

Developmentally Disabled  
Institutionalized Aged  
Hospital Privileges

# CDA

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# Hospital Dentistry





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# Journal

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## DEPARTMENTS

- 391** *The Editor/A Wake-up Call*  
**395** *Impressions/Tips for Passing the All-Important Exam*  
**466** *Dr. Bob/All Representatives Are Busy*

## FEATURES

### **406** GENERAL DENTAL PRACTICE IN THE HOSPITAL

*An introduction to the issue.*

Stanley R. Surabian, DDS, JD

### **408** A FOCUS ON THE INSTITUTIONALIZED AGED AND SPECIAL CARE PATIENT FOR TODAY'S PRACTICE

*This growing population, the places wherein they reside, and the unique challenges they present are discussed.*

Dennis M. Kalebjian, DDS, and Carole A. Murphy-Tong, DDS

### **415** DEVELOPMENTAL DISABILITIES AND UNDERSTANDING THE NEEDS OF PATIENTS WITH MENTAL RETARDATION AND DOWN SYNDROME

*A background on developmental disabilities, services, and issues related to regulatory requirements, with a focus on retardation and Down syndrome, is provided.*

Stanley R. Surabian, DDS, JD

### **424** DEVELOPMENTAL DISABILITIES: EPILEPSY, CEREBRAL PALSY, AND AUTISM

*The developmental disabilities that do not have retardation as a component are reviewed.*

Stanley R. Surabian, DDS, JD

### **433** INTEGRATING HOSPITAL DENTISTRY INTO THE GENERAL DENTAL PRACTICE

*Practical considerations for the dentist wanting to incorporate hospital dentistry into his or her practice are outlined.*

Ronald J. Sani, DDS, and Richard O. Spencer, DDS

## A Wake up Call

JACK F. CONLEY, DDS

In the quest to provide the best possible care for patients, dentists have long been attracted to the claims for new techniques, materials, equipment, and instruments featured either by manufacturers in their advertising or by clinicians in their educational presentations.

We also obtain information or try out materials or techniques based upon recommendations by colleagues whom we respect. Descriptions of excellent clinical results by trusted colleagues are often a motivating factor for trial of new products and techniques, particularly in the world of general dentistry.

There is nothing inherently wrong with the approach of adopting new materials and techniques recommended by noted clinicians or colleagues, as the willingness to share new information is an attitude that was originally espoused by none other than Pierre Fauchard. However, the increasingly rapid rate at which new developments are adopted, and the manner in which information on them is shared with the profession, have changed significantly from the days of Fauchard. As a result, it has become a responsibility for the practitioner to more carefully evaluate the information he or she receives in order to avoid pitfalls, some of which have an ethical implication.

The impetus for my comments in this space comes as the result of my attendance at an excellent presentation by Richard Simonsen, DDS, at the recent California Dental Association Scientific Session in

Anaheim. In effect, Dr. Simonsen issued what I believe to be an important wake-up call to our profession, and I credit him for the outstanding message he delivered. My purpose here will be to focus on one of the important issues he raised, which I believe leads right back to a very important professional ethical responsibility.

One of the communication resources that has become a major source of new information, particularly to the general dentist, are the large-format tabloid-type journal publications. While the questionable activities Dr. Simonsen identified and we discuss here are not limited to occurring exclusively in these publications, a proliferation is evident within their pages. We refer to large, full-color advertising that proclaims, in emotionally descriptive terms, the merit of the product, equipment, or technique being promoted. Missing in most of these promotions is any evidence or reference to scientific information that would support the advertising claims. Unsupported claims such as superb translucency fill the advertising display. There is no accompanying data on the translucency rating of this or competing products for the dental office purchaser to evaluate. The marketing specialist figures, I presume, that dentists with little time to research the possibilities will take the good words to heart and order the product immediately.

However, this plain form of advertising isn't quite as objectionable to us as the type that heavily features testimonials by clinicians who are well-known (usually by

virtue of their visibility on the educational circuit). In one recent publication, we counted 12 advertisements, each of which included testimonials by three to six dentists (complete with photos) extolling the virtues of a given product or product line. For example, an ad with several dentists proclaimed superior results in “study after study.” There was no reference to the specific studies mentioned in the ad.

If we questioned them about their claims, we are certain that the marketers would suggest that many dentists inquire or research this information before purchasing. However, we know that the prevalence of this type of advertising strongly suggests that it is successful, it is profitable, and few dentists probably take the time to make the comparisons that could place the unsubstantiated claims into question.

A further look at the testimonial type of advertising showed that the majority of the ads featured multiple clinicians. This approach apparently is perceived to provide greater credibility to a claim than one well-known dentist alone can. It is also perplexing that many dental readers are naive enough to fail to discount the likelihood that those quoted have either received complimentary products or compensation in return for their “testimony.” It is also likely that many, if not most, of the testimonials attributed to dentists are actually written by the marketing experts.

To this point in our discussion, we have limited our comments to the “obvious” advertising of the display format. We hope that some of our colleagues, through the process of critical thinking, are able to recognize and discount the importance of these display-advertising claims, because after all, it looks like advertising. But what about the more-sophisticated and subtle advertising that occurs in the short articles that are commonplace in these publications? We refer to articles that describe materials or techniques that carry the name of a known clinician. The “author” may or may not have authored the

piece. Nonetheless, the author often has received compensation from a company for conducting some form of clinical research or consultation on product(s) featured in the article. Even if a connection is disclosed, we suspect that many of our colleagues make their decisions on a new product purchase based upon their connection with the known clinician and not on the quality of the evidence. (It should be mentioned here that author disclosures of any financial interests or contractual arrangements with companies or products discussed in manuscripts in this CDA publication are required and subsequently published with the article.)

This discussion leads us back full circle to our responsibilities of professional ethics. A new product is often rushed into the marketplace with only an approval for patient safety. If we base our decision to use it without reviewing scientific data that supports its efficacy as a long-term restorative treatment, are we abandoning at least some ethical responsibility we hold to the patients we care for?

As Simonsen pointed out, in restorative dentistry we have conventional materials that have been proven successful for many routine applications. If for example, we abandon use of a conventional crown for a new crown material that promises “unsurpassed esthetics and biocompatibility” based solely upon the testimonial of a clinician compensated for this opinion, are we fulfilling our ethical responsibility to our patients? We believe that we might be failing in our responsibility if we neglect to conduct complete research about the new materials we adopt. Only if we search for data that provides us with a clear indication that the material has been tested and proven to maintain the same qualities in addition to the promises of new advances will we have fulfilled our responsibilities to our patients.

If we fail to heed Simonsen’s wake-up call and instead use materials and adopt techniques without regard to evidence supporting their efficacy, we will be allowing a third party (a company

offering a product) to make our treatment decisions.

We must be more vigilant in our efforts to require evidence and disclosure from those who educate us about new materials and techniques if we are to fulfill our ethical responsibilities to our patients.

## Tips for Passing the All-Important Exam

By DEBRA BELT

June is here, and for hundreds of dental school graduates this means it's time for that major commitment. It's time to set a date and say I do to the California Dental Licensure Exam.

For those facing the exam this month, there is good news and good advice. The good news comes from the Department of Consumer Affairs. The good advice comes from dentists who have been there.

First, the good news. The Department of Consumer Affairs reports a 76 percent success rate among last year's examinees. For those who happen to be taking the exam this month, the success rate is even higher. June appears to be the magic month for dental examinees. Those who take the test during the summer traditionally have a higher passing percentage than those who take the test in March or in September/October.

Of the five clinical exams given each year, three are in June; and the majority of prospective dentists take the exam at this time. Last year, of 1,555 examinees, 765 took the exam; and only 152 failed, according to statistics from the Department of Consumer Affairs. That's an 80 percent success rate for June examinees. Of those taking the exam in September/October, a 75 percent pass rate is reported while March examinees had a 66 percent success rate. Statistics for 1998 and 1999 show the same pattern.

Now for the good advice: Have faith in your dental education, visualize that every thing will go well on the exam, be organized and avoid a brand new bur. Oh, and a little Kentucky Fried Chicken may help.

"There were three of us studying together for the exam," explains Cynthia Brattesani, DDS, who took the dental licensure exam in 1989. "The night before the exam, we had Kentucky Fried Chicken, something we didn't eat very often, but thought it would provide us with extra energy for the next day. After the exam, we all agreed that the fried chicken helped pull us through."

Fried chicken aside, Brattesani says she received some very good advice in a casual conversation with one of her professors at the University of California at San Francisco.

"The keys are to be organized and to envision what you will do step by step. And visualize everything going right."

Brattesani notes that advance planning helps organization on exam day.

"Take a cast of the arch you will work on during the exam, and then you can put the rubber dam on and punch it in advance. Do several in advance in case one rips.

"And remember details like wiping the dam after it's prepped," she adds. "Remember, 'what glows goes.' Show that you are clean, organized and care about dentistry."

Another helpful suggestion Brattesani received was to avoid using a brand-new bur.

"You will have more control with a slightly used bur," she says. "This is especially useful since hands may be on the tense side during the exam."

Several dentists note that anxiety and mental stress are really the biggest hurdles. In retrospect, dentists say they were well-prepared in dental school and that having confidence in this training will help on exam day.

"Just depend on your education and try to be calm and cool," says Chick Wolf, DDS. Having taken board exams in six different states, Wolf says he may hold the record

for taking dental licensure exams.

As a dental school graduate, he traveled around and took exams in Maryland, Florida, Colorado, Nevada, Arizona and California as he and his wife were trying to decide where to settle. Even though he had taken three other state exams by the time he reached California, it was still "traumatic."

"I took the exam at Loma Linda and it was a hot, smoggy day. You couldn't even see the sun," he recalled. "At that time (1972), the pass/fail rate was 50 percent. At the exam, all of the students were wearing white clinic jackets and I was wearing a blue one from when I worked in the Coast Guard. Then the examiners arrived, and they were wearing blue jackets. Then during the denture set up, the lab was so hot that the wax was melting and teeth were floating all over the place.

"I think they just wanted us to sweat," he said with a laugh.

For graduates planning on taking exams out of state, Wolf suggests meeting and talking to local students about the exam.

"The level of education in schools around the country is very comparable, and students have been given the best possible background to practice dentistry in any state," he said.

"When all was said and done with the state board exam, it was not as difficult as I thought it would be," said Debra Finney, DDS, who took the exam in 1986.

"The biggest hurdle is getting over the

## Results of the 2000 California Dental Licensure Exam

### March 2000

Total participants: 289  
Passed: 192 - 66 percent  
Failed: 97 - 34 percent

### June 2000

Total participants: 765  
Passed: 613 - 80 percent  
Failed: 152 - 20 percent

### September 2000

Total participants: 501  
Passed: 376 - 75 percent  
Failed: 125 - 25 percent

### Cumulative Statistics

Total participants: 1555  
Passed: 1181 - 76 percent  
Failed: 374 - 24 percent

anxiety and fear of the unknown. Just remember that you are well-prepared and that a majority of people have no problems.

“And in case something does go wrong, remember that it’s a one-point-in-time assessment and may not be an accurate reflection of your ability.”

### Perio Disease May Lead to Diabetes

Chronic periodontal disease may contribute to diabetes, according to a review of recent research. While it has been established that people with diabetes are more prone to developing periodontal disease, new research is suggesting that periodontal disease may, in turn, be a risk factor for diabetes.

The research review was presented at an American Academy of Periodontology/ National Institute of Dental and Craniofacial Research symposium on periodontal systemic connections held in April.

Periodontal disease can cause bacteria to enter the bloodstream and activate immune cells. These activated cells produce inflammatory biological signals (cytokines) that have a destructive effect throughout the entire body.

“In the pancreas, the cells responsible for insulin production can be damaged or destroyed by the chronic high levels of cytokines. Once this happens, it may induce Type 2 diabetes, even in otherwise healthy individuals with no other risk factors for diabetes,” explains presenter Anthony Iacopino, DMD, PhD.

According to Iacopino, hyperlipidemia or high serum cholesterol, not impaired glucose tolerance, seems to be a significant risk factor for periodontal disease in diabetics.

“Therefore, lipid-lowering therapies -- such as low-fat diets, lipid-lowering drugs and exercise -- are vitally important for diabetics who want to improve their quality of life, as well as their oral health,” he says. “The same approaches may also prove beneficial in nondiabetic patients with high cholesterol.”

The next step to determine for sure

whether periodontal disease can cause diabetes is to perform clinical studies and intervention trials.

### Studies Needed To Advance Dental Caries Strategies

The development of new diagnostic techniques to detect early stages of dental caries may give dentists more options than ever before to stop or reverse decay using noninvasive techniques. This and other findings emerged from a Consensus Development Conference on the Diagnosis and Management of Dental Caries Throughout Life, convened by the National Institutes of Health in March.

The conference examined the current state of dental caries research to help dental care providers and the general public make informed decisions.

Conference panel members reviewed an extensive collection of literature related to dental caries, including a systematic review of the dental research literature provided by the Agency for Healthcare Research and Quality. The panel also heard presentations by experts in the field, as well as public comment.

Although optimistic about the future of dental practice, the panel was disappointed in the overall quality of the clinical data that it reviewed. According to the panel, far too many studies were small, poorly described, or otherwise methodologically flawed.

“This is not to say that the diagnostic, preventive, and restorative techniques currently used do not work,” said the panel, “but rather that earlier studies to support their efficacy do not meet current scientific standards.”

The panel noted that effective dentistry requires early identification of children at high risk for extensive caries so that they may receive early and intense preventive intervention. Children at low risk also need to be identified to reduce unnecessary care and expenditures. According to the evidence presented, the most consistent predictor of caries risk in children is past caries experience. Low

socioeconomic status is also associated with higher caries rates. While some risk factors may be applicable across all ages, others are distinctive for adult and elderly populations, such as the inability to maintain good oral hygiene, lack of adequate salivary flow, and gum recession.

The panel called for a major investment of research and training funds.

