The History and Current Status of Anesthesiology in Dentistry, 2008*

By Kenneth L. Reed, DMD

December of the year 1844 marked the introduction of anesthesia to the world. A dentist, Horace Wells, had his own third molar removed after inhaling nitrous oxide. Wells later reported, "I didn't feel it so much as the prick of a pin."[1]

In 1844, the word 'anesthesia' had not yet been coined. It wasn't until 1846 that Oliver Wendell Holmes first suggested the term 'anesthesia' to describe the state produced by ether, which had been demonstrated in the Bullfinch building at Massachusetts General Hospital a few weeks earlier by another dentist, William T.G. Morton. The patient for this demonstration was Edward Gilbert Abbott who, after the procedure was completed replied, "I did not experience pain at any time, though I knew that the operation was proceeding." This lead to the now famous proclamation by the surgeon, Dr. John Collins Warren, "Gentlemen, this is no humbug."

A painting entitled "Ether Day" by Robert C. Hinckley of this historic moment with Morton, Abbott and Warren is said to be the most famous painting in all of American medical history.

Robert C. Hinckley (1853–1941), Ether Day, 1882–1893

It was a dentist that brought anesthesia to the medical world, while it was a physician that brought local anesthesia to the dental world. Dr. William Stewart Halsted performed the first peripheral nerve block in medicine. The year was 1884. He injected the local anesthetic cocaine to anesthetize the inferior alveolar nerve. A variation of the Halsted inferior alveolar nerve block is taught in dental and dental hygiene schools to this day almost 125 years later.

The early 1900s brought the request for better local anesthetics. Alfred Einhorn introduced the first really successful local anesthetic for dentistry in 1904. That drug, procaine, is known by virtually every dental patient to this day as its brand name, "Novocain."

The request for "better" was not limited to just dental local anesthetics. The choice dentists had at this time was either local anesthesia or general anesthesia; there was nothing intermediate. Dr. Niels Jorgensen developed what has come to be known as intravenous moderate sedation. Once again, a dentist introduced this concept to medicine. Dr. Jorgensen's technique of administering pentobarbital, meperidine and scopolamine intravenously prior to dental treatment, what he termed intravenous premedication, was accepted and taught at the Loma Linda University School of Medicine as early as 1945. The technique has also been taught at the Loma Linda University School of Dentistry since 1955.

The search for "better" continued with local anesthesia advancement and the introduction of lidocaine by Nils Lofgren of Astra pharmaceuticals in 1948. To this day, lidocaine is the "Gold Standard" to which all new local anesthetics are judged.

It was realized as early as the 1950s that a specialty of anesthesia in dentistry would benefit the profession and the first application for specialty status was submitted to the American Dental Association (ADA) during this time.[2] Unfortunately for dentistry, and more importantly dental patients, this application did not pass.

Beginning in the 1950s, anesthesia in dentistry changed forever. First, there was the creation of a department of dental anesthesiology at the Tokyo Medical and Dental University by Dr. Tadashi Ueno.[3] Then there was the creation of the American Dental Society of Anesthesiology (ADSA), also in 1953.[4] The formation of the ADSA was particularly important for the future of anesthesia in dentistry as its founding purposes were stated to be to:

a) Encourage the study of anesthesiology
b) Encourage specialization in anesthesiology
c) Foster higher standards of education in the dental schools as regards the teaching of anesthesiology
d) Raise the standards of practice of anesthesiology by providing more and better training programs at the graduate level and to meet together for the purpose of exchanging information and reporting progress in the field of anesthesiology.[5]

Over five decades later, all of the above early purposes of the ADSA have been fulfilled in some capacity except one:

Encourage specialization in anesthesiology.

In the first half of the 20th century, the majority of publications concerning anesthesia in dentistry were by oral and

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maxillofacial surgeons. Jastak reports that in the 1960s approximately 20% of the articles in the Journal of Oral Surgery, Anesthesia and Hospital Dental Service, (now known as the Journal of Oral and Maxillofacial Surgery) were dedicated to local anesthesia, general anesthesia or sedation.[6] Indeed, of the three years oral surgeons spent in their specialty training during the 1960s, six to twelve months were often devoted to anesthesia.

