REFERENCES

Figure 6. Gadolinium-contrast, T1-weighted MRI of brain abscess. Note ring enhancement of abscess capsule.

molar infections involving the submasseteric space to the infratemporal space through the temporal bone via emissary veins to the temporal lobe.

The classic triad of brain abscess symptoms includes fever, headache and focal neurological deficits. Contrast-enhanced CT scan shows the typical well-demarcated ring enhancement of the abscess capsule. Gadolinium-enhanced, T1-weighted MRI highlights the classic ring in the mature abscess (Figure 6). The microbiology of the brain abscess is consistent with the primary focus—sinus, otogenic or odontogenic.

Treatment of brain abscess requires a combination of surgery and antibiotic therapy with suitable penetrability as discussed above. Surgical options include aspiration or excision. Repeated aspiration, possibly stereotactically guided, may be necessary prior to resolution of the abscess. Excision of the lesion may result in more rapid resolution but may cause more residual neurologic deficits. Mortality rates persist at upwards of 20%.

Conclusion
The vast majority of orofacial infections are rather routine, relatively benign and easily treated by all dental practitioners. When confronted with deep fascial space infections of the head and neck, proper clinical assessment, selective diagnostic imaging, appropriate antibiotic therapy, prompt airway control and timely surgical intervention are of paramount importance to avoid the rare but life-threatening quintet of complications discussed above.
BY MID-WAY THROUGH THE 1960s, the American specialty of oral surgery lay, by many accounts, dead in the water. Indeed, it had established its expertise in exodontia, had demonstrated in two major military conflicts its predominance in the management of facial fractures, had contributed significantly to the literature of orofacial infections and had established its preeminence in the delivery of outpatient general anesthesia. But, by then, from all quarters, the specialty had become besieged professionally, politically and administratively. It was inhibited from making skin incisions in many parts of the nation, and from managing midface injuries in most; obtaining its own grafts was disallowed; dual admission protocols for its inpatients were mandated; and whatever gains it had achieved in the management of clefts in previous decades had been lost. Training rotations on anesthesia services occurred regionally and only rarely, and on general surgery or medical services chiefly in the minds of imaginative mentors. Only a few of our training centers dealt comprehensively with maxillofacial trauma, the temporomandibular joint, clefts or malignant disease; and our correction of maxillo-mandibular imbalance dealt almost exclusively with mandibular “progs.” “Orthodontic surgery” and “orthognathics” were terms foreign to our lexicon.

Beginnings and Clinical Impact
In mid-June 1966, Hugo Obwegeser, in his first American lectures, set a charge to events that would change all that hampered oral surgery and transform the American specialty forever. In a few short days of spectacular lectures, films and commentaries at the Walter Reed Army Medical Center, Dr. Obwegeser demonstrated his vast experience with an array of surgical procedures about which his American audience had never dreamed.

He demonstrated that these procedures were within the scope of dentistry and oral surgery and beyond the ken and interest or molestation of other surgical specialties; and, perhaps most importantly, he inspired and encouraged his audiences to believe that his experience could be their experiences, that anything he had done they could do. Time magazine (July 1, 1966) commented:

“….last week, 500 of the most eminent U.S. oral surgeons sat on the edges of their chairs at Washington’s Walter Reed Army Medical Center as a respected Swiss practitioner described his radical jaw-splitting procedures...American oral surgeons have never been so impressed....”

Memorably, Dr. Obwegeser brought orthodontic surgery into common parlance and practice (orthognathic was a later, American modification). Certainly the single most impressive procedure introduced at that time, and the one within orthognathic surgery by which Dr. Obwegeser even today is most readily recognized, was the bilateral sagittal ramus osteotomy, the venerable sagittal split. Dr. Obwegeser was not the first person to propose approaching the ramus in sagittal fashion, but, in his writings of 1957 and his lectures in 1966, he did demonstrate his particular technique, the
most effective refinement of this entirely intraoral advance. While Dr. Obwegeser emphasized the versatility of his procedure as being its chief attribute, his American audience saw its intraoral approach as the major attraction in avoiding scars and keeping the surgery within confines into which competing surgeons often feared to tread.

But Dr. Obwegeser’s contributions in orthognathics went far beyond a single procedure. He taught his American colleagues the exciting gains to be achieved with maxillary surgery and with moving individual segments of either arch; and he stressed the need for strong union and cooperation with the specialty of orthodontics.