Panel chair Michael C. Alfano, DMD, PhD, dean of the New York University College of Medicine, notes that “for the American people to benefit from these findings, insurance companies will need to change the way they compensate dental providers so that the next generation of conservative therapy can be enjoyed by everyone.”

### Fred Flintstone Went to the Dentist

Researchers looking at teeth found in Mehrgarh in pre-historic Pakistan have found what they believe to be one of the earliest examples of dentistry -- perfectly round holes in teeth that may have been created by early stone-tipped drills.

Electron microscopy showed the holes’ sides to be too perfectly rounded to be the result of caries. Also visible were concentric grooves that were probably left by a drill using a tiny stone bur.

Andrea Cucina, the scientist who discovered the holes, suspects they were a treatment for caries and that plants may have been inserted into them to prevent bacterial growth.

The holes were the same diameter as those found in necklace beads in the same area, so it appears that the people of Mehrgarh had the skill and tools necessary to perform the delicate dental work.

### Cake Cravings Are in the Genes

Our appreciation of sweet foods begins with an interaction between sugars and specific receptors on taste cells of the tongue. However, despite progress in identifying receptors for other tastes (sour, bitter, salty and umami or glutamate), the sweet taste receptor in mammals has remained elusive.

## Dentistry's Next Steps

The Consensus Development Conference on the Diagnosis and Management of Dental Caries Throughout Life called for:

- Studies of dental caries in the population that collect information on natural history, treatment, and outcomes in all age groups
- Clinical trials of established and new treatment methods that conform to contemporary standards of design, implementation, and analysis
- Systematic research on caries risk assessment
- Studies of clinical practice including effectiveness, quality of care, outcomes, health-related quality of life, and appropriateness of care

Now, a group led by Linda Buck at Harvard University has identified a candidate gene that may encode a sweet receptor. The group studied two strains of mice: so-called "tasters," which prefer water containing sugar or saccharin, and "nontasters," which show far less preference for sweet water.

Based on previous evidence that the sweet taste receptor gene might resemble the bitter and umami receptors (which are G-protein-coupled receptors), the researchers searched for G-protein-coupled receptor genes within the region of the mouse genome known to control the "taster" or "nontaster" phenotype. They found several such genes, but one in particular (T1R3) was expressed in taste cells. Furthermore, they found specific changes in T1R3 (and not the other genes) in the "nontaster" mice, thus providing further evidence that this gene may function as a sweet taste receptor.

Despite the strong circumstantial evidence that T1R3 encodes a sweet taste receptor, definitive proof awaits a functional test. For example, it should be possible to insert T1R3 into a cell that normally does not respond to sweet stimuli. If T1R3 indeed codes for a sweet taste receptor, such a cell should become responsive.

Experiments of this sort have proven particularly difficult in the taste receptor field. Nevertheless, the work will certainly spark more research in this area, as

there is substantial commercial interest in designing new sweeteners. At a more basic level, the work should also help to answer long-standing mysteries such as how responses at single neurons give rise to the complex perception of taste.

## Unfortunately, You Have Come A Long Way, Baby

Women now account for 39 percent of all smoking-related deaths each year in the United States, a proportion that has more than doubled since 1965, according to a report on women and smoking released by Surgeon General David Satcher.

The report concludes that the increased likelihood of lung cancer, cardiovascular disease, and reproductive health problems among female smokers makes tobacco use a serious women's health issue.

Meanwhile, increased marketing by tobacco companies has stalled progress in smoking cessation by women, and recent increases in smoking among teenage girls threaten to wipe out any progress that has been made in the past few decades, the surgeon general notes.

"In the early decades, smoking prevalence was more prominent among men, and it took nearly 25 years before the gap narrowed and smoking became commonplace among women," Satcher says. "Women not only share the same health risk as men, but are also faced with health consequences that are unique to

women, including pregnancy complications, problems with menstrual function, and cervical cancer."

Women and Smoking: A Report of the Surgeon General summarizes patterns of tobacco use among women, factors associated with starting and continuing to smoke, the health consequences of smoking, tobacco marketing targeted at women, and cessation and prevention interventions.

"Smoking is a critical women's health issue that must be addressed on all fronts," Health and Human Services Secretary Tommy G. Thompson says. "We must begin this battle in schools before girls even begin to smoke, and we must share with teenage girls that smoking is not only harmful, but it is not glamorous. Society must not glorify smoking."

The report calls for increasing public awareness of the devastating impact of smoking on women's health; exposing and countering the tobacco industry's targeting of women; encouraging public health policymakers, educators, health professionals, and women's organizations to work for policies and programs that deglamorize and discourage tobacco use; reducing disparities related to tobacco use and its health effects among different ethnic/racial populations; decreasing nonsmokers' exposure to environmental tobacco smoke; and mounting comprehensive statewide tobacco control programs proven to be effective in reducing and preventing tobacco use.

## Physicians Not Fleeing State, UCSF Says

Contrary to conventional wisdom, physicians are not leaving California for greener pastures elsewhere, according to a new study from the Center for Health Professions at the University of California in San Francisco.

But others maintain that the study is flawed and physicians are indeed leaving the state, leaving practice, or retiring, resulting in a medical "brain drain" out of the Golden State.



The study found that the number of physicians per 100,000 patients actually increased from 177 in 1994 to 190 in 2000.

Among the data studied were an American Medical Association medical licensure database and a survey of nearly 2,000 state physicians.

While many in the medical community believe that physician earnings in California are lagging due to the influence of HMOs and medical groups say they have trouble recruiting new physicians, 1998 incomes ranged from \$120,000 to \$250,000, which is comparable to that in other states.

But the Santa Clara County and California medical associations say that the study's data are outdated.

## Honors

The American Academy of Cosmetic Dentistry has presented Jeff Morley, DDS, of San Francisco, with its 2001 Award for Outstanding Contribution to Cosmetic Dentistry. The award recognizes his 25 years of dedication to advancing the field of cosmetic dentistry in both practice and communications.

Deon M. Carrico, DDS, of Dana Point, Calif., has been awarded the Western Pedodontic Odontic Society Mentor Award for 2001. He was an innovator of the society in 1956 and served as the first treasurer.

Henry H. Takei, DDS, of Los Angeles, has been named the Marquette University School of Dentistry 2001 Distinguished Alumnus in Dentistry. Takei is a professor of periodontics at the University of California at Los Angeles.

John Green, DDS, of San Rafael, Calif., has been honored with the Distinguished Service Award by the American Dental Education Association. He is dean emeritus of the University of California at San Francisco School of Dentistry.

Mahmoud Torabinejad, DMD, of Loma Linda, Calif., has been elected vice president of the American Association of Endodontists. He is the director of graduate endodontics and a professor of

endodontics at Loma Linda University School of Dentistry.

## Web Watch: Women's Smoking

Resources on tobacco statistics and cessation strategies are available on the following Web sites:

[http://www.cdc.gov/tobacco/sgr\\_forwomen\\_yahoo.htm](http://www.cdc.gov/tobacco/sgr_forwomen_yahoo.htm)

This page from the Centers for Disease Control and Prevention contains abbreviated and full versions of the surgeon general's recent report on the increases in women's death rates due to smoking.

<http://www.4woman.gov/quitsmoking/>

This Web page of the National Women's Health Information Center provides information on tobacco cessation, including information especially for teens and in Spanish.

<http://www.surgeongeneral.gov/tobacco/>

This page contains the latest findings about drugs and counseling techniques for treating tobacco use and dependence.

[http://www.cdc.gov/tobacco/statehi/pdf\\_2001/CA\\_sh2000.pdf](http://www.cdc.gov/tobacco/statehi/pdf_2001/CA_sh2000.pdf)

This page from the State Tobacco Activities Tracking and Evaluation System contains data on tobacco usage in California.



# General Dental Practice in the Hospital

STANLEY R. SURABIAN, DDS, JD

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**Stanley R. Surabian, DDS, JD**, is chief of dental services and program director for the general practice residency at Community Medical Centers in Fresno, Calif.

**T**his edition of the *Journal of the California Dental Association* focuses on the dentist's role in hospital practice. The four articles reveal the complexities in managing the diagnostic and treatment considerations of patients with special care requirements. I am pleased to have participated as contributing editor and as a contributing author to this edition.

In 1925, the American Dental Association published the first standards for hospital dental practice. For many years, ADA accredited the Hospital Dental Services as well as individual hospital residency programs.<sup>1</sup> General practice residency accreditation standards were instituted in 1972. In 1979, ADA became one of five corporate members of what is now called the Joint Commission on the Accreditation of Hospital Organizations. An ADA moratorium on accreditation of hospital services began on Jan. 1, 1982.<sup>2</sup> The ADA Commission on Dental Accreditation accredits dental schools and advanced education in general dentistry, GPR, and recognized dental specialty programs.

Several dental schools provide undergraduate dental student exposure to patients requiring special care; yet, a curriculum that includes special care dentistry is normally reserved for

advanced postgraduate education programs including the GPR, which must be hospital-based, and the AEGD, which is most frequently based in a dental school. While most AEGD programs have a special care component, some also offer a hospital operating room experience. The number of programs available is deficient. From 1972 to 1990, the number of programs increased by 57 percent (118 programs), and the number of positions increased by 131 percent (1,367 positions). The unmet demand for these graduate general dental programs was estimated to be approximately 300 positions.<sup>3</sup> As of Jan. 1, 2000, GPR and AEGD programs incorporate concepts of competency-based education to stress the outcomes of education rather than the process.<sup>4</sup>

The American Association of Hospital Dentists, one of three organizations making up the Federation of Special Care Organizations in Dentistry, is the only organization of hospital dentists representing general dentists and specialists under one umbrella. The Federation, also sponsored by the Academy of Dentistry for Persons with Disabilities and the American Society for Geriatric Dentistry, publishes an excellent bimonthly journal titled *Special Care in Dentistry*. Raymond F. Zambito, DDS, EdD, MBA, secretary of the American

Association of Hospital Dentists and later editor of the Journal of Hospital Dental Practice (now part of Special Care in Dentistry), in a speech presented before the American Hospital Association in 1972, took a visionary look at the development of hospital dental services that focuses success in three areas:<sup>5</sup>

- Total patient services;
- Education -- predoctoral and postdoctoral; and
- Community outreach extensions.

His vision is just as vivid and clear today as it was in 1972. Because of space limitations, I cannot list all the great pioneers and contributors who fashioned the environment that is furthered today by another generation of skilled hospital dentists. Dr. Zambito's message is on target for future planning and is the core of what we attempt to do today.

The articles in this edition are a small attempt to cover the field. I want to acknowledge our specialty colleagues who also contribute extensively to education and practice in the hospital environment, including oral and maxillofacial surgeons, pediatric dentists, periodontists, and other specialty colleagues and supporting dental auxiliary personnel. Certainly, I also want to acknowledge the tremendous support received from our physician, nursing, and administration co-workers. More often than not, a cooperative environment exists to further patient care, education, and community outreach.

Authors Dennis Kalebjian, DDS, and Carole Murphy-Tong, DDS, in their article "A Focus on the Institutionalized Aged and Special Care Patient for Today's Practice" review working with elderly and institutionalized patient populations. As you read through the article, the issue of access to care becomes critical. Care-facility dental evaluation and treatment is often rendered by dentists who see patients in the facility or in the dental office. Quite often treatment, based on the patient's psychological and physiological status, requires a hospital operating room. Patients in these facilities often

have complex needs and are on multiple prescribed medications. The dentist must have a knowledge base particularly appropriate in managing dental care for these individuals. The special care curriculum of GPR and AEGD programs should include dental education experience in this complex area of care.

The contributing editor authors two articles. The first is titled "Developmental Disabilities and Understanding the Needs of Patients with Mental Retardation and Down Syndrome." This article reviews the topics of developmental disabilities and application of the Americans With Disabilities Act, and then focuses on two specific diagnostic categories:

- Mental retardation and
- Down syndrome.

The second article is titled "Developmental Disabilities: Epilepsy, Cerebral Palsy, and Autism." This article focuses on three developmental disabilities, which do not have mental retardation as a diagnostic component but have critical dental and medical considerations that must be understood:

- Epilepsy;
- Cerebral Palsy; and
- Autism.

The author stresses that improving access to care is successful when barriers between patients with special needs and oral health services are removed. Increased understanding allows progress in this area. Oral Health in America: A Report of the Surgeon General, among its many recommendations, emphasizes the need to eliminate oral health disparities of people in this country.<sup>6</sup>

Authors Ronald Sani, DDS, and Richard Spencer, DDS, in their article "Integrating Hospital Dentistry into General Practice," review the clinical approach to managing patients requiring dental treatment in the operating room. The article takes the reader from assessment of the patient in the dental office to the hospital operating room, including postoperative recovery and patient discharge from the facility with scheduled follow-up and

management.

Every dentist must understand the parameters of hospital treatment as practiced by our dentist colleagues who hold hospital medical staff privileges. Advanced postgraduate general dental education programs capably train future practitioners in this important area. These articles should enlighten the dental community and increase the level of understanding of hospital general dental practice. The contributing editor's hope is that the reader will be encouraged to explore the issues raised in this edition to successfully manage care of their patients, including those with special needs.

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# A Focus on the Institutionalized Aged and Special Care Patient for Today's Practice

DENNIS M. KALEBJIAN, DDS, AND CAROLE A. MURPHY-TONG, DDS

**ABSTRACT** Dentists must understand the growing institutionalized-aged and special-needs population, the places wherein they reside, and the unique challenges of access that confront both the patient and dentist. This article discusses governmental regulation and legislation of long-term-care facilities and outlines professional duties and requirements of dentists who care for residents of such facilities. It will also cover the treatment needs of this population and the venues available to the hospital-trained dentist.

It is Monday morning, and Dr. Treatall arrives early to prepare himself for the day ahead. Unlike the other days of the week, this is the day Dr. Treatall begins practice in his private office but completes his workday at the community hospital treating one of his "special" patients in an operating room setting. The rich aroma of Starbucks' flavor of the day momentarily causes Dr. Treatall to think about his good fortune to be a dentist on such a magnificent day. A crisp knock on the door, however, refocuses the doctor's eyes upon today's rather long patient list.