By 1968 and then into the 1970s, Jastak reports, anesthesia topics had dropped to 3% to 7% and fell below 3% by 1987.[6] More recently, oral and maxillofacial residencies have gone to a four-year minimum training program with many awarding the Doctor of Medicine degree after a six or more year training period. With the increase in training requirements for oral and maxillofacial surgeons, time spent in anesthesia actually decreased. Six to twelve months of dedicated anesthesia training is unheard of in today's oral and maxillofacial training residencies.

According to the Commission on Dental Accreditation (CODA) Standard 4-3.1, today's anesthesia training standards for oral and maxillofacial surgery residencies consist of a minimum of four months on an anesthesia rotation for each resident. Additionally, CODA Standard & 4-9.1 states in part:

- For each authorized final year student/resident position, students/residents must administer general anesthesia/deep sedation to a minimum of 100 ambulatory oral and maxillofacial surgery patients per year, a substantial number of which must be general anesthetics.
- *Intent: A substantial number means at least 10. The pediatric portion of this requirement is that the student/resident be trained in the unique anatomical/pharmacological/physiological variations of the pediatric anesthesia patient (defined as 12 years of age or under).*[7]

Clearly, since the latter half of the 20th century, oral and maxillofacial surgery training has focused on more advanced surgical procedures.

In an attempt to continue to improve anesthesia in dentistry to the benefit of our patients, the first "guidelines for teaching the comprehensive control of pain and anxiety in dentistry" were published in 1972.[8] This document has been updated many times since the original version and will continue to be updated as needed.

In the late 1970s a group of dentists saw a need to form an organization that had not existed. This group would be composed of dentists who had two or more years of full time training in anesthesia. Their purposes were to establish an advanced program for continuing education in pain and anxiety control and to pursue the development of a specialty of anesthesiology in dentistry. On February 16, 1980 the American Society of Dentist Anesthesiologists (ASDA) was formed with 17 founding members.[9]

The next major event potentially affecting the administration of anesthesia by dentists was in the early 1980s where physicians 'drew a line in the sand.' The American Society of Anesthesiologists (ASA) wrote as a portion of a policy statement in 1982: "anesthesia care is the practice of medicine."[10] As of this date, potentially, dentists administering anesthesia could be accused by state medical boards of practicing medicine without a license. Fortunately, by 1987 the ASA had published a more reasonable statement: "The ASA recognizes the right of qualified dentists as defined by the American Dental Association to administer conscious sedation, deep sedation and general anesthesia to patients having dental procedures only."[11]

During the turbulent times of the mid 1980s, many dentists realized that a specialty of anesthesia in dentistry would have a significant impact on minimizing the effect of statements made by non-dental organizations like the ASA. Starting around 1984 the ADSA began developing a board exam and it began developing a specialty application for anesthesia in dentistry.[9]

In the 1985 update of the "guidelines for teaching the comprehensive control of pain and anxiety in dentistry," the concept of "deep sedation" was introduced and training required to perform this level of anesthesia was deemed to be the same as for general anesthesia.[4] 1989 brought a landmark event, a workshop on anesthesia education jointly sponsored by the ADA and ADSA which lead to many recommendations that have subsequently been adopted within dentistry.[12]

For those dentists that administer anesthesia, the 1980s prepared them for further difficulties. That was fortunate actually, as greater challenges yet lie ahead in the 1990s. Immediately upon entering the 1990s major potential hurdle presented itself. This one was called the Poswillo Report.[13] This British report made over 50 recommendations aimed at reducing the risk of death or adverse health effects during dental treatment, including treatment under general anesthesia. It called for enhanced education in anesthesia for dentists, but without a formal specialty of anesthesia in dentistry in the United Kingdom (UK), there was no ability to provide this training.[6] The physicians certainly had no interest in providing this training to mere dentists. This report set the stage for severely limiting the number of general anesthetics performed in dental offices and ultimately lead to the loss of the ability to administer general anesthesia altogether by dentists.[14] Today, dentists in the UK may only administer single agent moderate sedation; they've entirely lost the ability to perform general anesthesia.

