

Internet Resources for Dental Anesthesia

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The extraordinary growth of the Internet has created a revolutionary leap in the ability of health professionals to easily communicate and access information. These resources are readily available to the public as well, and an understanding of these sources is important in determining the validity of the content. A few Internet sites of interest to dentists interested in anesthesia and pain control are presented to demonstrate the depth and breadth of these resources via the Internet.

Key Words: Internet, World Wide Web.

The evolution of the Internet began as a military effort (the Defense Advanced Research Projects in 1958) to connect computers to control ballistic missiles. In the 1970s and 80s, the driving forces behind the growth of the Internet were academic and governmental applications, finally culminating in its current role as a provider of nearly universal and almost unlimited access to information. The changes wrought by this extraordinary leap in human communications and connectivity has been compared to the Industrial Revolution.¹

Dentistry and other health disciplines have adapted this new technology to many aspects of professional life. From communicating via e-mail, ordering supplies, processing insurance claims, subscribing to topic or specialty specific discussion lists, accessing continuing education programs, addressing patient care issues, and collaborating on research initiatives to disseminate health care information to the general public and to the provider, the Internet is affecting and changing the ways health professionals communicate and access information.²⁻⁶ Current use of Internet resources by dentists is significant and will only continue to grow in the future.⁷

Because dental pain and anxiety control require such a broad base of knowledge that crosses over to so many different areas (eg, anatomy, physiology, and pharmacology) and interfaces with so many other specialties (eg, anesthesiology, internal medicine, pediatrics, oral and maxillofacial surgery, and other dental specialties),

the Internet is particularly useful in providing a unique and valuable resource for anesthesia providers.⁸ Anesthesia resources on the Internet include information from dental and medical departments, schools and medical centers, independent organizations, medical and dental anesthesia and specialty societies, publishers, companies, patient advocacy groups, government agencies, individuals, and journals. The types and breadth of information available on the Internet are staggering and range from treatment guides, research results, and review articles to institutional information and referral guides. Also of interest to the health care professional are product alerts from government agencies and drug and equipment manufacturers, and the ability to perform detailed medical and dental literature searches from anywhere on the planet. National and international forums, commonly asked questions, professional society information, and patient support groups all have sites that may be easily accessed.

It is important to realize that this information is available to patients as well as to health professionals. The popularity of the Internet with the general public should not be underestimated. Health queries are second in popularity only to queries on pornography sites on the Web. The federal government's health information initiative was overwhelmed during its first 30 days when nearly 4.8 million visitors accessed the site.⁹

Many health care professionals are routinely confronted with patients bringing to their attention information from a medical Web page. At this time, only 12% of doctors refer patients to the Internet for information. However, 67% of these doctors had patients come into their practices with information already

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downloaded from the Internet.¹⁰ Through the Internet, patients are better informed because they can tap into health resources, thus increasing their awareness and their knowledge. At the same time, nearly universal access to health information on the Internet can present challenges to health care providers when patients have been misinformed or have difficulty extrapolating information to their specific problems, resulting in false hope and increased time spent correcting misconceptions. This is especially true for many of the Internet discussion groups, listserves, and health-related newsgroups where a participant's credentials or expertise are impossible to verify. Many Web sites are also used to promote commercial medications, books, and devices. It is important to understand that many sites exist for commercial enterprises that are disguised as unbiased forums.

With the ability of Internet search engines to ferret out an enormous number of sites in response to any query, it is important to realize that most sites are not peer-reviewed—nor are there any standardized quality-assurance programs to guarantee accuracy. Anyone can create a World Wide Web site on any topic.

With new sites proliferating daily, and with the large number of existing sites that may be of interest to the dental anesthesia community, it is impossible to present an exhaustive review of all relevant sites. Unfortunately, URLs (uniform resource locators, which may be thought of as Internet addresses) and e-mail addresses change continually, resulting in confusion and making any listing of Internet sites immediately obsolete. Many sites have links to other sites of interest. Our goal is to make dental anesthesia providers aware of major Internet resources in this area, direct them to interesting sites unique to anesthesia, and prepare anesthesia providers to strike out into this brave new world.