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The receptionist half whispers, "Dr. Treatall, your first two patients have been seated." Obediently, Dr. Treatall dons his OSHA-compliant white lab coat, grabs his loupes, opens the door, and heads toward operatory 1.

Though the waiting area is not in his line of sight, Dr. Treatall has sensed more than the usual motion and conversation emanating from that part of the office.

The receptionist advises, "Dr. Treatall, there was a problem with transportation. Your 9:30 and 10:15 appointments have arrived early, but not to worry, the nursing home attendant will wait with them."

Dr. Treatall nods his head in acknowledgment, as he begins to weigh the effect of voicing dissatisfaction. He thinks to himself "Is it purposeful to test the natural impatience of two octogenarians in the waiting room, or should daily production be sacrificed to a 'humanitarian'?



reschedule?" Indecisive, Dr. Treatall greets Mrs. Jones in operatory 1. Mrs. Jones has also noticed the congestion in the waiting area as she recounts her passage through it, employing the colorful phrase "wheelchair gauntlet." Dr. Treatall understands that Mrs. Jones means no harm, and he silently administers local anesthesia for tooth No. 30's replacement alloy.

Next, Dr. Treatall slips into operatory 2 to examine a new patient, as Peggy the hygienist stands by. He is greeted by the warm smile and wide eyes of a young man named Johnny. Johnny is a high-functioning, developmentally delayed patient with a seizure disorder, who is not at all self-conscious. Johnny is extremely friendly, eager to cooperate, though maybe a little loud. Dr. Treatall has always been committed to providing access for all patients. Having negotiated the examination, he clears Peggy to begin the scaling.

Returning to check on Mrs. Jones, Dr. Treatall inquires about the profoundness of her anesthesia. He ends up asking twice so he can be heard over Johnny's excitement of working with the hygienist next door. (If ever the annoying sound of the high-speed handpiece is welcome, it's now.) No longer aware of the loud banter from the adjacent operatory, Dr. Treatall becomes immersed in the technical bliss of operative dentistry.

Suddenly, like an alarm clock that jolts one from a restful slumber, Peggy declares her patient to be in a state of seizure, grand mal to be specific. As Dr. Treatall provides the needed emergency support, Mrs. Jones bites on an oversoaked cotton roll. As Mrs. Jones waits, she overhears the receptionist telling the doctor that one of the nursing home patients had become disruptive in the waiting room, so both were returned to the facility. "Dr. Treatall, you will now have plenty of time to complete Mrs. Jones." Mrs. Jones is silently overjoyed.

Thirty minutes later, Dr. Treatall dismisses Mrs. Jones. She asks if the coast is clear as she plans her exit from the operatory; there is no answer from Dr. Treatall. With a bit less bounce in his step, Dr. Treatall retreats to his small private office only to find a note confirming his scheduled in-service at Sleepy Haven Nursing Home today at noon. Recognizing the doctor's difficult morning, the receptionist delivers a fresh cup of coffee, while praising her employer's willingness to treat long-term-care patients. Departing, the receptionist adds, "I get so many calls from care homes and nursing homes, you must be everybody's favorite dentist."

Somewhat worn from the morning's events, Dr. Treatall smiles as he is satisfied with the coffee's fine aroma.

Every community benefits from the presence of a "Dr. Treatall" who provides dental access to underserved, long-term-care populations. As depicted in the above fictional account, the commitment is not an easy one. The challenge to meet the dental treatment needs for residents of long-term-care facilities is multidimensional. Dentists are challenged to deliver care to a group of patients, many of whom have complex physical and/or mental health conditions. Sometimes the physical parameters of a private dental office cannot be overcome for such patients, making it necessary for the dentist to utilize an alternative treatment setting. Guardianship and consent issues are often burdensome and time-consuming. Remuneration for services delivered to Medicaid beneficiaries, who make up 67 percent of all California skilled nursing home residents,<sup>1</sup> frequently fails to cover overhead expenses. Alternatively, many long-term-care patients who receive no public funds are constrained by economic factors. Such patients frequently choose to forego needed dental care,<sup>2</sup> only to complicate any future treatment plan. Lastly, the daily oral hygiene needs of nursing home residents are often greater than the resources available to address them, especially when nursing homes must struggle to retain a skilled and knowledgeable staff.

Today's dentist must understand the growing institutionalized aged and special needs population, the places wherein they reside, and the unique challenges of access that confront both the patient and dentist. This article identifies hospital-based general practice residency and advanced education in general dentistry programs as primary sources for training new dentists to provide access for nursing home residents. It addresses governmental regulation and legislation of long-term-

care facilities and outlines professional duties and requirements of dentists who care for residents of such facilities. Lastly, this article will discuss the treatment needs of the institutionalized aged and special needs population within the context of various management strategies and treatment venues available to the hospital-trained dentist.

### The Institutionalized Patient

In the care-dependent populations of the United States, geriatric, developmentally disabled, physically disabled, and cognitively impaired groups are growing. In 1995, there were approximately 1.5 million elderly residents living in nursing homes.<sup>3</sup> This number continues to grow as more people live into their 80s and beyond, due in part to lower mortality rates from disease in older adults. Notably, the 20th century has experienced a tenfold increase in the 65 and older population, to 12.7 percent of the total population in 1998; and further acceleration of growth in the 65 and older segment is projected.<sup>4</sup> By the year 2040, 21 percent of the U.S. population will be older than 65. The special care populations, including adults with cognitive disorders (e.g. Alzheimer's dementia) and developmental disabilities (e.g., Down syndrome), will also increase.<sup>5</sup> Of the 50 million people who are disabled in the United States, 10 million require assistance with basic daily living activities. By the year 2050, it is projected that 20 million people will not be able to live independently due to some form of a chronic health condition.<sup>6</sup> The facilities where many members of these groups reside will similarly expand.

Patients living in institutional settings are a heterogeneous group of individuals with diverse medical conditions. They are found living in a broad variety of settings, which can be categorized according to distinctions such as facility size, level of nursing care, profitability, patient's primary diagnosis, patient's length of stay, etc. There are nursing

homes, skilled nursing facilities, subacute facilities, Alzheimer's centers, psychiatric hospitals, residential facilities for the developmentally disabled, and long-term-care and intermediate-care facilities; and the list continues with any combination of these distinguishing classifications. Since 1967, there has been an 85 percent decrease in the developmentally and psychologically impaired population cared for in larger state-operated facilities, as reported by the residential care industry. Underlying this decrease has been a long-standing effort to place both developmentally and psychologically disabled patients into smaller facilities and residential homes, integrating them into the community as much as possible.<sup>7,8</sup> As a result, in California, the average number of residents per facility was 7.4.<sup>9</sup> This move away from large state-run facilities to smaller private-care facilities has left patients in a state of dental decline. Even though the intention was to improve the lives of the institutionalized, patients are no longer cared for by an institution's staff dentist but now must rely on practitioners from within the community who are often unable or unwilling to treat them.<sup>8</sup>

Regardless of the facility type, the overwhelming dental needs of the institutionalized population has been thoroughly documented during the past 20 years. The 1986 California Dental Association Survey of Skilled Nursing Facilities found that 56 percent of all residents needed comprehensive oral examinations, and 17 percent needed immediate attention for acute conditions.<sup>1</sup> Two years later, Barnes and colleagues conducted a study that found that 31.7 percent of institutionalized adult mental patients needed emergency care and that overall 94.4 percent required some form of dental therapy.<sup>7</sup> In 1993, Dolan and colleagues reported edentulism was as high as 41 percent among nursing home residents, and approximately 46 percent of those already wearing dentures needed new or relined prostheses.<sup>11</sup>

Finally, the 1995 U.S. National Nursing Home Survey found that approximately 60 percent of nursing homes either have dental services on call or off site, or do not have dental services at all.<sup>3</sup>

### Training to Provide Access

The outlined demographic changes and statistical projections emphasize the need to involve more dentists in the delivery of dental services for institutionalized patients.

The average general practitioner's lack of training is central to the issue of access to care for the institutionalized dental patient.<sup>10,12</sup> Historically, the deficiency in training contributed to the lack of exposure to or familiarity with the population, which resulted in the inability of practitioners to include such patients within private community-based practices. In response, didactic and clinical experiences directed toward treating the functionally dependent and frail older dental patients within GPR and AEGD programs were recommended to the ADA Commission on Dental Accreditation.<sup>13</sup> Underscored by the profound needs of the institutionalized population, there is dual benefit to the important role hospital-based GPR and hospital-affiliated AEGD programs now play. Not only are practitioners enriched as a result of these programs; but also, and more importantly, patients with special needs are afforded access to dental care. The treatment setting of last resort for even the most challenging institutionalized dental patient -- the hospital operating room -- is well within the capability of hospital-trained dentists.<sup>5</sup>

Hospital-based GPR and hospital-affiliated AEGD programs offer excellent exposure to medically compromised patients, many of whom are residents of skilled nursing or other institutionalized care facilities. GPR and AEGD programs are well-positioned to serve long-term-care populations as part of the competency-based training and assessment for dental residents.<sup>14</sup>

The ADA outlines seven goals for hospital GPR and AEGD programs:<sup>15,16</sup>

I. The resident acts as a primary care provider for individuals and groups of patients.

II. The resident plans and provides multidisciplinary oral health care for a variety of patients, including those with special needs.

III. The resident manages the delivery of oral health care by applying concepts of patient and practice management and quality improvement that are responsive to a dynamic health care environment.

IV. The resident functions effectively within the hospital and other health care environments.

V. The resident functions effectively with interdisciplinary health care teams.

VI. The resident applies scientific principles to learning and health care. This includes critical thinking, evidence or outcomes-based clinical decision-making, and technology-based information retrieval systems.

VII. The resident utilizes the values of professional ethics, lifelong learning, patient-centered care, adaptability, and acceptance of cultural diversity in professional practice.

While the above seven goals outline the purpose of hospital-based dental graduate training, it is significant that all seven goals have specific relevance to long-term-care populations. Goal I establishes the dentist as the primary care provider -- an important distinction in settings where patients are maintained by a variety of primary and ancillary care providers. Goal II references special needs patients, who make up a segment of the long-term-care population. Goal III addresses "responsive(ness) to a dynamic health care environment." The rapid growth of the 75 and older segment of the U.S. population<sup>17</sup> and acknowledgment of the \$70 billion nursing home industry<sup>18</sup> will demand responsive practice management measures by dentists. Goal IV speaks to the resident's ability to function effectively at all extra-office sites. Goal V underscores the need

for the resident dentist to communicate and coordinate with other professionals to manage oral care for compromised patients whose care must be multifaceted. The scientific principles referenced in Goal VI must be the foundation for the expansion of methods and techniques employed for nursing home residents. GPR and AEGD didactic training is well-suited to develop the critical-thinking skills of a new generation of dentists. Lastly, Goal VII captures the essence of what is professionally required to successfully deliver care to long-term-care residents.

### Legislation and Regulation

Guidelines for dentists working within nursing homes are based upon federal and state regulations for long-term-care facilities, within the context of the dental practice acts of each state. Nursing homes with hospital affiliation are additionally influenced by standards of the Joint Commission on Accreditation of Health Care Organizations.<sup>19</sup> For relevance to the broadest number of dentists who interact with community-based facilities within California, this paper limits discussion to the federal and state regulations and related statutes.

The Medicare/Medicaid rules of the Federal Omnibus Reconciliation Act of 1987 as well as select California statutes and regulatory codes are pertinent to California dentists. While the 1987 federal rules are most widely cited,<sup>19</sup> the more restrictive provisions of coexisting state and federal regulations always prevail.

California Code defines dental services as "those services provided by dentists and registered dental hygienists."<sup>20</sup> Written arrangements for obtaining diagnostic and therapeutic services shall be prescribed by the attending dentist. The facility "shall assist" the patient in arranging for transportation. The advisory dentist must participate at least annually in the staff development program for all patient care personnel and approve oral hygiene policies and practices for care of patients.<sup>21</sup> Dental service requires

comprehensive diagnostic care for all clients and must include a complete extraoral and intraoral examination. In cases where a client has not received a dental examination within the six months prior to admission, the client's oral condition must be evaluated by a dentist within one month following admission. Comprehensive treatment services for all clients include provision of dental treatment, annual re-examination, oral hygiene instruction, maintenance of a permanent dental record, and full-time dental emergency coverage of clients.<sup>22</sup>

By comparison, the 1987 federal act requires skilled nursing facilities to provide or obtain routine and emergency dental services for its residents.<sup>23</sup> The federal regulations were designed to be the national tool requiring nursing homes to become directly responsible for the dental care of their residents. The practical application of dental care within the nursing home begins with a minimum data set assessment and care screening for the nursing facility resident. The oral-related portion of the MDS screen is usually performed by nondental personnel within 14 days of admission and repeated at least annually thereafter.<sup>24</sup> The MDS form includes two sections relevant to dentistry: "oral problems," listed under the oral/nutritional status section, is usually completed by a dietitian; and "oral status and disease prevention," listed under the oral/dental status section, is usually completed by a nurse. Positive findings from the screening mandate that a dentist be summoned for examination and comprehensive dental treatment plan within seven days.