The Washington lectures also enormously expanded American perspectives in the domains of pre-prosthetic surgery. Dr. Obwegeser outlined a scheme of soft-tissue manipulations and hard-tissue augmentations designed to provide foundations for prosthetic reconstruction that theretofore had remained foreign to American surgeons. These efforts drew on the experiences of continental surgeons, derived from two world wars, and demonstrated the efficacy of autogenous intraoral bone grafting and split-thickness skin grafting. The former was absolutely taboo in the United States at the time, and the latter a concept generally unrecognized by American oral surgery.

Dr. Obwegeser’s additional emphasis fell on concepts of intraoral reconstruction in general. He described techniques of alveolar cleft obliteration and oro-antro-nasal fistula repair, elements long neglected or inadequately addressed on the American side of the Atlantic. He demonstrated the intraoral removal of even large maxillary and mandibular tumors or segments of necrotic bone, and immediate obliteration of the resultant defects with autogenous hard- and soft-tissue grafts. He taught that most facial fractures could be managed intraorally, but emphasized equally strongly the importance of wound disguise in all extraoral approaches to the face and jaws.

The expansive effects of Dr. Obwegeser’s influence became patent within a decade of his Walter Reed inaugural. If American oral surgery wanted to graft and close alveolar clefts, who cared? No one else was paying much attention to those problems. And if American oral surgeons had the ability to handle and precisely place an intraoral skin graft, perhaps they also had sufficient skill to handle the harvesting of the graft. If the oral surgeon had the knowledge and ability to electively section and reposition a maxilla into a more esthetically and functionally desirable relationship, did the surgeon not also have the skill to resect those same parts in cases of neoplastic disease or infection? These observations in the eyes of fair-minded observers allowed the American specialty to advance into the fields of ablative, cleft and elective, reconstructive maxillofacial surgery.

### Educational Influences

Hugo Obwegeser accepted his first American oral surgical trainee in 1965, a year before his Walter Reed exposure. He subsequently designed a program of formal training for Army oral surgeons, accepted legions of American specialty members for short-time visits, and embarked on frequent return visits to the United States to serve as featured speaker in dozens of regional and national forums.

His relationship with American oral surgery was symbiotic: His celebration in the United States became recognized worldwide, not only in oral surgery circles but in those of otolaryngology and plastic surgery, as well; soon he was lecturing around the globe in the corridors of every surgical specialty. The explosion in American clinical experience evoked by Dr. Obwegeser’s teachings provided an impetus to American clinical and bench investigation previously unimagined; extensive vascular studies on surgerized jaw segments, investigation of new methods of segment fixation, increasing sophistication in patient diagnosis and evaluation, long-term postoperative stability studies, and an expansion of interest into soft tissue considerations in maxillofacial reconstruction all reflected Dr. Obwegeser’s inspiration.

By the 1980s, paradoxically, American investigative efforts in the surgeries spawned in Europe far surpassed anything achieved there previously.

### Organizational Influences

Dr. Obwegeser’s educational contributions in the United States were paralleled by his organizational achievements on his own ground. In 1970, he was the prime mover in bringing the disparate voices of the European specialty together in founding the European Association of Maxillofacial Surgeons (now the European Association for Craniomaxillofacial Surgery), and its Journal of Maxillofacial Surgery, which he led as first editor. Considering the general histories of the European nations and their individual surgical heritages, these organizational undertakings called for great fortitude and resolve—and foresight as well, as best manifested by Dr. Obwegeser’s insistence that the scientific meeting of the EAMFS be taken to Warsaw in 1980, anticipating the collapse of the Berlin Wall and the Iron Curtain by almost a decade.

Such accomplishments are not gained without force of will, and Dr. Obwegeser’s initiatives and intense defense of his positions and philosophies have not left him beyond controversy. His mandate of the dual degree fundament for membership in the EAMFS brought fire from his European confreres with only single medical or dental degrees. It also frustrated many in the American community, who were woefully unfamiliar with European educational circumstances and who misinterpreted his intentions.
A MAN OF ENERGY AND INDEPENDENCE

HUGO OBWEGESER, the icon, remains today an example of the complete professional man. The energies that carried him from simple Alpine beginnings through his early stringent and self-sacrificing days of professional life following the Second World War, and then through the halcyon days of his extraordinary clinical and educational career, support him still in his afterglow activities. Now in his 80s, he remains an active hunter and outdoorsman, a dedicated internationalist, a congenial bon vivant in any social group, but always a man ready to wrestle intellectually with any challenger in matters of surgery or specialty education.