INTERNET RESOURCES

Health and Anesthesia-Related Search Engines and Portals

<http://www.healthfinder.org> This site, created by the US Department of Health and Human Services in collaboration with several other federal agencies, is a good point from which to access links to high-quality medical information. This site has attracted more users than any other health-oriented search engine. The engine is updated daily and has versions for children and for people who speak Spanish.

<http://www.yahoo.com/health/medicine/anesthesiology> The Yahoo site is a good example of a commercial search engine with many links to

professional organizations and various groups of interest.

<http://www.lib.uiowa.edu/hardin/md/index.html> The Hardin Meta Directory of Internet Health Services is a great medical portal site, with links to all medical specialties.

<http://www.eur.nl/FGG/ANEST/anaesite.html> Wright's Anesthesia and Critical Care Resources on the Internet is an eclectic site, with discussion groups, links to virtual textbooks, and forums for the anesthesia provider. The goal of this site is to attempt to track and organize all anesthesiology, pain, and critical care resources available via the Internet and the World Wide Web.

<http://www.achoo.com> This huge commercial site offers a searchable database of more than 15,000 links to health sites. The site is organized into 3 categories: human health and disease, business of health, and organizations and sources. This engine also sponsors occasional polls and a "site of the week" section.

Virtual Anesthesiology

<http://gasnet.med.yale.edu> This site, Virtual Library-Anesthesiology, known as GasNet, is a global anesthesiology server network and is probably the most popular medical anesthesiology site on the Web. Its virtual anesthesia library site is comprehensive.

<http://umdas.med.miami.edu/aha/vma> This site, the Virtual Museum of Anesthesiology, will interest those who want to know more about the history of anesthesia. The site includes exhibits of old equipment, references, and essays.

<http://www.vh.org> The Virtual Hospital is sponsored by the University of Iowa and provides an interesting look into the future.

<http://www.hon.ch/HONcode/Conduct.html> The Health on the Net Foundation Code of Conduct for medical and health Web sites addresses one of the primary concerns of Internet users: the reliability and credibility of medical and health information on the Internet.

Organizations and Specialty Groups

<http://www.asahq.org> The home page of the American Society of Anesthesiologists (ASA) contains

links of interest to anesthesia providers and includes anesthesia references and databases. It contains good reviews of latex allergy problems and protocols, NPO protocols, the "ASA Closed Claims Study," a virtual anesthesia textbook, and ASA practice guidelines, along with the organization's political information and initiatives. The contents make it the premiere anesthesia site.

<http://www.ada.org> This site is the home page for the American Dental Association (ADA). It is one of the main portal sites for organized dentistry and contains links to dental specialty group, continuing education resources, and other areas of interest.

<http://www.agd.org> The site of the Academy of General Dentistry (AGD) is another large, well-maintained dental portal site with many useful links.

Dental Specialty Groups

<http://www.aapd.org> This is the home page for the American Academy of Pediatric Dentistry.

<http://www.perio.org> This is the American Academy of Periodontology's home page.

<http://www.aae.org> This site is for the American Association of Endodontists.

<http://www.aaoms.org> This site is that of the American Association of Oral and Maxillofacial Surgeons.

<http://adsahome.org> The American Dental Society of Anesthesiology (ADSA) is the largest and one of the oldest organizations devoted to anesthesia in dentistry. This newly configured site contains organizational updates and a continuing education registry, along with information regarding ADSA publications (*Anesthesia Progress* and *The Pulse*). Online registration for ADSA continuing education programs is available.

<http://www.sedation4dentists.com/> The American Society for the Advancement of Anesthesia in Dentistry (ASAAD) was founded in 1929 by a group of dentists dedicated to promoting pain and anxiety control in dentistry. This site contains organizational news and continuing education announcements for the oldest continuing organized society of dental anesthesia in the world.

<http://www.asdahq.org> The site for the American Society of Dentist Anesthesiologists (ASDA) has es-

tablished as its purpose the support and encouragement of the clinical practice of anesthesia by dentists. This site supports its mission to promote the acquisition and dissemination of scientific knowledge.