State licensure rules generally mirror federal regulations,<sup>19</sup> however comparison and analysis reveal unique sections of each regulation that should be integrated into a nursing home's guidelines for resident dental care. For example, federal regulations have changed the nursing facility's duty. Instead of merely assisting residents who



seek dental services, they are directly responsible for the dental care needs of their residents. At the same time, two California regulations remain purposeful for inclusion into dental guidelines. The first issue relates to nurse's aides, who render most of the nursing home resident's daily care, including oral care. The California regulatory requirement for annual advisory dentist participation in a staff development program for all patient care personnel affords some remedy to the skill deficiencies and high turnover rates among nursing staff members.<sup>25</sup> The second issue concerns the fact that dentist-performed oral examinations are more consistent and thorough in identifying oral health problems than are MDS oral examinations performed by an experienced nurse.<sup>26</sup> The California regulation requiring a dentist-performed comprehensive extraoral and intraoral examination within one month following admission, may in practice be more restrictive than the federal MDS screen by nondental personnel. Examination within one month is required only when an examination has not been performed and documented within the six months prior to the resident's nursing home admission.<sup>22</sup>

Finally, a review of California statutes regarding dentures within the institutionalized aged population is appropriate. Dentist responsibility for labeling of new dentures began in 1983, requiring that "any dentures fabricated by, or pursuant to, an order of a dentist are to be marked with the name, initials, or social security number of the patient for identification purposes unless the patient objects."<sup>27</sup> Similarly, facilities have responsibilities relative to the theft and loss of dentures of residents living within long-term-care facilities. "The marking of a patient's personal property, including dentures" is among the policy and procedures required for implementation by long-term-care facilities.<sup>28</sup> Facility policy regarding marking of dentures for identification purposes requires disclosure

to nursing home residents and their families with no right of refusal. Advisory and provider dentists who work with nursing home residents must understand nursing home policies and procedures pursuant to relevant California statutes.

### Patient Management Considerations

There are several considerations necessary to develop an effective management strategy for the delivery of dental care to institutionalized patients. The first is a strong personal commitment to the patient's needs. It is important to build partnerships with long-term-care facilities and have open lines of communication with medical and administrative staff. This will ensure that as patients are examined and evaluated, each receives the appropriate treatment based upon factors such as cooperation level, general health status, financial resources, and severity of oral disease. An interdisciplinary approach to care is key to achieving satisfactory outcomes for all parties involved. This can be a complicated task but at a minimum should include communication with staff responsible for the patient's daily care, the attending physician, the patient and/or patient's family or guardian. With these combined efforts, it can be determined if the patient is a suitable candidate to receive comprehensive dentistry, maintenance care, or only limited emergency treatments.

Depending upon the scope of patient needs, the selected level of care, and equipment resources available, the dentist can determine whether to deliver dental services on site within the care facility or within the familiar confines of the traditional private office setting. Alternatively, if a patient has extensive or acute needs, has demonstrated repeated resistance to treatment due to a limited or debilitated mental state, or is unable to conform to the demands of treatment due to a physical disability, then general anesthesia may be indicated.<sup>5,29,30</sup> If the patient's incapacity to cooperate

compromises the quality of dentistry or endangers the patient and staff, this is a strong justification for using general anesthesia.<sup>9,29</sup> Another issue that must be factored into a patient management decision involving general anesthesia is the option of physical restraints. General physical restraint is inappropriate for all patients. Specific restraint to protect the patient for a short time is used only when indicated and with informed consent. Particularly when the patient is elderly or otherwise frail, physical restraint may induce serious physical or psychological trauma, possibly negating any benefit gained from the dental treatment.<sup>31</sup> Whenever general anesthesia is contemplated for institutionalized patients, the increased risk for complications must be carefully weighed. Elderly nursing home patients usually are medically compromised and are therefore poorer candidates for anesthesia. By comparison, some patients with special needs, e.g., a patient with emotional disability, are not necessarily predisposed to a higher risk from anesthesia. However, it should be noted that there may be a higher incidence of medical problems common to a particular disability; therefore, pre-anesthetic evaluation is important.

Lastly, informed consent is an important moral and ethical issue faced each time the institutionalized patient is identified as needing dental services. As with any proposed treatment, caregivers are required under modern interpretation to disclose any information to patients and then allow patients to either accept or decline the proposed treatment. This means that all of the risks and benefits of the procedure must be known, appreciated, and understood as well as the risks of not having the treatment performed.<sup>32</sup> However, with this population, many patients are not able, or are only marginally able, to make informed decisions about their care. Understanding information becomes a critical issue as it may take longer

for patients to absorb and respond to treatment choices. Consent cannot be informed if patients are unable to recall what was discussed with them prior to giving consent. However, refusing treatment is allowed and in itself does not automatically mean the patient is incompetent. In most cases, competency will have already been established for institutionalized individuals because of previous medical determinations. Alternative health care decision-makers most often are the closest living relative, a court-appointed guardian, or, in the specific instance of California Regional Centers for the Developmentally Disabled, the regional center administrator or medical director. Most often, conservator information is documented in the patient's medical or facility record, even though in some dental situations there may be insufficient time to obtain the informed consent from the person authorized to give it. In such rare cases, the treating dentist who reasonably believes that a procedure should be undertaken immediately may proceed without liability exposure for failure to obtain informed consent.<sup>33</sup> However, in the event that the prescribed emergency treatment requires hospital management with general anesthesia, it is prudent to document the sanction of two independent practitioners not involved in the delivery of treatment.<sup>30,34</sup> With regard to the comprehensive treatment needs of individuals legally incapable of giving consent, it is imperative to involve family or other responsible third parties in the consent process prior to delivery of planned dental services.<sup>34</sup>

## Conclusion

This article described the growing institutionalized elderly and special needs population; defined the places wherein they reside; and identified the unique challenges of access to dental care that confront both patient and doctor. Hospital-based GPR and AEGD programs were cited as primary sources for training

dentists to provide access for nursing home residents. Governmental regulation and legislation relevant to long-term-care facilities were addressed, and the professional duties and requirements of dentists serving nursing home patients were reviewed. Finally, this article itemized treatment objectives within the institutionalized aged and special needs population, outlined various management strategies, discussed different treatment venues available to the hospital trained dentist, and reviewed related consent issues.

If the problems of providing access to dental care for the institutionalized population were simple, then solutions would have been implemented years ago when unmet needs were first recognized. During the past 20 years, positive efforts have been made with legislation directed to nursing homes and educational guidelines directed to postgraduate dental programs. These efforts have helped facilitate care and promote professional involvement as the aged and special needs populations significantly increase. However, for the present, it remains important for all practicing dentists to acquire the professional understanding and personal commitment required to meet the needs of our most challenging patients.

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# Developmental Disabilities and Understanding the Needs of Patients With Mental Retardation and Down Syndrome

STANLEY R. SURABIAN, DDS, JD

**ABSTRACT** This article provides the dentist with a background on developmental disabilities, services, and issues related to statutory and regulatory requirements, with a focus on mental retardation and Down syndrome. Down syndrome has mental retardation as a component, yet requires additional emphasis because of its prevalence and associated craniofacial manifestations. Also discussed are treatment considerations.

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*On Andrew's big night, he sat on stage in his high school gym and waited as the reigning homecoming royalty silently read a scroll bearing the names of their successors. Each year, seniors select five boys and five girls as candidates for king and queen of the school. The entire student body then chooses the winners by secret ballot.*

*The couple wove tantalizingly among 10 would-be monarchs and finally grabbed Andrew and the next queen. Andrew, a 17-year-old senior, is no star quarterback. To his 450 classmates, none of that mattered. Neither did his Down syndrome.*

*Tyler, a classmate, said, "I don't think it's ever been that loud in that gym before. .... I tried to keep it in around all my friends. But when he got up there with the crown, I just couldn't hold it in anymore. ... A few tears had to roll down."*

*"I wasn't expecting it," said Andrew, his blue eyes sparkling. "I thought I'd be on the bottom." The night Andrew was crowned, Hannah was chosen as homecoming queen. "I saw it was Andrew, and I was ready to give him a big hug. So many times kids with disabilities don't get attention like that. It's attention they deserve as much as anybody else," she said.<sup>1</sup>*

**T**he purpose of this article is to provide the dentist with a background on developmental disabilities, services, and issues related to statutory and regulatory requirements. The article then focuses on mental retardation and Down syndrome. Down syndrome has mental retardation as a component, yet requires additional emphasis because of its prevalence and associated craniofacial



**Table 1.** The Department of Developmental Services Client Development Evaluation Report Breakdown of the Number of Individuals With Specific Diagnostic Categories.<sup>8</sup>

Disability	Number With Disability	Percent With Disability
Mental retardation	115,671	82
Epilepsy	32,248	23
Cerebral palsy	29,984	21
Autism	13,511	10
The numbers may reflect duplicated counts because clients may have more than one disability.		

manifestations. Treatment considerations are included, and this article emphasizes the need to establish referral patterns to those dentists who utilize the hospital operating room as an alternative setting to provide necessary treatment. The alternative creates an access-to-care problem.

## Background

The general dentist with hospital privileges provides services for segments of the population traditionally underserved in health care. Services in the hospital environment are provided to patients with special care considerations such as those with developmental disabilities, those with medically compromising conditions, and young children who present special behavior-management problems. In some cases, an overlap may occur with all of these situations presenting in the same patient.

The recently published document *Oral Health in America: A Report of the Surgeon General* concludes with a framework for action to remove known barriers between people and oral health service:

"Individuals whose health is physically, mentally, and emotionally compromised need comprehensive integrated care. ... Given the wide variability among groups with disabilities, more in-depth assessment and analysis of the determinants of oral health status, access to care, and the role of oral health in the overall quality of life and life expectancy are needed."<sup>2</sup>

Access to dental care is an issue of increasing importance. Dental school special care programs or advanced education programs in a hospital-based general practice residency or in general dentistry are important training experiences for dentists who wish to provide dentistry to patients with special needs.<sup>3</sup> All people with developmental disabilities, qualifying by California Department of Developmental Services standards, are eligible for state assistance. Attitudes within the dental team, financial considerations, self-image problems, and medical or physical conditions limit access to care.<sup>4</sup> Modernly, the Americans With Disabilities Act of 1990 has addressed several issues and provides the federal definition of disability under the ADA:

"(2) Disability. The term disability means, with respect to an individual (A) a physical or mental impairment that substantially limits one or more of the major life activities of an individual; (B) a record of such an impairment; or (C) being regarded as having such impairment."<sup>5</sup>

The ADA consists of requirements under several sections of the law, which include employment, transportation, state and local government services, public accommodations, and telecommunications. Complaints for employment discrimination may be filed with the Equal Employment Opportunity Commission and remedies include back pay and court orders to stop discrimination. Private lawsuits are limited to stopping discrimination, but not for

money damages. Complaints may also be filed with the U.S. attorney general's office. The attorney general may file lawsuits to stop discrimination, obtain money damages, and impose other penalties. This enforcement pattern is followed in other sections of the ADA. Three U.S. Supreme Court decisions have upheld the federal ADA provisions.

At the state level, a broader definition is applied to the term "disability" in California. With the recent passage of AB 2222, California has the strongest ADA law in the country. This law amended the state's Fair Employment and Housing Act. Under AB 2222, mitigating measures do not dilute the definition of disability in California. Under federal law, a person may not meet the definition if "mitigating measures" are used to manage the disability; whereas, under California law, even if "mitigating measures" are present, that does not negate a person's disability status. Furthermore, the ADA uses the term "substantial limits"; however, the new California law eliminates the term "substantial."<sup>6</sup> How does this apply in a practical sense? A person with a visual impairment qualifying under the ADA with a disability, under the federal law, would not qualify if corrective lenses were worn to improve vision. In California, the mitigating circumstance would not preclude qualification simply because corrective lenses are used. Dentists and other health care workers should be aware of federal ADA requirements and the California modifications.

For purposes of this article, California law must be looked at for the specific definition of developmental disability. Recognizing that people with developmental disabilities are covered under the ADA, people with other disabilities come within the ADA definition while not qualifying with a developmental disability. In California, the Lanterman Developmental Disabilities Services Act of 1969 defines the rights of people with developmental disabilities and how services are delivered. The Department

of Developmental Services promulgates Title 17 regulations to meet statutory requirements. Developmental disabilities are defined by California statute:

"The term developmental disability refers to a severe and chronic disability that is attributable to a mental or physical impairment. The disability must begin before the 18th birthday, be expected to continue indefinitely, and present a substantial disability. Also, the disability must be due to one of the following conditions:

- Mental retardation
- Epilepsy
- Cerebral palsy
- Autism
- A disabling condition closely related to mental retardation or requiring similar treatment
- A developmental disability does not include other disabling conditions that are solely physical in nature."<sup>7</sup>

The Department of Developmental Services Client Development Evaluation Report breaks down the number of individuals with specific diagnostic categories (TABLE 1).<sup>8</sup>

The Department of Developmental Services' client population numbers 140,316. Of this client base, only 3,808 individuals with developmental disabilities (2.7 percent) are in California Developmental Centers. The developmental centers provide complete dental facilities and services. Full-time dental staffs provide care to the population of each center. A total of 132,691 clients (97.3 percent) are in a home environment, private residential, or care facility. While the idea of placing patients in a developmental center often brings to mind an image of a "snake pit" environment, this is not the current situation. In this author's opinion, having visited these centers many times, care is extraordinary; and the commitment of the care providers is vigorously monitored and regulated. Clients receive routine dental care, and recall systems are in place. Incremental dentistry facilitates completion of

necessary dental care because access to care is ensured. In the center's living areas, workers assist or provide oral hygiene care. In 1998, the Academy of Dentistry for Persons with Disabilities addressed the situation in a position paper titled "Preservation of Quality Oral Health Care Services for People with Developmental Disabilities":

"No one intends for the move to the community to result in a deterioration of an individual's health, specifically oral health. However, that is exactly what is happening for some citizens, especially those who cannot access comprehensive oral care in their community or require special behavior management during dental procedures."<sup>9</sup>

Similarly, the surgeon general's report recognized the access-to-care problem that comes with deinstitutionalization:

"Deinstitutionalization has resulted in highlighting the problem these individuals have regarding access to dental care as they move from childhood to adulthood. Availability of dental providers trained to serve special needs populations and limited third-party support for the delivery of complex services further complicate the issues entailed in addressing the needs of this population."<sup>3</sup>

A study of parents of children with developmental disabilities examined access-to-care issues for people with various developmental disabilities. Problems finding dental care in the community were measured. The results showed problems in access by diagnostic category expressed by percent:<sup>4</sup>

- Cerebral palsy: 60 percent;
- Mental retardation: 54.1 percent;
- Autism: 46.7 percent;
- Epilepsy: 28.6 percent; and
- Down syndrome: 23.5 percent;

The study does not measure the number of dentists willing to provide care. Unfortunately, common methods used by parents and caretakers to find care often fall short in special care situations. Component and constituent dental societies need to gather information from

their membership for referral to dentists, residency or dental school programs, and hospitals providing special care dentistry. Agency and advocacy organizations are often aware of provider availability, but this information is not always updated.