Beyond his early years, he was not a researcher, but he has always registered strong support for hard scientific investigation. He remains consistently “his own man,” but, on demand, can become the astute politician and effective organizational animal. He remains true to his roots, delights in being an excellent family man, but all the time maintains a world view and variegated interests.

Every avenue of endeavor honors its forebears, and Hugo Obwegeser has harvested accolades from surgical groups from every point on the compass. Albeit much belatedly, the American Association of Oral and Maxillofacial Surgeons recognized this giant with honorary membership in 2005. He was not the first influence from abroad to indelibly brand the American specialty—Kazanjian and Thoma are others who come to mind—but his journey to our shores buoyed, and perhaps saved, the American specialty at a time of its great vulnerability.

Hugo Obwegeser was truly the wind beneath our wings. He was and remains, quite manifestly, the most influential oral and maxillofacial surgeon of our time.

Dr. Obwegeser was well aware that dental training was wholly essential to the molding of the competent maxillofacial surgeon, but he was also a product of the medical milieu that had been the spawning ground of maxillofacial surgeons for generations. For Dr. Obwegeser, it was eminently clear that Europeans training in the specialty should have double qualification. As American oral and maxillofacial surgery practice has become broader, his views on medical education have gained validity in the minds of many American educators, so that the medical degree is now incorporated in over 40% of our training programs.

Significance and Stature Today

The magnitude of Dr. Obwegeser’s influence over the years since his appearance at Walter Reed is inestimable. Ironically, though it was his particular corrective procedures—the ramus osteotomies, the segmental movements, the vestibuloplasties—that first captivated his American audience and which since have brought functional and esthetic betterment to thousands of patients, it is these fields of orthognathic and pre-prosthetic surgery that have retreated so markedly in American practice in recent years. The withdrawal of insurance reimbursement has injured the practice of orthognathic surgery mightily, but, if the truth be known, so has the imperfect surgical result that discourages the participating orthodontist.

The incorporation of osseointegrated implants into the rehabilitation of the edentulous ridge has obviated to great degree the need for anatomical restoration of the denture-bearing tissues. Nonetheless, considerations for surgery remain integral to proper treatment planning in the minds of every orthodontic and prosthetic trainee and practitioner. Orthognathic and pre-prosthetic surgical management is demanding in diagnosis, execution and post-surgical care; regretfully, it seems that a significant section of the practicing community, probably as a reflection of society at large, seems less willing to invest the hard work and accept the surgical and legal risks that these intricate operations mandate.

More positively, the influence of Hugo Obwegeser is responsible for the monumental increase in the number of patients treated across the vistas of cleft deformities and major maxillofacial deformities of all kinds, and ablative and reconstructive innovations everywhere in the maxillofacial skeleton. It has empowered the American specialty to add “maxillofacial” to its official designation. Much of what has been gained within the specialty over the last two decades—in understanding the biology of the diseases and abnormalities we treat, in improved medical management, in understanding the intricacies of the temporomandibular joint, in implantology—derives from the energies and intellects of our home-grown leaders. But even these achievements owe at least indirect homage to the professor from Switzerland who excited and inspired us nearly 40 years ago.

Hugo Obwegeser put more American oral surgeons into the operating room than any man before or since, and, through his own efforts and through the encouragement he gave us all, has provided the American specialty the widest pallet of privileges in its history.
Acronyms in Dentistry:
What Do They Mean?

Do you know a CHIP from a WHO? Can you tell the difference between a SNODENT and a SNOMED? If you need help understanding dental-related acronyms, you’ll want to keep this list close at hand.

Andrew G. Vorrasi, D.D.S.

IT’S NOT EASY dealing with the business aspects of dentistry today. Dentists are confronted regularly with new technologies and health information. Increasing governmental regulations challenge office compliance. Patients present with a variety of benefit products. Dentists receive solicitations from marketing and practice management companies, in addition to managed care companies, hoping to enlist the dentist as a partner in assuming the financial risk for the cost of patients’ treatment.

The growth of electronic claims processing has spawned a whole new lexicon. And committees, entities and processes have emerged within the American Dental Association, government and among groups of interested parties in the benefits industry. Every new entity, committee, law, protocol and concept comes to be known by its acronym, a word formed from the first (or first few) letters of a series of words, for example, NYSDA.

The acronyms generated by all of this activity can be intimidating and confusing. Take, for example, the acronym HIPAA, which stands for the Federal Health Insurance Portability and Accountability Act. HIPAA regulations have placed new requirements on offices that use electronic claims processing.