<http://www.aana.com/> This is the home page for the American Association of Nurse Anesthetists (AANA) and is geared to certified registered nurse anesthetists. It has good political and education sections.

<http://www.sambahq.org> This site, the home page for the Society for Ambulatory Anesthesia (SAMBA), has good links to other sites of interest for ambulatory care providers.

<http://www.soba.org> The Society for Office-Based Anesthesia (SOBA) has a site that is organized for educational, scientific, and charitable purposes for anesthesia practitioners having an interest in office-based anesthesia practices. They also support and educate members of the anesthesia community in the practice of office-based anesthesia care through conferences, courses, and symposia. Home to one of the best and most multidisciplinary forums on office-based anesthesia.

<http://weber.u.washington.edu/crc/CRCpage/pain.html> This site, for the International Association for the Study of Pain, contains information about acute and chronic pain.

<http://www.aaop.org> The American Academy of Orofacial Pain's home page is a good source of educational activities in this area.

Guidelines

<http://text.nlm.nih.gov/nih/cdc/www/50txt.html> This site contains guidelines for anesthesia and sedation in the dental office from the National Institutes of Health Development Consensus Conference.

<http://www.asahq.org/Practice/Sedation/Sedation.html> This site contains practice guidelines for sedation and analgesia by nonanesthesiologists and contains a report by the American Society of Anesthesiologists Task Force on sedation and analgesia by the nonanesthesiologist.

<http://www.ada.org/prac/careers/pain-01.html> This site contains the first part of the guidelines for teaching the comprehensive control of pain and anxiety in dentistry from the American Dental Associa-

tion. Part 2 can be found at <http://www.ada.com/prac/careers/pain-02.html>.

<http://www.ada.org/prac/careers/cs-guide.html> This site contains the American Dental Association statement on the use of conscious sedation, deep sedation, and general anesthesia by dentists.

<http://www.ahcpr.gov/> The Agency for Health Care Policy and Research (AHCPR) currently disseminates their clinical practice guidelines via the Web. The AHCPR is uniting with the American Medical Association and the American Association of Health Plans to develop the National Guideline Clearinghouse as a repository of guidelines for all areas of medicine.

Journals

<http://www.anesthesiology.org> This site, for the journal *Anesthesiology*, contains a guide for authors, abstracts, and tables of contents.

<http://www.anesthesia.ucsf.edu/webdocs/aa/> Indexes and references are available for the journal *Anesthesia and Analgesia*.

<http://gasnet.med.yale.edu/esia/> The *Educational Synopses in Anesthesia and Critical Care Medicine* contains concise reviews of current literature.

<http://gasnet.med.yale.edu/periodical/aja/> The *American Journal of Anesthesiology* is a clinically oriented peer-reviewed journal.

<http://gasnet.med.yale.edu/periodical/jcm/> The *Journal of Clinical Monitoring and Computing* contains monitoring- and computer-oriented medical information on the cutting edge.

<http://gasnet.med.yale.edu/journals/soa/soa.html> *Survey of Anesthesiology* is a good way to keep up with the entire spectrum of the anesthesia literature.

<http://gasnet.med.yale.edu/societies/apsf/newsletter/> The *Anesthesia Patient Safety Foundation Newsletter* is a valuable newsletter totally dedicated to patient safety through investigations of anesthesia equipment, monitoring, and techniques.

<http://gasnet.med.yale.edu/journals/imcn/imcn.html> The *Informatics and Medical Computing*

News Newsletter describes a high-tech approach to computing and medical information handling.

<http://www.ama-assn.org/public/journals/jama> The *Journal of the American Medical Association* site contains a wide range of topics.

<http://www.ahajournals.org/> The *Journals of the American Heart Association* site is a great portal to world of cardiac risk, new drugs, and techniques.

<http://www.nejm.org> The well-respected general medical journal *New England Journal of Medicine* has a cutting-edge site.

Equipment

<http://www.iso.ch/meme/TC121.html> The international standards of anesthetic and respiratory equipment is posted here. This site contains an exhaustive repository of all types of anesthesia equipment standards.