Glassman and Miller have assessed the need for community-based dental delivery systems for people with special needs at the University of the Pacific, School of Dentistry, Center for Oral Health for People with Special Needs, in San Francisco.<sup>10</sup> A system was developed with the Department of Developmental Services State Regional Centers to improve oral health for people with special needs. The ongoing program includes oral health assessment, coalition building, development and networking of local resources, training of health professionals, and utilization of preventive dentistry training materials.<sup>11</sup> This program addresses the long-standing problem of access to dental care for people with developmental disabilities.<sup>12</sup>

The patient with a developmental disability presents no real problems in treatment in the general dental office. Modification of normal routines and procedures and patient management techniques are minimal.<sup>13</sup> For the dentist without hospital privileges, those few patients requiring general anesthesia in an operating room are easily referred to dentists in the community offering those services. Because people with developmental disabilities may have one or more conditions that would lead to management difficulties, each patient requires individual evaluation by a dentist. Physicians typically have a minimal understanding of dental treatment considerations unless the physician has a special interest in and is routinely involved with the practices of knowledgeable dental colleagues. The oral evaluation requires a dentist's level of assessment abilities. GPR and AEGD programs provide the level of training necessary for diagnostic evaluation of the physical status, the oral condition, and the polypharmacy

considerations leading to development of a problem list and ultimately a treatment plan that considers how the process best meets the patient's oral health care needs. Under dentist direction and supervision, the dentist and a dedicated auxiliary staff constitute the ideal team to serve best the patient's interests.

### Mental Retardation

To understand mental retardation, there must be recognition of its diagnostic features and the degrees of severity within the intellectual component of the condition.

#### *Diagnostic Features*

To have the diagnosis of mental retardation, the person must meet all the following three diagnostic criteria. Each criterion will be discussed separately:

- Significant subaverage general intellectual functioning;
- Concurrent deficits or impairments in present adaptive functioning; and
- Onset before age 18 years.<sup>14</sup>

### Significant Subaverage Intellectual Functioning

The intelligence quotient (IQ or equivalent) is determined by use of one or more standardized, individual intelligence tests (Wechsler, Stanford-Binet, Kaufman Assessment). The IQ must be at an average of 70 or lower. The Wechsler IQ of 70 represents a range of 65 to 75 because the measurement error is plus or minus five. An IQ of 70 is two standard deviations below the mean. Of importance in IQ determination are such factors as sociocultural background and native language and associated situations such as handicaps in communication, motor skills, and sensory perception. The diagnosis becomes more complicated when scattered subtest scores or other factors reflecting an individual's strengths and weakness influence the IQ scale. Diagnosis is complicated by discrepancies between the factors used in measurement. Diagnostic verbal and performance scores

cannot be averaged merely to reflect the mathematical result.

History demonstrates examples of strongly believed characteristics. Identification of mental retardation or the propensity toward mental retardation was based most often on whichever prejudice was at the forefront of thought.<sup>15</sup> Ethnicity was often categorized as a factor. When classified by Caucasians in the mid-19th century, the "Caucasian type" was the "highest functioning" in human abilities. Similarly, as reflected in a series of New York Times articles in the early 20th century, there was the concept of "feeble-mindedness" and the dangers posed by "weak minds." The extrapolation is that the "feeble-minded" were a public menace and morally defective, including "the insane, the socially deviant and the mentally deficient."<sup>15</sup> By the mid-20th century, this type of belief diminished because of other factors, including the rise of ethical values of autonomy inspired by the facts revealed during the Nuremberg Trials following World War II. Society also looked at issues of racial prejudice and the lack of informed consent for medical research testing. In 1959, the public became aware that at Willowbrook State School, children with mental retardation were given hepatitis to study the detectability of the disease. In 1963, elderly people in a New York hospital were injected with live cancer cells to see if the cells survived. The infamous Tuskegee Study, 1932-1972, was a shock to the public consciousness. African-American males were studied to see the effects of end-stage syphilis. The patients were never informed that penicillin was available to cure the disease. In 1972, the study came to public awareness when all subjects were either dead or demented. The concept of biomedical ethics developed in reaction to paternalistic beliefs coaxed under the veil of beneficence -- do the best for your patient. Physicians decided what was best typically without the informed consent of the patient. Modernly, the ethical base of autonomy is in the forefront. The patient must be

the decision-maker based on material information revealed by the health care provider in language the patient can understand. To consent to or refuse treatment is the patient's decision.<sup>16</sup>

Similarly, societal endorsement of ethnic segregation and gender discrimination began to be revealed. While negative or incorrect societal attitudes are rarely erased, modernly, they are diminished in influence to the point where society as a whole takes a better direction. Knowledge, reason, and research with ethical guidelines replace dogma. The determination of "significant subaverage intellectual functioning" as one of the criteria used to determine a diagnosis of mental retardation considers not only mathematical results of standardized testing but also all factors leading to a correct diagnosis.

### Concurrent Deficits or Impairments in Present Adaptive Behavior

What standard is expected? The state of California under the Welfare and Institutions Code, Section 4512, looks to the individual's age or cultural group. Next, the deficit or impairment must be apparent in at least two of the following areas:

- Academic skills;
- Communication;
- Health;
- Home living;
- Leisure;
- Safety;
- Self care;
- Self direction;
- Social/interpersonal skills; and
- Use of community resources.<sup>7</sup>

A person's IQ measurement tends to remain stable because it is a cognitive determination. Adaptive functioning can improve depending on the education and training available to the individual.<sup>14</sup> The American Association on Mental Retardation has an adaptive behavior scale. Behavior scales provide a clinical assessment of several factors. Complicating factors include the presence of significant handicaps. Some factors

normally considered maladaptive may actually reflect good adaptive skills based on that person's life situation.<sup>14</sup> One example is dependence; dependence is a feature of adaptive behavior necessary in institutional or residential care situations. Rather than being a negative factor, dependence becomes a normal adaptive feature in this situation. The individual, in order to function in a way that maximizes living in a specifically structured environment, must rely on others.

### Onset Must Occur Before Age 18 Years

The developmental period is the part of an individual's life prior to age 18 years.<sup>14</sup>

### *Degrees of Severity of Mental Retardation*

#### Mild Mental Retardation

In some classification systems, this is the "educable" category. The IQ range is 55 to 70. This is the highest functioning level and the largest category. Approximately 85 percent of individuals diagnosed as mentally retarded are in this category.<sup>14</sup> The Department of Developmental Services lists 39 percent of its clients in this category, but 18 percent of its client base does not have a diagnosis of mental retardation.<sup>15</sup>

The level of functioning may change with age. During preschool years, these individuals develop communication and social skills and have minimal impairments -- particularly in sensorimotor areas. During the school years, academic achievement may develop to a sixth-grade level.<sup>14</sup> Sometimes comments are made about a person having the mental age of an 11-year-old child. This may be true to an extent, but the important point to remember is that an adult does not have the mind of an 11-year-old child. Based on chronological age, this person has more life experiences than a child does. The mental age is based not only on academic achievement, but also on such factors as vocational or skill training, interpersonal relationships in society, and the work

environment. Typically this individual reads for information but not enjoyment. An independent living environment is often possible or a shared or supervised living situation.

#### Moderate Mental Retardation

In some classification systems, this is the "trainable" category. The IQ range is 40 to 55. This is the second-highest functioning level. Approximately 10 percent of individuals diagnosed as mentally retarded are in this category.<sup>14</sup> In California, the Department of Developmental Services reports that 19 percent of its clients are in this diagnostic category.<sup>15</sup>

Academic achievement beyond the second-grade level is not a reality. Training in community and occupational skills can be a benefit. Development of communication skills in early childhood followed by personal care become important to this individual. While this group cannot read for information, unskilled and semiskilled work is possible in sheltered environments. Living is in supervised settings, whether at home or in care facilities.

#### Severe Mental Retardation

The IQ range is 25 to 40. This is a lower functioning level. Approximately 3 percent to 4 percent of individuals diagnosed as mentally retarded are in this category.<sup>14</sup> The Department of Developmental Services reports that 10 percent of its clients are in this diagnostic category.<sup>15</sup>

Speaking ability may develop during school-age years in addition to minimal self-care skills. Skills are limited to simple tasks and sight recognition of "survival" words. Performance of tasks, as well as living, is usually under supervision.<sup>14</sup>

#### Profound Mental Retardation

The IQ range is less than 25. This is the lowest functioning level. Approximately 1 percent to 2 percent of individuals diagnosed as mentally retarded are in this category.<sup>14</sup> The Department of

Developmental Services reports that 8 percent of its clients are in this diagnostic category.<sup>15</sup>

A diagnosed neurological condition usually constitutes the reason for an individual's classification in this category. Training is limited because of sensorimotor deficits. Continual supervision is necessary, and living must be in sheltered environments.

### Unspecified Severity of Mental Retardation

Although the diagnostician may face a strong presumption of mental retardation, sometimes it becomes difficult to classify. Perhaps the individual cannot be measured by standardized intelligence tests because of a young age or lack of cooperation. This assessment is more difficult in the very young, except when presented with profound deficits.<sup>14</sup>

### *Measurement of Status*

Functional assessment in children is "an effort to systematically describe and measure a child's abilities and limitations when performing the activities of daily living."<sup>17</sup> Measurement often depends on the value of the information. While educators may value the measurement of activities of daily living for purposes of program planning to develop skills, medical professionals may focus on etiology or physical and neurological impairment. Variations continue to exist, and future research will need to focus on the relative value of measurement instruments as a tool for educators, parents, and rehabilitation professionals and as a tool for medical professionals, especially in children with disabilities.<sup>17</sup>

Developmental assessment can identify children who might have permanent developmental delays. While maternal education is one of the best predictors of developmental delay at age 18 months, at age 8 years maternal education and parental assessment scores are the best predictors of school achievement. At age 14 years, parental assessment



scores and socioeconomic status are the best predictors of school achievement with the scores being the strongest predictor in children with intellectual disability.<sup>18</sup> Related limitations in behavior adaptation is similarly shown through the individual's personal independence and social responsibility at certain ages and combined with cultural influence. There are milestones when various skills can be seen:

- Infants: gesture language, such as waving good-bye;
- School years: school achievement; and
- Adulthood: social and economic adjustment.

### *Self-Injurious Behavior*

Dentists, as part of interdisciplinary teams, must be aware that self-injurious behavior can arise in people with severe and profound mental retardation. Generally, as the degree of cognitive function decreases, the prevalence of such behavior increases.<sup>19</sup> The most common clinical feature is lip biting or additionally biting the buccal mucosa. Lesch-Nyhan syndrome is a genetic disorder with these same features and includes biting the digits of the hand.<sup>20</sup> Lesch-Nyhan syndrome is not a common occurrence, so self-injurious behavior is more commonly a manifestation in individuals with the greatest mental impairment. Control of this behavior may involve behavior modification, restraints, padding, sedation, or extraction of the remaining teeth.<sup>21</sup> The level of intellectual functioning is a primary factor allowing success in the area of behavior modification.

### *Down Syndrome*

As of May 2000, the entire 21st chromosome was mapped in the Human Genome Project. Researchers were surprised to find only 225 genes present on the chromosome: 127 known genes, 98 predicted genes, and 59 pseudogenes. Down syndrome is caused by Trisomy 21, an extra copy of chromosome 21.<sup>22</sup> Down syndrome affects 1 in 700 live births and has among its characteristics

mental retardation. Only a subset of chromosome 21 genes may be involved in the phenotypes of Down syndrome.<sup>23</sup>

### *Cause*

During reproduction, cell division occurs in the ovaries and testicles when a cell divides into two. Each of these cells has half the chromosomes (23) of the parent cell (46). This process is called meiosis. In all but 5 percent of Down syndrome cases, one cell has two 21st chromosomes and the other cell has one 21st chromosome, which results in the fertilized egg having three 21st chromosomes, called Trisomy 21. The extra chromosome changes the normal number of 46 chromosomes in each cell to 47.<sup>24</sup>

Translocation is another type of chromosome abnormality appearing in 4 percent of the cases where an extra 21st chromosome attaches to the existing 21st chromosome. In one-third of the translocation cases, parents should receive genetic counseling and testing because one parent could be the translocation carrier.<sup>24</sup> Mosaicism is a feature in 1 percent of the cases. The mosaic designation comes from some cells with 46 chromosomes and some cells with 47 chromosomes.<sup>25</sup> There are two ways mosaicism occurs:

- When the cell has three 21st chromosomes in the initial zygote, the extra 21st chromosome is lost in one or more cell lines during cell division; and
- When the cell has two 21st chromosomes in the initial zygote, one duplicates during cell division.<sup>24</sup>

Chromosome 21 has a relatively low gene density, which may account for Trisomy 21 being one of the only viable human autosomal trisomies.<sup>22</sup> People with Down syndrome have mental retardation, recognizable physical features, and frequently congenital heart disease and other developmental abnormalities, and may have early onset Alzheimer's disease, increased risk for some leukemias, immunological deficiencies, and other health problems.<sup>26</sup>

### *Physical Features*

Recognizable physical features include these characteristics:

- Brachycephaly -- Flattened occiput and shorter anterior-posterior craniofacial dimension. When tonsils are present, the tongue may protrude because of reduced space.<sup>27</sup>
- Ocular hypertelorism and slanting of the eyes;<sup>28</sup>
- Epicanthal folds on the inner corner of the eyes;<sup>25</sup>
- Brushfield spots -- white flecks of the iris;<sup>29</sup>
- Depressed nasal bridge;<sup>25</sup>
- Slightly smaller ears, feet, hands, and stature;<sup>25</sup>
- Decreased muscle tone;<sup>25</sup> and
- Smaller mouth and hypodontia.<sup>30,31</sup>

### *Systemic Features*

#### *Cardiovascular*

People with Down syndrome are known to have certain associated features of greater frequency than the general population. Mitral valve prolapse was revealed by echocardiogram to be present in 50 percent of a group with Down syndrome compared with the general population, which normally has a 5 percent to 15 percent prevalence. Many of these individuals lacked auscultatory findings of heart murmur.<sup>32</sup> Cardiac anomalies such as atrial and ventricular septal defects, A/V communis, and patent ductus arteriosus are corrected with pediatric surgery procedures.<sup>33</sup>

#### *Musculoskeletal*

Skeletal muscle tone is reduced in Down syndrome.<sup>27</sup> Joint problems include subluxation of the patella and dislocation of the hip joints.<sup>25</sup> Atlantoaxial instability is present in an average of 15 percent of people with Down syndrome, but only 1 percent to 2 percent requires surgical attention. This condition is a result of ligamentous laxity increasing mobility between the C1 and C2 vertebrae.<sup>25,33</sup> Ligamentous laxity is generalized causing hyper-reflexibility of joints throughout the body.<sup>27</sup>

## Oral Conditions

Periodontal conditions, caries, and preventive dentistry approaches are considerations in management of the oral health needs of patients with Down syndrome.