The next year, 1991 was even worse for US dentists wishing to be trained to provide general anesthesia services for their patients. June 28, 1991 gave us the Residency Review Committee (RRC) of the Accreditation Council for Graduate Medical Education (ACGME) memorandum.[15] Briefly it stated that:

1. RRC is aware that dentists are on anesthesiology rosters
2. Non-physicians are ineligible to train in ACGME accredited residency programs
3. Enrollment of non-eligible residents may be cause for withdrawal of accreditation

This memo was made public just as the ADSA was preparing to apply for specialty status of anesthesiology in dentistry.[4] Fortunately for most of dentistry, later that year ACGME responded to the Council on Dental Education (CDE) of the ADA with a letter stating that

non-physicians may participate in "limited rotations" in anesthesia.[16] This benefited oral and maxillofacial surgery and general practice residencies but left dentists that wanted to pursue anesthesia residencies without avenues for training.

For a number of different reasons including the ACGME memo and pressure from the American Association of Oral and Maxillofacial Surgeons (AAOMS), in late 1991 the Board of Directors (BOD) of the ADSA decided to no longer pursue a specialty of anesthesia in dentistry.[9]

It was quite unfortunate that dentistry lost anesthesia residency positions directly due to the 1991 ACGME memo.[17] One of the end results of this memo is that many dentists must now take their patients that require anesthesia or sedation for procedures other than oral surgery to the hospital and incur those costs and loss of productive time in the office. At about the time of all of the above, Robert Mass compared office-based anesthesia costs to hospital-based anesthesia costs for a typical one-hour dental case.[18] In early 1990s dollars, he found the hospital fee was about $1,900 while the office-based case would typically cost $150. Consumer price index calculators give a value of $1,900 in 1991, a value of just under $3,000 today. Even today, office-based anesthesia remains generally around 10% of the cost of hospital-based anesthesia for dental procedures.[19]

Mass also determined that over 90% of dentists in New York State certified to perform anesthesia/sedation were oral surgeons. They represented just over 3% of all dentists, making it impossible for them to service all of the anesthesia/sedation needs for dental patients in the state.[19] This statistic begs for the addition of anesthesia as a specialty of dentistry. There is simply a much greater need and demand for anesthesia/sedation services among dental patients than can be effectively met by those currently holding anesthesia/sedation permits.

In 1994, the ASDA put forth an application for a specialty of anesthesia in dentistry. The CDE determined that the application demonstrated compliance with all requirements for specialty recognition. ADA's Committee on Specialty Recognition (Committee G) agreed. Despite positive votes by the Board of Trustees and strong support by the majority of individuals and organizations who provided testimony at the Reference Committee hearings, this application ultimately failed when voted on at the ADA House of Delegates.[20]

Due in part to pressure from AAOMS and considering the composition of the 1996 House of Delegates of the ADSA, this body formally voted to remain neutral on the issue of a specialty of anesthesiology in dentistry.[9]

Anesthesia in dentistry continues to exist and in some ways flourish as it has since Horace Wells gave us this gift in December of 1844. There have been major challenges both from within and from outside of dentistry. Anesthesia for dentistry is becoming more visible to the public as evidenced by the ASDA establishing an Internet web presence in 1997 (www.asdahq.org) and the ADSA's web site being launched in 1998 (www.adsa-home.org).

In 1997 the ASDA put forth another application for specialty status. The CDE had only one issue with requirement #1 relating to Parameters of Care. Similar to the 1994 application, there was strong support by the majority of individuals and organizations who provided testimony at the Reference Committee hearings, yet that application too ultimately failed when voted on at the ADA House of Delegates achieving a 49% vote in favor of the application.[20]

In 1999 the specialty application for anesthesiology in dentistry was most recently put forth. Despite a letter from the Chairman of the Council on Dental Education and Licensure (CDEL) of the ADA in which was written[21]:

> During its April 1999 meeting, the Council on Dental Education and Licensure considered the American Society of Dentist Anesthesiologist's (ASDA) request for recognition of dental anesthesiology as a dental specialty. In conjunction with this request, the Council considered the following information:
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> 1. The April 1999 report of the Committee on Specialty Recognition (Committee G)
> 2. The ASDA's written response to the Council's November 1998 report dated March 1, 1999
> 3. Information from the ADA Survey Center provided to the ASDA and the Council
> 4. The ASDA's written presentation distributed to the Council and summarized during the ASDA's special appearance before the Council on April 17, 1999.
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> Based on careful review of the written information and the oral comments presented during the special appearance before the Council, the Council determined that the ASDA has met all requirements for specialty recognition. Accordingly, the Council adopted a resolution recommending that the ASDA's request for recognition of dental anesthesiology as a dental specialty be approved. Further, the Council directed that this action be forwarded to the American Dental Association's 1999 House of Delegates. The Council further directed that a report of the Council's assessment of the ASDA application be forwarded to the House of Delegates in support of its recommended action.