Resident Teaching Materials

<http://www.medana.uibas.ch/eng/amnesix.htm> The Resident Handbook, also known as the "Redbook," contains a comprehensive and useful resident handbook for anesthesiology from the University of Basel.

<http://www.anes.hmc.psu.edu/caseconferencefolder/caseconferencetoc.html> Penn State University hosts this site, a good collection of resident case conferences.

<http://www.anesthesia.ucsf.edu/anesthweb/didactics/didacthome.html> The University of California, San Francisco, hosts this site, which contains didactic materials for anesthesia residents.

<http://www.ccf.org> The Cleveland Clinic Foundation's site contains interesting and varied topics in the educational research lab folders.

<http://umdas.med.miami.edu/educationalresources/educationalresources.html> The University of Miami hosts this site, which provides a good basic review of anesthesia skills.

Literature Searches

<http://www.nlm.nih.gov/databases/> This government site associated with the National Library of Medicine allows free access to MEDLINE. In addition, this site allows free literature searches of the Index Medicus and allows access to many governmental databases.

<http://www.ncbi.nlm.nih.gov/PubMed/> PubMed is one of the most prominent of the MEDLINE search engine interfaces. It is produced by the National Library of Medicine and is extremely user-friendly. The filter system allows easy access to clinical evidence on a specified subject. This Web site is a very popular medical site for the general public. All of its features are free except for Loansome Doc, which allows ordering of articles selected during a search.

Medical Textbooks

Many standard medical reference textbooks are available in CD-ROM versions, and an increasing number are appearing online. Although conventional print volumes continue to be an integral part of a health professional's library, CD-ROM and online versions will replace hard copy as access to the Internet and connectivity increases. Nearly 40 full-text medical references are online, with varying degrees of comprehensiveness.

<http://www.mdconsult.com> This is a medical super-site with links to many medical texts. Many selected practice guidelines are also available at this site.

<http://www.harrisonsonline.com> The complete and ever-popular 14th edition of *Harrison's Principles of Internal Medicine* is available for registered users online. This site includes recent updates, reviews of current clinical trial results, editorials, links to other medical sites, and other topics of interest to the medical community. A free, month-long trial period is available before committing to the \$85 annual fee.

<http://www.samed.com> *Scientific American Medicine* is a loose-leaf monthly update of medical advances and reviews that is also available in CD-ROM format. Subscription holders of either format get free online access to this highly regarded, up-to-date source of current practice.

Anesthesia Mailing and Lists

<http://idf.stat.com> The Internet Dental Forum (IDF) allows subscription to many different dental-related mailing lists. The most popular is the IDF. This is a mailing list only for those verified to be directly involved with dentistry (no patients, lawyers, or the like are allowed). There are currently close to 1000 members, and this mailing list generates over 100 messages per day. There is a 30-day free trial period, after which the yearly subscription fee is \$60.

Another of the IDF family of mailing lists is the dental-drugs mailing list. There are currently over 300 members on this worldwide mailing list; it is only open to dentists with prescribing privileges. This is probably the best way to stay current on the Internet on the topics of anesthesia for dentistry and dental drugs. Although this mailing list is associated with the IDF, there is no subscription fee. It is also of much lower volume, averaging fewer than 10 messages per day. Subscription information is also located at IDF's site.

<http://gasnet.med.yale.edu> GasNet™ Anesthesiology is an interesting multifaceted anesthesia resource site maintained by Dr Keith Ruskin. One aspect of GasNet is a mailing list. It comprises physician and anesthesiologists, but there are a few nonphysicians, including veterinary anesthesiologists, certified registered nurse anesthetists, and some dentists. To subscribe to GasNet, send an e-mail to Keith Ruskin at admin@gasnet.med.yale.edu and ask to be added to GasNet.

Drugs

<http://www.rxlist.com> This site, the Drug List, allows users to find comprehensive information on specific drugs listed by brand or generic name.