### *Periodontal Conditions*

Early onset of periodontal disease often begins with the primary dentition.<sup>34</sup> Rapidly progressing periodontal disease leads to early tooth loss.<sup>35,36</sup> In children with Down syndrome, while the pathogens were no different than in the control group, all of the pathogens were detected with greater frequency. *Porphyromonas gingivalis* was widely distributed, increasing the severity of gingivitis in the group older than 5 years.<sup>37</sup> Children with Down syndrome have a different leukocyte response together with more extensive gingival inflammation than do children without Down syndrome.<sup>38</sup> Progression of periodontal disease is marked by occasional acute symptoms (infection, inflammation, pain) followed by chronic progression of disease.<sup>28</sup> Factors that lead to a higher susceptibility of periodontal disease in patients with Down syndrome include atypical patterns of T-cell immunodeficiency together with functional defects of polymorphonuclear neutrophil leukocytes and monocytes. The individual has an inadequate reaction to bacterial attack, altered makeup of connective tissue, and an antigenic stimulus overloading an immature immune system. This is seen more frequently in people with Down syndrome living in care facilities compared with those living at home.<sup>39</sup>

Patients with Down syndrome have seven times the frequency of *Actinobacillus actinomycetemcomitans* than a non-Down syndrome control.<sup>40</sup> The relationship between gingivitis and the host response to oral microorganisms in Down syndrome by age shows different microbiological colonization for children younger than age 5 compared with associated gingivitis at puberty. Only *A. actinomycetemcomitans*

colonization is associated in both groups.<sup>41</sup> Future study is needed to clarify whether a higher *A. actinomycetemcomitans* antibody response is pathogenic or protective as may be the case in juvenile periodontitis.<sup>42</sup> In Trisomy 21, periodontitis subgingival debridement reduces the presence of bacteria but not herpesvirus. Periodontal herpesvirus-bacteria coinfections may promote growth of subgingival bacteria capable of reducing periodontal defense mechanisms leading to periodontal breakdown.<sup>43</sup>

### *Caries*

Anecdotal thought typically follows the line of thinking that patients with Down syndrome seem to have less caries. Primary molars in patients with Down syndrome show an equal or increased crown dimension compared with the non-Down syndrome population; however, permanent teeth in patients with Down syndrome show a smaller dimension. During an early stage of gestation, there may be a transitory acceleration of mitotic activity in the developing enamel organ affecting primary teeth. Retardation of growth would follow, reflecting the development of smaller permanent teeth.<sup>44</sup> It is unknown whether this factor contributes to a reduced caries rate. In children with Down syndrome, it is unknown whether antibodies are protective or responsible for reduced caries rate. A positive correlation was found between the caries rate and serum IgM antibody titers against *Streptococcus mutans*.<sup>41</sup> A study of three groups of preadolescent children -- mental retardation, Down syndrome, and non-mental retardation Down syndrome -- showed significantly reduced caries in the patients with Down syndrome (84 percent caries free) compared with the other two groups. *Streptococcus mutans* counts were lowest in the population with Down syndrome and significantly lower than the group with mental retardation.<sup>45</sup> A follow-up study of similar adult populations showed the same results.<sup>46</sup>

### *Preventive Dentistry*

Oral hygiene regimens and the motivation of the dental team influence the oral health of all individuals. Systemic problems also require appropriate precautions and therapy for patients with Down syndrome. Preventive dental health practices in children with Down syndrome are decreased when less help is given during tooth brushing.<sup>47</sup> Decreased musculoskeletal development suggests a need to ensure attention to oral hygiene practices with assistance when necessary. Similarly, children with Down syndrome are less likely to be taking fluoride supplements and are older when making their first dental visit.<sup>47</sup> Children with Down syndrome benefit from efforts of a well-motivated dental team utilizing a comprehensive preventive dental health program that incorporates plaque control, topical fluoride, and pit and fissure sealants. Furthermore, the early teenage years are the best time for patients with Down syndrome to understand and cooperate effectively in a preventive program.<sup>48</sup> Patients with Down syndrome who are also immunocompromised may be susceptible to toxic shock syndrome. Dental management of odontogenic infections requires correlation with the treating physician.<sup>49</sup> Prophylactic antibiotics are recommended prior to emergency dental treatment within six months following a toxic shock syndrome incident.<sup>50</sup> The reduced anterior-posterior cranial dimension can lead to sleep apnea. Patients with Down syndrome and other developmental disabilities sometimes receive therapy for sleep apnea using a mandibular protracting device (modified Esmarch appliance). The patient with Down syndrome may benefit from use of this therapy, which allows free mandibular movement and prevents airway collapse.<sup>51</sup>

### *Conclusion*

Andrew, the high school teenager, is now homecoming king. As we celebrate with him, let us always be aware of our obligation as members of society to

advocate for those of us who typically do not have advocates. Andrew's dream was met, although his expectations were minimal. This article explored the topic of developmental disabilities generally and mental retardation and Down syndrome specifically. Dentists must understand the issues related to developmental disabilities. Our awareness and even our scope of practice will expand. If a dentist cannot treat a patient with special needs because the difficulties presented are too complex, he or she must remember to see the patient, evaluate, and refer to the dentist with expertise in this field. Dentists need not reject patients sight unseen or abandon them. Dentistry's collective goal is to get the patient to a treating dentist capable of providing necessary care. As Andrew's friend Hannah reminds us: "So many times kids with disabilities don't get attention like that. It's attention they deserve as much as anybody else."

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# Developmental Disabilities: Epilepsy, Cerebral Palsy, and Autism

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**ABSTRACT** This article provides the dentist with a review of the three developmental disabilities that do not have mental retardation as a diagnostic component: epilepsy, cerebral palsy, and autism. Discussion focuses on diagnostic criteria and other dental and medical considerations. A greater understanding of developmental disabilities allows the dentist to offer care in the dental office when feasible or to understand and develop referral relationships with colleagues who utilize the hospital operating room to provide comprehensive care.

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*"I asked my dentist if I could bring my child in for a dental checkup. Although I did not see any dental problems, and I brush and floss her teeth regularly, I felt it was time to start a routine of regular dental visits to prevent future problems. The dentist, at first, agreed to see my youngest child because my other children see the same dentist. I made the appointment and brought my daughter to the office; the dentist refused to see her upon realizing she has cerebral palsy."*

Is this your practice? Probably not, however, the dentist who treats patients with developmental disabilities occasionally hears similar statements. Sometimes care may be more difficult because the normal routine needs to be modified, but most people with developmental disabilities bring

something special to the office. The office staff may find the most fulfilling part of practice occurs when a certain individual comes to the office for an appointment and then hugs everyone on the staff on the way to the operator, relates the experience of viewing a favorite television show or movie, or excitedly tells the office staff a joke or brief story. When this person's name appears on the schedule, everyone's day is made better. Some offices never enjoy such an experience because they turn away very special people requiring their professional skills. Oral Health in America: A Report of the Surgeon General addressed the magnitude of the problem:

"The oral health problems of individuals with disabilities are complex. These problems may be due to underlying



congenital anomalies as well as to inability to receive the personal and professional health care needed to maintain oral health. There are more than 54 million individuals defined as disabled under the Americans With Disabilities Act, including almost a million children under age 6 and 4.5 million children between 6 and 16 years of age.”<sup>1</sup>

The purpose of this article is to provide the dentist with a review of the three developmental disabilities that do not have mental retardation as a diagnostic component: epilepsy, cerebral palsy, and autism. Discussion focuses on diagnostic criteria and other dental and medical considerations. A greater understanding of developmental disabilities allows the dentist to offer care in the dental office when feasible or to understand and develop referral relationships with colleagues who utilize the hospital operating room to provide comprehensive care. The discussion begins with epilepsy, the most prevalent major developmental disability that does not have mental retardation as a diagnostic component.

## Epilepsy

A seizure is a transient episode of disturbed central nervous system dysfunction. Epilepsy is the tendency to have seizures.

## Mechanism

Normal brain function is made possible by electrical charges passing between nerve cells in the brain to all parts of the body. In a seizure, intermittent bursts of intense electrical energy can disturb normal function.

## Causes

In most cases, a cause cannot be determined. Estimations are that 70 percent of people with seizure disorders cannot be diagnosed with a specific cause of the disorder.<sup>2</sup> The remaining 30 percent are the result of permanent, nonprogressive cerebral changes.

Head trauma, meningitis, tumors, lead poisoning, infections, and maternal injury affecting fetal brain development during pregnancy are most frequently identified as specific causes of seizure disorders.

## Incidence

New cases of seizures and epilepsy occur each year at a significant rate, primarily in children and young adults. Of the 181,000 new cases, 45,500 are in children younger than 15; 74,000 are in people 15 to 64; and 60,000 are in people older than 65. Within two years, 75 percent will successfully control their seizures with treatment.<sup>3</sup>

## Prevalence

The number of cases at any one time in the United States is 2.3 million.<sup>4</sup> Thirty percent of cases occur in the developmental period up to age 18. Estimates of the number of people in the world with epilepsy are as high as 40 to 50 million; however, 75 percent of those do not receive treatment.<sup>2</sup>

## Classification

A better understanding of epilepsy is made easier by a classification of the types of seizures and therapeutic measures used to control seizure activity (**TABLE 1**).

**Table 1.** Seizure Classifications

Disability
Major motor seizures -- tonic-clonic (grand mal)
Minor motor seizures -- absence (petit mal)
Myoclonic seizures
Febrile seizures
Complex partial seizures

## Generalized Seizures

### Major Motor Seizures -- Grand Mal

The major motor seizure is called a grand mal seizure. This is the most common type of seizure. It is characterized by tonic movements where

the muscles become board-like and by clonic movements where the extremities have rapid, jerking movements. There is a loss of consciousness; and the patient becomes akinetic, falling down. The major motor seizure has three distinct parts:

- Aura -- recognition of smells, tastes or visions that precede the seizure activity;
- Ictus -- the seizure period of tonic-clonic activity; and
- Post ictus -- a period of sleep immediately following the ictus period.

Dentists must be aware of the patient's epilepsy. The patient's medical history and follow-up oral dialogue will reveal the type of seizure and the course of seizure activity. This is very important because the trust between the patient and the dentist can help prevent injury in the dental office. The patient is able to recognize the aura and can relate this to the dentist when a seizure is impending. This allows enough time to protect the patient by rendering supportive care to prevent self-injury. The mouth must be left alone. No foreign objects such as tongue blades should be inserted into the mouth during the ictus phase of the seizure or injury may occur to the patient, the dentist, or the dental auxiliary staff.<sup>5</sup> The staff should move the dental unit modules or instrument arms away from the patient while preventing the patient's head from slipping off the headrest and the arms and legs from hitting surrounding equipment and furniture. The course of a grand mal seizure leads to the post ictus stage of sleep. When the patient recovers from this period, the dentist should remind the patient that he or she is in the dental office and has had a seizure. The patient will often be embarrassed and agitated, so a calming, understanding approach is best.

When the patient's ictus phase lasts more than five minutes or a series of new seizures begins before the first episode

is complete, the patient is in status epilepticus.<sup>6</sup> This condition is rarely seen. It requires immediate treatment including administration of a parenteral benzodiazepine such as diazepam (Valium) or midazolam (Versed). Because the benzodiazepines are sedatives, the post ictus stage of sleep may be enhanced. A 911 call will allow paramedic management of the patient and transportation to a hospital emergency department.

### *Minor Motor Seizures – Absence (Petit Mal)*

The absence seizure makes up only 2 percent to 3 percent of all seizures. There is no aura, and the duration of the ictus period is a few seconds, rarely up to a minute in duration. Staring into space and rapid eye blinking creates the period of absence or the appearance of daydreaming.<sup>6</sup> Some patients can trigger a petit mal seizure by hyperventilating. Onset is in early childhood and lasts into puberty with virtually no seizures after age 20.

### *Myoclonic Seizures*

Myoclonic seizures are very rare and can occur in all ages as a result of permanent neurological damage from hypoxia or drug poisoning. The ictus period consists of short episodes of muscle contractions and spasms.<sup>6</sup> There is no period of continuous seizure activity. The short episodes may reoccur after a period of time.