At the ADA House of Delegates that year, the vote to recognize dental anesthesiology as a specialty of dentistry was again defeated. There were three applications to recognize dental anesthesiology as a specialty of dentistry in the 1990s and despite overwhelming approval by various ADA committees and despite the application having been said to meet all requirements to become a specialty by said ADA committees, there were three defeats.

In January 2007 CODA published a Standards document entitled "Advanced Dental Education Programs in Dental Anesthesiology." As of the date of that publication, Standards now exist in order for dental anesthesia residencies to be accredited. Prior to this publication, no such accreditation was possible for the many decades that dentists were being trained in general anesthesia. These Standards are actually quite stringent. For instance, each resident must do a minimum of 500 deep sedations/general anesthetics, 200 of which must be intubated general anesthetics, and at least 50 must be nasotracheal intubations and 20 cases must incorporate advanced airway techniques such as fiber-optic intubation,

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laryngeal mask airway, etc. A minimum of 100 cases must be for children six years old or younger and 50 cases must be for special-needs patients.

According to an editorial that Dr. Joel Weaver published in *Anesthesia Progress* in the summer of 2007, there are three major benefits to the profession that will be derived from the accreditation of dentist anesthesiologist residency programs.

1. Since there is a huge increased need and demand for dentists to provide advanced sedation and anesthesia services for other dentists, accreditation should provide increased funding opportunities to support more residents and residency programs to meet that need and demand.
2. Accreditation by dentistry helps cement anesthesia at its highest level as being within the scope of dental education and within the scope of the clinical practice of dentists.
3. Finally, accreditation keeps the highest level of anesthesia education within the control of dentistry and maintains our ability to control the quality of anesthesia training that dentist anesthesiologists receive to protect the safety of the public that we serve. State dental boards now have an appropriate measuring stick to judge the adequacy of anesthesia training for dentist anesthesiologists. They should now recognize that future dentist anesthesiologists must be graduates of CODA-accredited training programs to be eligible for anesthesia permits (with, of course, traditional grandfathering for those who completed training prior to accreditation.)

Since the dental anesthesia accreditation standards were published, two new dental anesthesia programs have been created and are accepting residents. Both are in New York; one at Lutheran Medical Center in Brooklyn and the other at Stony Brook on Long Island. Other programs are reported to be in the process of organization.

The ability for dentists to provide general anesthesia for their dental patients has been lost in the UK. At least part of the reason for this is lack of a specialty of anesthesiology in dentistry in that country. Alternatively, the ability for dentists in Japan to administer general anesthesia has been secured due to their forward thinking decisions made decades ago in consideration of the best interests of their patients.

On August 27, 2007 the Royal College of Dental Surgeons of Ontario, Canada recognized the specialty of anesthesiology in dentistry. The rest of Canada may or may not follow suit.

Despite these positive trends in anesthesiology for dentistry in North America, dentistry remains in a precarious situation. We are on the cusp of losing the ability to administer general anesthesia for our patients. We must make a concerted effort to maintain this valuable service. Both the oral surgery model and the dentist anesthesiologist model of office-based anesthesia are required in order to properly serve all of our patients. The oral surgeon's "anesthesia team" approach to the administration of general anesthesia for their office-based procedures has a long history of safety. It is absolutely critical that this method of alleviating pain and anxiety for their patients remain.

However, there is also a tremendous need and demand for dentist anesthesiologists to provide safe and comfortable anesthesia care for non-oral surgery dental procedures. The physically and mentally challenged and the pediatric dental patient especially have the greatest needs for anesthesia services while their restorative dentistry is performed. Only if we come together as "dentistry" will we be able to continue to provide safe and effective office-based general anesthesia and sedation services to all of our dental patients who so desperately need it. ◆

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