NYSDA’s Council on Dental Benefit Programs sought clarification of the current acronyms used in reports from the ADA Council on Dental Benefits and from the ADA House of Delegates to help NYSDA members stay abreast of today’s issues and the key players in the benefits arena. It turned to Richard Herman, NYSDA’s representative to ADA Council on Dental Benefits, for help in preparing a list of terms in common use in this new environment. We’ve arranged these terms according to the following categories: Committees (interagency, government, ADA); Government; Corporate; and Terminology/Miscellaneous.

Dental Benefit-Related Acronyms
Committees
ACODENIC: Advisory Committee on Dental Electronic Nomenclature, Indexing and Classification. ADA advisory committee.
AHCPR: Agency of Health Care Policy & Research.
AMAP: American Medical Accreditation Program.
ASCX12: Accredited Standards Committee X12. Committee of American National Standards Institute (ANSI). Develops standards for electronic data interchange (EDI); represents more than 300 organizations that can have competing interests.
CRC: Code Revision Committee. Includes equal representation from third-party payers and ADA. Third-party payer organizations represented are: America’s Health Insurance Plans, Blue Cross and Blue Shield Association, Centers for Medicare and
Medicaid Services, Delta Dental Plans Association, National Association of Dental Plans, National Purchaser of Dental Benefits. ADA is represented by six dentists in practice, appointed by ADA President.

**DeCC:** Dental Content Committee. Deliberative body sponsored and chaired by ADA, established in accordance with administrative simplification provisions of Health Insurance Portability and Accountability Act of 1996 (HIPAA) to cooperate in maintenance of standards adopted under HIPAA. Named Designated Standards Maintenance Organization (DSMO) by Secretary of Department of Health and Human Services. Addresses standard transaction content on behalf of dental sector of health care community.

**DBIS:** Dental Benefit Information Service.

**DPPC:** Dental Practice Parameters Committee.

**EHNAC:** Electronic Healthcare Network Accreditation Commission. Will be nationally recognized accreditation authority for entities engaged in e-health activities of electronic health care transactions and management of health care information.

**HCPAC:** Health Care Practitioner Advisory Council. AMA committee.

**HCQA:** Health Care Quality Alliance.

**HISB:** Healthcare Informatics Standards Board. ANSI committee. Provides open, public forum for voluntary coordination of health care informatics standards among all U.S. standard-developing organizations.

**ICG:** Impact Communications Group.

**ISO:** International Standards Organization. World's largest developer of standards. Principal activity is development of technical standards. ISO standards also have important economic and social repercussions. U.S. member of ISO is ANSI.

**JCAHO:** Joint Commission on Accreditation of Healthcare Organizations. Independent, not-for-profit organization established more than 50 years ago. Governed by board of physicians, nurses, consumers. Sets standards by which health care quality is measured in America and around the world.

**NCQA:** National Committee on Quality Assurance. Source for information about quality of nation's managed care plans.

**PEAC:** Practice Expense Advisory Committee.

**RUC:** AMA/Specialty Society Relative Value System Update Committee.

**WEDI:** Workgroup for Electronic Data Interchange. Core purpose is to improve quality of health care through effective and efficient information exchange and management. ADA is WEDI member.

**WEDI SNIP:** Workgroup for Electronic Data Interchange-Strategic National Implementation Process.

**Government**

**CHAMPUS:** Civilian Health and Medical Program of the Uniformed Services.

**CHIP:** Children's Health Insurance Program/Medicare-Medicaid.

**CMS:** Center for Medicare and Medicaid Services (see HCFA).

**DHMOs:** Dental Health Maintenance Organizations.

as DSMOs organizations that agree to maintain standards adopted by the Secretary.

**ERISA**: Employee Retirement Income Security Act.

**FPL**: Federal Poverty Level.

**HCFA**: Health Care Financing Administration’s name was changed in July 2001 to Centers for Medicare and Medicaid Services.

**HHS**: Department of Health and Human Services.

**HIPAA**: Health Insurance Portability and Accountability Act of 1996.

**HIPDB**: Health Integrity & Protection Data Bank. Central repository of information on doctors, dentists and other health care providers. Contains reports on malpractice payments and other adverse actions.

**HRS**: Health Resource & Service Administration.

**NCVHS**: National Committee on Vital and Health Statistics. Serves as statutory public advisory body to Secretary of Health and Human Services in area of health data and statistics.