### *Febrile Seizures*

During episodes of high fever, children up to 6 years of age can develop febrile seizures if body temperature is not well-controlled.<sup>6</sup> Two percent to 3 percent of the population will experience a febrile seizure. Within one week, the child will have normal electroencephalogram and lab values, while 40 percent will have another seizure with another febrile episode.<sup>7</sup>

## **Partial Seizures**

### *Simple Partial Seizures*

The partial seizure occurs when the abnormal electrical activity is concentrated in a localized area of the brain. A simple partial seizure does not involve a loss of consciousness. The localized activity involves a certain muscle group, extremity, or various motor or sensory activities. Involuntary movements occur such as fumbling, lip smacking, senseless behavior, staring, visual sensations, and vocalizations.<sup>6</sup>

### *Complex Partial Seizures*

The complex partial seizure involves loss of consciousness and can have secondary generalizations spreading to both cerebral hemispheres.<sup>6</sup>

### *Prognosis*

Seizure disorders are diagnosed frequently in the pediatric population. A majority of patients with childhood epilepsy are free of seizures by adulthood.<sup>8</sup> An increased understanding of epilepsy, concerns about antiepileptic drugs, and possible adverse effects in pediatric populations, result in no drug therapy at the time of diagnosis in 20 percent of the children in a community-based program; after one year, 10 percent continued with an antiepileptic drug.<sup>9</sup> At one time, epilepsy was thought to be a chronic, progressive disease. It was believed historically that when a person had one seizure, a second seizure would ultimately occur and as the progression continued, seizure activity created more seizure activity “by increasing instability of the nerve elements.”<sup>10</sup> Drug interventions to prevent seizures early in the course of the disorder do not create a remission of the problem. The underlying condition of epilepsy, not the seizure itself, is responsible for the deterioration.<sup>11</sup>

The ketogenic diet may be a benefit in children to control seizures when other forms of therapy do not succeed. Physician management is essential

for this prescribed high-fat, low-carbohydrate, reduced-calorie diet.<sup>2</sup>

## **Traditional Antiepileptic Drugs**

Antiepileptic drug therapy is based on three considerations. First, it blocks the initiation of electrical activity when a particular area of the brain is involved. Second, drug therapy prevents the spread of the electrical activity to other areas of the brain. Third, different drugs are available to treat different forms of epilepsy. Several drugs are currently prescribed (TABLE 2):

### *Phenytoin (Dilantin)*

Phenytoin is a widely used drug to suppress major motor and partial seizures. It was introduced in 1938.<sup>12</sup> Its reduces the spread of electrical activity to other areas of the brain. In dentistry, phenytoin-induced gingival hyperplasia will occur in approximately 40 percent of patients using the medication in a routine regimen.<sup>13</sup>

While no correlation has been shown between the blood levels of phenytoin and the amount of gingival enlargement, a prophylactic program of oral hygiene control can prevent the development of pseudopockets. Nevertheless, the phenytoin-induced enlargement could not be prevented.<sup>14</sup> This does not negate the value of initiating in-service education of care providers for clients of community-care programs.<sup>15</sup> Correlation of phenytoin-induced gingival hyperplasia severity and calculus formation, inflammation, plaque score, and probing depth was evident without correlation with daily drug dose and duration of drug intake.<sup>16</sup>

Gingival overgrowth is noticed first in the interdental papillae with lobulations occurring coronally, and it decreases as it approaches the mucogingival junction.<sup>17</sup> Slow overgrowth can lead to orthodontic-like forces that can displace teeth in the area. Phenytoin gingival overgrowth usually develops in the anterior areas during the first six months of phenytoin

**Table 2.** Traditional Antiepileptic Drugs

	MAJOR MOTOR	Minor Motor	MYOCLONIC	Febrile	Simple Partial	SIMPLE PARTIAL	COMPLEX PARTIAL
Phenytoin	X					X	X
Phenobarbital	X			X		X	X
Carbamazepine	X					X	X
Ethosuximide		X					
Valproic Acid	X	X	X				
Primidone	X	X	X			X	
Clonazepam		X	X				
Mesphenytoin	DISCONTINUED						

therapy with no enlargement after nine months.<sup>18</sup>

### Surgical Treatment of Phenytoin-Induced Gingival Hyperplasia

When gingival overgrowth overcomes function by overgrowing the surfaces of the teeth, excision is necessary. Many people with epilepsy and phenytoin-induced gingival hyperplasia can be treated in a dental office. Surgery becomes necessary when function is compromised. Traditional periodontal surgery techniques may be used; however, many patients with epilepsy have other developmental disabilities. These concomitant disabilities may lead to a situation of patient uncooperation and resistance to routine oral hygiene measures. When a patient is compromised sufficiently by hyperplasia, overgrowth can limit mouth closure and biting, resulting in trauma to the overlying gingival tissues. Surgery may be required under controlled circumstances in a hospital operating room under general anesthesia. Periodontal surgery by traditional methods may become technically difficult and time-consuming, and considerable bleeding is probable.<sup>13</sup> During the post-treatment period, the patient will continue to be uncooperative for definitive follow-up control including dressing or suture removal. Electrosurgery offers the best solution. The excision

must be in attached gingiva, and care is given to avoid contacting periosteum or bone with the electrode tip. Remaining in one area with the electrode tip results in overheating the tissues, which leads to increased pain and possible necrosis. Following probing and pocket-marking, a large diamond-shaped electrode tip is used to excise the tissue to the proper gingival height. The same instrument is used to scallop gingival contour in the interdental papilla areas. Properly angled gingivectomy-gingivoplasty excisions complete tissue contouring. Other tips such as various loops are then used to finalize the removal of tissue tags and areas not accessible with larger tips. The unit is used in the cut setting. For persistent bleeding spots, a small ball tip may be used on cut-coagulation or coagulation settings to create hemostasis. The tissues should be frequently irrigated with sterile saline to prevent dehydration and to cool the tissues. Final debridement of root surfaces takes place when the teeth are made accessible by the surgery. Ultrasonic and hand instrumentation is used to debride calculus and smooth the root surfaces.

### Phenobarbital (Luminal)

Phenobarbital, a long-acting barbiturate, is a widely used antiepileptic drug to suppress simple and, to a lesser extent, complex partial seizures and

febrile seizures; and it is often used as an adjunctive medication with phenytoin for tonic-clonic seizures.<sup>6</sup> Phenobarbital has been in use since 1912. It reduces the spread of electrical activity to other areas of the brain and elevates the seizure threshold. Phenobarbital is given in low dosages and is easily absorbed when administered orally. As with all barbiturates, depression of the central nervous system may occur.

### Carbamazepine (Tegretol)

Carbamazepine is pharmacologically similar to tricyclic antidepressants. Introduced in 1974, carbamazepine is often used in the treatment of trigeminal neuralgia. Seizure control is achieved by reducing the spread of electrical activity to other areas of the brain and by blocking sodium channels, which inhibits generation of repeated bursts of electrical activity. As an effective agent to control simple and complex partial seizures and tonic-clonic seizures, it may be used to replace phenytoin and eliminate the possibility of gingival hyperplasia. In some patients, phenytoin may be the most effective antiepileptic drug; therefore, replacement is evaluated carefully by the treating physician. Part of the evaluation requires monitoring hepatic function because carbamazepine use may cause liver toxicity.<sup>6</sup>

**Table 3.** Recently Approved Antiepileptic Drugs

	MAJOR MOTOR	Minor Motor	MYOCLONIC	Febrile	Simple Partial	SIMPLE PARTIAL	COMPLEX PARTIAL
Gabapentin	X					X	X
Lamotrigine	X					X	X
Zonisamide						X	X
Levetiracetam						X	X
Oxcarbazepine						X	X
Topiramate						X	X

### *Ethosuximide (Zarontin)*

Succinimides are used for the effective management of absence seizures. Although well-absorbed orally, ethosuximide is a gastric irritant, making nausea and vomiting the most common side effects.<sup>6</sup>

### *Valproic Acid (Depakote)*

Valproic acid is used to treat myoclonic seizures; secondarily, it is used to reduce the incidence of absence and tonic-clonic seizures. Its reduces the propagation of seizure-causing abnormal electrical activity in the brain. Monitoring hepatic function is essential to prevent hepatic toxicity.

### *Primidone (Mysoline)*

Primidone is used to treat partial and tonic-clonic seizures. It is used primarily with carbamazepine and phenytoin as part of an antiepileptic drug regimen. There are two active metabolites, the first being phenobarbital for simple partial seizure control. The second active metabolite is phenylethylmalonamide for complex partial seizure control.

### *Clonazepam (Klonopin)*

Clonazepam is a benzodiazepine drug used to treat absence and myoclonic seizures. Benzodiazepines primarily act on the brain's limbic system; therefore, sedation may occur. Chronic use requires a level of medication that avoids sedation and minimizes the development of drug tolerance.

### *Mesphenytoin (Mesantoin)*

Mesphenytoin was introduced in the 1940s. Physicians were advised in 2000 by Novartis Pharmaceuticals that Mesantoin has been discontinued. New, more effective antiseizure medications are now available.<sup>2</sup>

### **New Antiepileptic Drugs**

No major FDA antiseizure drug approvals occurred between 1978 and 1993. Since 1993, several promising new drugs have been introduced (**TABLE 3**).<sup>2</sup> The dentist should monitor health questionnaires for patient use of these agents:

- Gabapentin (Neurontin) -- to control partial and tonic-clonic seizures;
- Lamotrigine (Lamictal) -- to control partial and tonic-clonic seizures;
- Zonisamide (Zonegran) -- to control partial seizures in people age 16 and older;
- Levetiracetam (Keppra) -- to control partial seizures in adults;
- Oxcarbazepine (Trileptal) -- to control

partial seizures in adults and as add-on in children and adults; and

- Topiramate (Topamax) -- to control partial seizures in adults and as add-on in children.

### **Cerebral Palsy**

Cerebral palsy is a nonprogressive chronic condition caused from damage to areas of the brain. Cerebral damage can occur during various stages of development: prenatal, during the birth process, or infancy. The resultant brain damage leads to limited motor function decreasing body movement, coordination, and muscle control (palsy). There are three main types of cerebral palsy or a combination of various types (**TABLE 4**):<sup>19, 20</sup>

- Spasticity -- the most common type; movement is difficult because of stiffness and rigidity of the extremities;
- Athetoid -- movement is involuntary, purposeless, slow, and uncontrolled; and
- Ataxia -- balance and depth perception is disturbed and is uncoordinated, particularly when attempting voluntary movement.

#### Classification of Areas of Involvement

Cerebral palsy is classified by location and the number of involved extremities (**TABLE 5**):

- Monoplegia -- one extremity;
- Paraplegia -- two lower extremities;
- Hemiplegia -- two extremities on one side of the body; and
- Quadriplegia -- all four extremities.

**Table 4.** Types of Cerebral Palsy

Spasticity	Stiff and Rigid Extremities – Movement Difficult
Athetoid	Involuntary, Purposeless, Slow, and Uncontrolled Movement
Ataxia	Disturbed Balance and Depth Perception – Uncoordinated Voluntary Movement



**Table 5.** Cerebral Palsy Classification -- Location

Monoplegia	One Extremity
Paraplegia	Two Lower Extremities
Hemiplegia	Two Extremities – One Side of Body
Quadriplegia	All Four Extremities

### *Factors Affecting the Developing Brain*

Any number of factors can affect the developing brain, but the following are the most common:<sup>19</sup>

- Insufficient oxygen reaching the brain,
- + Premature placenta separation from the uterus wall,
- + Awkward birth position in the uterus,
- + Labor period that is too long or too abrupt,
- + Disturbed circulation in the umbilical cord;
- Premature birth;
- Low birth weight;
- Rh or A-B-O blood-type problems;
- Infection of the mother early in pregnancy by a viral disease such as German measles; and
- Acquired in infancy -- head injuries, falls, child abuse.

#### *Intelligence*

Individuals with cerebral palsy may have normal or advanced intelligence. One person may have several developmental disabilities including mental retardation. Only when an individual has cerebral palsy and mental retardation does subaverage intellectual functioning become a factor in measuring intelligence. Cerebral palsy, by itself, does not have mental retardation as a component.

### *Treatment*

Cerebral palsy is not a disease, and it is not curable or communicable as in a disease process. It is a developmental condition and requires intervention to enhance the individual's ability to manage the condition. Several factors help the child achieve maximum, enhanced development:<sup>19</sup>

- Identifying the developmental disorder

at the earliest age;

- Interdisciplinary attention to hearing, learning, movement and speech;
- Enhancing emotional, personal, and social development;
- Improving coordination;
- Preventing dysfunction; and
- Helping the child become as independent as possible.