<http://www.fda.gov/cder/ob/> The Electronic Orange Book contains listings of approved drug products with therapeutic equivalence evaluations and identifies drug products approved on the basis of safety and effectiveness by the Food and Drug Administration (FDA).

<http://www.fda.gov/cder/approval/> This site, the FDA New and Generic Drug Approvals, lists recently approved drugs that have gone through the FDA regulatory process and is intended to provide timely information on new drug products.

<http://www.pdr.net> This electronic version of the *Physicians' Desk Reference* (PDR), PDR.net, is a medical and health care Web site created by Medical Economics Company Inc, publisher of health care magazines and directories, including the PDR.

Alternative Medicine

<http://wellweb.com> With the renewed interest in alternative medical treatments, the Wellness Web site provides good reviews of alternative medicines as well as conventional ones.

Telemedicine

Web-based telemedicine will soon be a reality for some health care providers. The majority of telemedicine users currently utilize dedicated (T1) or integrated services digital network (ISDN) lines, but the Internet will likely soon take over this role. Originally developed for rural practitioners, telemedicine is making inroads in urban practices. Applications exist for radiology, psychiatry, emergency medicine, dermatology, cardiology, and prison medicine.¹¹ Electronic stethoscopes, ophthalmoscopes, and otoscopes assist remote consultation, along with real-time electrocardiograms, transesophageal echocardiography, magnetic resonance imaging, computed tomography scan, and other tests. Telementoring allows for specialists to literally supervise the work of another at a remote location.

Continuing Education

<http://idf.stat.com/ce> There are many organizations involved with online continuing education in anesthesia today, and this educational delivery method will grow in the coming years. Currently, you may take online anesthesia-related continuing education from the IDF site mentioned previously.

<http://www.medicalcomputingtoday.com/cme.html> This site, for *Medical Computing Today*, contains a great directory of many continuing medical education sources and programs.

Other Neat Sites

- <http://www-anesth.ucsd.edu/anesth/Airway/Algorithms/ASA.html> The American Society of Anesthesiology Difficult Airway Algorithm.

- <http://gasnet.med.yale.edu/reference/tips/> Practical tips, tricks, and techniques for the anesthesiologist.
- http://gasnet.med.yale.edu/reference/Anesthesiology-Clip_Art.html A clip art library for the anesthesia provider.
- <http://medstat.med.utah.edu/kw/ecg/index.html> Learn electrocardiogram interpretation for the next millennium through the ECG Learning Center in Cyberspace.

Sites to Recommend to Your Patients

Many patients look for direction from health care providers to direct them to "safe" Web medical information sites. Here are a few "safer" Web sites for patient information.

<http://www.healthatoz.com> This site, Health From A to Z, is a good, all-around comprehensive site for the layperson.

<http://www.mayohealth.org/> The Mayo Clinic Health Oasis is a well-respected general health site where one can e-mail Mayo Clinic staff with health questions.

<http://www.nlm.nih.gov/sitemap.html> The National Library of Medicine's site is so extensive that if you cannot find it here, it probably doesn't exist.

THE FUTURE

Despite its penetration into so many facets of daily and professional life, the Internet is still in its infancy. New and better search engines will be available to make searches become even more inclusive while providing greater utility. "Virtual meetings" over the Internet will have a great impact on continuing education for health professionals, and the speed at which data and connections can be transmitted will be increased with the introduction of ISDN lines, cable modems, and direct satellite technology. The introduction of Java as a universal programming language and other access platform software such as Adobe Acrobat will continue to bring new and more useful applications to the Internet. Health professionals and their patients can only benefit by this revolution in communication and connectivity.

We are sure that many of you have bookmarked other sites of interest to the dental anesthesia community. The intent of this article was to begin to collect these sites, review them for relevance, and disseminate them. It is

impossible to be comprehensive with the number of sites of interest available. If you have come across a unique or useful site outside of the main stream, please e-mail their addresses to either: Dr Rosenberg (Mrosenberg@Infonet.Tufts.edu) or Dr Ken Reed (gumdr@gumdr.com) and they will be added to our database and made available through future reviews in *Anesthesia Progress* and established as links on the ADSA home page.

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