**NPDB**: National Practitioners Data Bank. (Same entity as HIPDB above.)

**NPRM**: Notice of Proposed Rule Making.

**PARCA**: Patient Access to Responsible Care Act.

**TFD**: TriCare Family Dental Program.

**WHO**: World Health Organization.

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**Corporate**

**ANS**: American National Standards Institute. Has served as administrator and coordinator of U.S. private sector voluntary standardization system for more than 80 years. Facilitates development of American National Standards (ANS) by accrediting procedures of standards developing organizations (SDOs).

**BC/BS**: Blue Cross/Blue Shield Plans.

**BC/BSA**: Blue Cross/Blue Shield Association.

**EOB**: Explanation of Benefits.

**ADRP**: Alliance for Dental Reimbursement Plans. Dedicated to promotion of Direct Reimbursement Dental Plans.

**NADP**: National Association of Dental Plans. Payer group with representation on CRC is nonprofit trade association representing entire dental benefits industry, i.e., dental HMOs, dental PPOs, discount dental plans, dental indemnity products.

**NAIC**: National Association of Insurance Commissioners. Organization of insurance regulators from all states and dependent areas.

**NADF**: National Association of Dental Plans Foundation. (See NADP.)

**NUBC**: National Uniform Billing Committee. Brought together by American Hospital Association (AHA) in 1975. Includes participation of all major national provider and payer organizations. Involved with medical billing forms.

**NUCC**: National Uniform Claim Committee. Created to develop standardized data set for use by non-institutional health care community to transmit claims and encounter information to and from all third-party payers. Chaired by American Medical Association (AMA), with Health Care Financing Administration (HCFA) as critical partner. Committee includes representatives from key provider and payer organizations, standards-setting organizations, state and federal regulators, NUBC.

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**Terminology/Miscellaneous**

**ASO**: Administrative Services Only.

**CQI**: Continuous Quality Improvement.

**DR**: Direct Reimbursement.

**HEDIS**: Health Plan Employer Data & Information Set. Tool created by National Committee for Quality Assurance (NCQA) to collect data about quality of care and services provided by health plans.

**LEAT**: Least Expensive Alternative Treatment.

**POS**: Point of Service Plans.

**PRO**: Peer Review Organizations.

**QA**: Quality Assessment.

**QI**: Quality Improvement.

**SNODENT**: Systematized Nomenclature of Dentistry.

**SNOMED**: Systematized Nomenclature of Medicine.

**TPA**: Third Party Administrator.

**UR**: Utilization Review.

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Dr. Vorvius is chairman of the NYSDA Council on Dental Benefit Programs.
A Residency Made Me a Better Dentist

Imposing a residency requirement on applicants for dental licenses in New York State was the right thing to do.

Peter A. Rouff, D.M.D.

NEW YORK STATE DENTAL LICENSURE through the new PGY-1 residency requirement is long overdue and, I believe, a step in the right direction. Government may not be the cause or solution to all problems, but the New York State Legislature, at the urging of NYSDA, got this one right.

The days of “drill, fill and bill” dentistry are long gone. Advances in dentistry no longer allow for a four-year dental degree to provide overall competent practitioners. Now, the residency program fills the transition between dental school and full individual responsibility for patient care. It also provides much needed care to an underserved (Medicaid) segment of the population.

We share our title with medical doctors, as well as two years of academic training and required national didactic boards. Prior to adoption of PGY-1 legislation, the only professions licensed through live patients were dentistry and cosmetology. Is this preferred company to medicine, podiatry and chiropractics?

“The way we've always done it” is not an excuse to continue down the same path. The NERB and other regional exams are antiquated. Neurosurgeons are not required to provide their skills on mannequin brains. Gastroenterologists do not spend months seeking a patient with sufficient “board blockage” to prove colonoscopy skills, nor does drilling typodont crown preps, completing a root canal on a tooth physically measured outside the arch, finding and completing two ideal operative lesions, completing complicated paperwork (the only true test of the periodontal section) and passing a watered-down version of the national didactic boards measure dental competency.

Certainly this change shifts the burden from the dental student to the Commission on Dental Accreditation and the residency program director to insure that residencies are not strictly “point and pull,” but provide exposure to all aspects of comprehensive care. An accredited program must be structured as a one-year clinical exam.

In reflecting on my past year as a resident, spent at Strong Memorial Hospital in Rochester, I recognized that my skill level has surged. By week seven, I had completed my dental school operative and periodontal requirements. At the end of December, I had completed twice the dental school requirements for removable prosthesis. Unlike my time in dental school, I was exposed to rotary instrumentation and implant placement and restoration. All of my work was completed on the underserved, economically disadvantaged (Medicaid) population who previously had sporadic, if any, care. Patients at Strong Memorial Hospital were very appreciative—my collection of thank you cards and well wishes were almost enough to convince me to stay.

Most importantly, after the pressures and confines of dental school, the general practice residency at Strong Memorial made the practice of dentistry fun and rewarding. This positive experience will set the tone for my career.

Dr. Rouff completed the general practice residency at Strong Memorial Hospital in Rochester in June and is enrolled in the orthodontic program at the University of Pennsylvania School of Dental Medicine. He acknowledges the help of his program director at Strong Memorial, Todd Thierer, the faculty and his fellow residents in his successful completion of the program. Dr. Rouff holds a bachelor's degree in economics from the University of Rochester, a master's degree in actuarial science from Boston University and a D.M.D. from Tufts University School of Dental Medicine. He is the son of Lawrence Rouff, D.D.S., of Binghamton, and the nephew of Stuart Rouff, D.M.D., of Johnson City.
In October I attended the Annual Session of the ADA House of Delegates. At one point in the meeting, delegates got together for a strategic planning session, which had been called to help determine the direction the ADA should travel over the next several years. It was an interesting session, and an eye-opening one as well.

During our deliberations, we were asked about the various “generations” involved in dentistry. These include traditionals (those born before 1946), baby boomers (those born between 1946 and 1964), generation X’ers (born between 1965 and 1981) and the millennials (born between 1982 and 2002). The traditionals and baby boomers are beginning to retire from dentistry; the generation X’ers are in the dental workforce now; and the millennials will begin to enter the workforce in the next several years.

As we discussed the role the ADA would play in the lives of the various generations, the facilitator asked for any delegates under the age of 40 to stand. Only a handful of delegates stood. There was an audible gasp in the room as delegates came to realize that younger dentists were not well represented in their delegations. Many of the decisions we would be making, therefore, decisions that would have an impact on these young members and the course of their careers, would be made in a sort of vacuum, with little input from those most affected.

This reality was reinforced for me at a reference committee hearing the next day. At the councils on Communications and Membership, testimony was heard on a proposal to institute an online leadership course for young dentists who were becoming involved in organized dentistry. The Board of Trustees, thinking such training would be better delivered in hands-on presentations and in person, recommended overwhelmingly against an online course.

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Such sentiment is understandable. The Board of Trustees is made up of established dentists who have been involved with organized dentistry for a long time, the traditionals and the baby boomers. For the most part, they are not as computer literate as the generation X’ers and the millennials. Hands-on was the way they learned about leadership, and it worked well for them. However, members of the new generations cut their teeth on computers and use them daily to a much greater extent than do older dentists. At the University at Buffalo School of Dental Medicine, for example, all dental texts are on DVD, and each student has his or her own laptop.

We must embrace the younger generation of dentists who are now filling our ranks. We also must think further outside the box if we are to attract these young people to organized dentistry. The younger generation (and I can’t believe I actually wrote those words—does that mean I am old?) is more tech savvy than its older colleagues. We must learn to use their knowledge to keep the leaders of tomorrow in our organizations. We must also find ways to get them involved with us in our decision-making processes, so that organized dentistry continues to nurture the leadership it needs as the profession faces an unknown and sometimes frightening future.

Each component of the ADA has its own rules with regard to who can be a delegate to the House. In the Eighth District, we have term limits for delegates. But I gather from my experience in the House, that term limits are not a universal principle. Just this year, a dentist from Alabama retired after 25 years as a delegate. And I often hear testimony in the House about how long this or that delegate has served—terms that are usually double-digit figures. That seems too long. It leads to stagnation. There are no new ideas.

The Erie County Dental Society sponsors a luncheon to which senior dental students are invited and where they are encouraged to interact with society members. This gives the established dentist a chance to mentor a younger, potential colleague and it gives students a chance to interact with dentists in a positive way. It introduces them to the concept of organized dentistry and its importance in their future professional lives. It is a win-win situation.

We must find ways to interact positively with the dentists of the future. After all, we were there once—I know I would have enjoyed a more positive approach to organized dentistry when I was just learning the ropes. If we don’t respond positively now to those just entering dentistry, we put the future of our great profession in jeopardy. If we do accept them into our ranks, we can be confident our future and the future of dentistry will be secure. It’s our decision to make. I think the correct course of action is obvious. ■