#### *Dental Management*

The most important consideration for a patient with cerebral palsy is to ask what his or her preferences are in receiving dental care, particularly the most comfortable position in the dental chair. Often patients have an exaggerated gag reflex. A rubber dam and sometimes a mouth prop are useful. The patient's head is kept in the midline. Turning the head results in asymmetric/symmetric neck reflexes. The head should be cradled with the forearms and hands while dental procedures are performed. Soft ties can help the patient feel more stable. Soft ties are restraints, and therefore they require specific informed consent from the patient or consent giver. With paraplegic involvement, the patient may not be capable of keeping the legs positioned on the dental chair. Especially for female patients, a soft tie to help keep the legs in position addresses concerns about patient dignity, which should never be compromised. Preventive programs are essential to allow the individual to realize the full potential in personal oral hygiene practices, attitudes, and motivation toward oral health.<sup>20</sup>

### *Caries*

Early studies in the United States and Europe could not correlate the caries rate with the degree of mental and motor disability.<sup>21</sup> Only small variations are shown among children in various diagnostic categories of cerebral palsy. A more recent finding shows the lowest caries rate in the most seriously motor and mentally challenged patients at ages 14 and 15 years. There is a suggestion that a patient with greater disabilities has less

access to sugar-containing foods, and possibly a delay in eruption of permanent teeth. Differences in oral hygiene care, which is generally poorer in the cerebral palsy group, cannot explain a reduced rate of caries in children with cerebral palsy.<sup>22</sup> While the caries rate did not differ greatly between children with cerebral palsy and controls, the ability to receive restorative care is less likely to occur and more likely to have a greater number of extractions.<sup>23</sup>

Children with cerebral palsy may drool because of the inability to control saliva in the oral cavity. Medications and behavioral modifications sometimes work to control drooling. In extreme cases, a surgery procedure called sialodochoplasty is sometimes suggested. Salivary ducts are either rerouted or ligated, thereby reducing saliva flow and drooling.<sup>24</sup> Long-term effects on the dentition have a potential downside. Increased caries particularly in the mandibular incisors and canines suggest IgA antibodies to *Streptococcus mutans* are similarly reduced in saliva increasing bacteria prevalence and caries activity.<sup>25</sup>

### *Barriers*

A respondent total of 57 adults with cerebral palsy were surveyed about barriers to dental care. A majority of respondents could move about unaided, make themselves understood in conversation, did not require general anesthesia, and maintained regular dental appointments.<sup>26</sup> Patients with greater needs are those who have barriers to care. Patients requiring dentistry performed in a hospital operating room under general anesthesia may find more barriers in locating dentists in the community who are prepared to provide this level of care.<sup>27</sup>

### *Autism*

Kanner was the first to ascribe the following characteristics to autism:

- Relating to others in an ordinary interaction was not possible; the individual is isolated;

- Sameness with no spontaneous activity; and
- Language was not for communication.<sup>28</sup>

Modernly, for diagnostic purposes, autism or autistic disorder is the qualitative impairment in social interaction and communication and restricted, repetitive, and stereotyped patterns of behavior, interests, and activities with delays or abnormal functioning in at least one of the following: social interaction, language as used in social communication, or symbolic or imaginative play. Onset occurs prior to 3 years of age.<sup>29</sup>

## Diagnostic Criteria

### *Social Interaction*

At least two characteristics out of four must manifest to show a qualitative impairment of social interaction:

- Marked impairment in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction;
- Failures to develop peer relationships appropriate to developmental level;
- Lack of spontaneous seeking to share enjoyments, interests, or achievements with other people; and
- Lack of social or emotional reciprocity.<sup>29</sup>

### *Language Used in Social Communication or Play*

At least one characteristic out of four must manifest to show a qualitative impairment of communication:

- Delay or lack of the development of spoken language not accompanied by attempts to compensate through gesture or mime;
- Those individuals with adequate speech have a marked impairment to initiate or sustain a conversation with others;
- Stereotyped or repetitive use of language or idiosyncratic language; and
- Lack of varied, spontaneous make-

believe play or social initiative play appropriate to developmental level.<sup>29</sup>

Restricted Repetitive and Stereotyped Patterns of Behavior, Interests and Activities

At least one characteristic must manifest to meet this criterion:

- Preoccupation of interest abnormal either in intensity or focus;
- Inflexible routines or rituals;
- Stereotyped or repetitive motor mannerisms; and
- Preoccupation with parts of objects.

One characteristic helps pinpoint the demeanor of the people with autism; that characteristic is unresponsiveness to others such as parents, teachers, or care providers. The inability to be responsive signals a warning to others that diverting attention to a task such as cooperating with the dentist may be nearly futile, yet possible, depending on how encompassing the disorder manifests in each individual.<sup>29</sup>

### *Causation*

The specific etiology of autism is undetermined.<sup>30</sup> Links to genetics are in dispute. Some studies show no genetic cause of autism.<sup>31,32</sup> Others have focused research on chromosome 7.<sup>33,34</sup> Hoxa 1, a small gene on chromosome 7, plays a role in brain stem development.<sup>34</sup> Miller linked autism to thalidomide embryopathy, suggesting that brain stem damage probably occurs early in embryogenesis at 3 to 4 weeks of age in utero. Ocular anomalies during the same period link the timing of damage to the early embryological period.<sup>35-37</sup> The comorbid occurrence of autism and Down syndrome is at least 7 percent.<sup>38</sup> These studies suggest autism occurs in early embryology; and, while a genetic link is a strong possibility, specific factors are unknown.

### *Problems in Dental Care*

The person with autism generally presents a challenge to the dentist. How effective is teaching? Children with autism

tend to remember the last things said and use different organizational strategies to retrieve items from memory.<sup>39</sup> Adults with autism demonstrate increased independence by developing skills through a structured teaching model.<sup>40</sup>

Visual teaching can be used to introduce children with autism to dentistry.<sup>41</sup> They require patience to “show, tell, do.” The “show, tell” may not be understood, leading the child to resist “do.” Simple rehearsals at home by parents can help condition the child for the office experience. Props such as mouth mirrors, film packets, prophylaxis cups, and pastes can be used at home by parents when adequately instructed by the dentist.<sup>42</sup> While behavior modification techniques have value in changing self-injurious behaviors, use of the reward system fails when the promised reward is no longer possible.<sup>43</sup>

A combined modality of desensitization, symbolic remodeling, and reinforcement treatment suggest children can be trained to undergo a dental exam.<sup>44</sup> Successful initial oral exams and radiographs were achieved 50 percent of the time. Successful management includes reinforcing positive behavior. If unsuccessful, negative reinforcement is recommended (“You don’t get to go home unless you let me finish the procedure”).<sup>45</sup> Children with autism resist eye contact, so the dentist must be firm and yet provide frequent verbal approval for appropriate responses.<sup>46</sup> Comprehensive dental treatment under general anesthesia may be required 30 percent of the time.<sup>47</sup> In a 10-year follow-up, patients resisted efforts to establish personal contact with the dental staff. Furthermore, sedative techniques were ineffective because of atypical response patterns. Use of general anesthesia was the only solution to provide necessary dental care.<sup>48</sup> A combination of factors might change considerations for care in the individual patient. When dental needs are great and attempts at behavior modification are unsuccessful, general

anesthesia in the operating room creates a controlled environment where care is delivered efficiently and effectively.

## Conclusion

Dentists offer their best services when they understand their patients. Each new generation of professionals will have greater knowledge and will use that knowledge to benefit society. Progress is slow, yet it has never been so rapid. Patients with special needs include those with developmental disabilities such as epilepsy, cerebral palsy, and autism. For the purpose of this article, categories were developed for discussion; however, each patient is an individual who requires unique attention. Understanding how developmental disabilities may affect the individual patient and the provision of dental care puts into motion the value of prevention and treatment for all patients seeking care. The ability of the dentist to manage care for patients with developmental disabilities as a routine part of practice is an achievable goal. Patients who are unable to cooperate for care in a dental office require treatment by dentists with hospital privileges. These practitioners are a resource for dentists when they consider options of care for their patients. The importance of identifying these dentists in the community cannot be overemphasized. The dental profession's ability to provide an expansive spectrum of care helps meet the future oral health care expectations of all individuals.

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# Integrating Hospital Dentistry Into the General Dental Practice

RONALD J. SANI, DDS, AND RICHARD O. SPENCER, DDS

**ABSTRACT** Societal trends and medical advances have resulted in increased numbers of physically and/or psychologically challenged individuals living within our communities. For some of these individuals, hospital dentistry with general anesthesia provides the only means by which general dental services may be provided. This paper presents considerations of significance to the general dentist wishing to incorporate outpatient hospital dentistry into his or her private practice.

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**T**oday's health care delivery system offers several design options for the delivery of surgical services. These include hospital operating rooms, short-stay surgical centers, outpatient surgical centers, and private office surgical suites. The anesthetic services provided within these facilities also offer several options including "local with anesthesia staff standby," sedation/analgesia (i.e., monitored anesthesia care), and general anesthesia. General dental services may be provided within any of these facility designs and may utilize any of these anesthesia options.

Additionally, the term hospital dentistry can be used to describe the delivery of dental services within any or all of the various hospital environments

(clinics, patient ward rooms, intensive care units, emergency rooms, operating rooms, etc.). This article, however, limits its discussion to the provision of outpatient general dental services utilizing general anesthesia within the hospital operating room and describes the major considerations that must be addressed by dentists wishing to incorporate these services into their general dental practices.

Throughout the evolution of hospitals, their timeless mission has remained the provision of care for the sick and injured. They remain institutions for the collective provision of a greater variety of services than is available through the individual practitioner.<sup>1</sup> Hospitals also provide services for individuals who are unable to receive treatment in the conventional private office setting. For these individuals,



whose physical and/or psychological status prevents the conventional provision of dental treatment, the hospital operating room often serves as the only access for restorative dental treatment.<sup>2</sup> It is within this context that the authors have integrated hospital dentistry into their general dental practices.

The use of general anesthesia is but one of the spectrum of techniques available to assist the general dentist with the delivery of dental services. This spectrum of techniques ranges from use of no anesthesia, to nondrug psychosedative techniques, to local anesthesia, to drug-induced-sedative techniques, to general anesthesia.<sup>3</sup> This spectrum also represents a continuum of increasing influence over the patient's state of consciousness ranging from no influence (no anesthesia), to obliteration of pain perception only (local anesthesia), to a reduction of consciousness (sedation), to loss of both consciousness and pain perception (general anesthesia).

### Societal Trends

The overwhelming majority of patients presenting for general dental services are treated successfully without general anesthesia. However, general dentists are seeing increased numbers of patients whose physical and/or psychological status dictates that their only means of receiving restorative dental services is with the use of general anesthesia. During the past 30 years, more than 75 percent of the developmentally disabled residents of state institutions have been deinstitutionalized. During the same period, the numbers of residents from psychiatric institutions decreased by 97 percent.<sup>4</sup> These individuals are now living in our communities and are relying upon community health providers, including dentists, for management of their health needs. As the population ages, increasing numbers of individuals are surviving long enough to develop advanced stages of chronically degenerative diseases such as Alzheimer's disease, Parkinson's disease, cardiovascular disease, etc.<sup>5</sup> The

physiological and psychological changes that accompany these maladies can progress to the point of preventing the patient from tolerating general dental services in the conventional dental office setting.

It has been estimated that 80 percent to 85 percent of children are manageable for general dental procedures utilizing routine behavioral techniques. The remaining 15 percent to 20 percent require more-aggressive management techniques, including pharmacological intervention. The child's age, cognitive development, temperament, and degree of fear and anxiety can serve to prevent adequate behavioral control with therapeutic doses of sedative agents. The anatomic and physiologic characteristics of the pediatric respiratory and cardiovascular systems cause the young patient to be more susceptible to respiratory and cardiovascular failure as the depth of sedation increases. Rather than intentionally increasing the depth of sedation in an attempt to manage a difficult pediatric patient, it is prudent to defer pharmacological management to individuals trained in the administration of general anesthesia and management of its associated complications (anesthetists, anesthesiologists).<sup>6</sup>

It is interesting to note that, while the physical and psychological status of all patients must be evaluated prior to treatment, it is most commonly the patient's behavioral status that determines the method of patient management employed.<sup>7</sup> Those patients exhibiting the most severe behavioral problems are managed most predictably utilizing general anesthesia for the delivery of dental restorative procedures.

The physical and psychological factors contributing to the need for utilizing general anesthesia also serve to prevent these individuals from receiving routine and regular preventive dental services. Extremely resistant behaviors also prevent the provision of adequate daily oral hygiene. Consequently, the typical general dental patient requiring general

anesthesia for treatment presents with extensive restorative needs, which can involve the full spectrum of services provided in the general dental office. When providing dental treatment utilizing general anesthesia, the goal is to satisfy all of the patient's restorative dental needs in a single operating room session. However, when deciding upon the specific dental procedures to be provided, due consideration must be given to the patient's developmental potential.<sup>8</sup> In patients whose developmental status is not expected to improve to the point of allowing the provision of adequate oral hygiene and preventive dental procedures, the prudent treatment plan will avoid the inclusion of services whose success depends upon close postoperative monitoring or repeated follow-up services (i.e., implant placement, orthodontic treatment, etc.).

### Selecting an Appropriate Hospital

When integrating hospital dentistry into the general dental practice, one of the first considerations must be the identification of an appropriate hospital or hospitals. An initial evaluation of the hospital's mission must be made to ensure that it is consistent with the population of patients for whom the general dentist is providing services. For example, a children's hospital may not be receptive to the treatment of adult patients. Also, for-profit hospitals that are founded and governed by investors may not be receptive to the provision of services for patients with limited reimbursement benefits for hospital services. Similarly, veterans hospitals and HMO-type hospitals (i.e., Kaiser Permanente) allow for provision of services to specific member patient populations.

Most commonly, those hospitals already familiar with hospital dental services are most easily approached regarding utilization of the operating room for the provision of such services. These can include teaching hospitals with general practice residency programs and/or other surgical facilities that already have general

dentists on staff. Dentist members of hospital medical staffs serve as valuable resources for locating the most appropriate surgical facility.

### *Hospital Staffing Issues*

Of equal importance with consideration of the hospital's mission are auxiliary staffing issues. All hospital auxiliary surgical staffs are well-trained in instrumentation and procedures associated with medical surgical services performed in their respective surgical suites. However, their education and training includes nothing relevant to general dental instrumentation or procedures, which renders them unqualified to assist the general dentist with the provision of those services. It is essential that trained dental assistants be available to assist the general dentist in the operating room. The most qualified auxiliary person to utilize in the hospital operating room is the general dentist's usual chairside dental assistant. Circumstances within the teaching hospital environment may also allow for the utilization of hospital-employed dental assisting staff from the in-house GPR program.

Therefore, when evaluating the possible affiliation with a specific hospital, it is important to inquire about policies regarding the utilization of dental assisting personnel within the operating room.

### *Hospital Equipment Issues*

While the availability of proper equipment does not guarantee optimum treatment results, the absence of proper equipment almost certainly compromises treatment. In the general dentist's private dental office, procedures are completed utilizing instrumentation, supplies, and equipment of one's personal preference. In the hospital operating room, the general dentist may be sharing instruments, supplies, and equipment with other colleagues. Also, for financial reasons and for the promotion of increased efficiency and instrument utilization, hospitals prefer to maintain instruments, supplies, and equipment that can be standardized to



**FIGURE 1.** Portable "tool chest" used to transport office instruments and supplies to the hospital.

the preferences of multiple staff members. To this end, the general dentist must be willing to allow for a certain latitude with personal preferences or be willing to transport preferred items from the office for personal use in the operating room (**FIGURE 1**).

Accordingly, when evaluating hospitals, one should inquire about the specifics of hospital-supplied dental equipment available for use in the operating room and the staff dentist's obligations for supplying equipment. Also, hospital dental equipment should be inspected and evaluated to ensure compatibility with the equipment and supplies provided by the general dentist. For example, aspects of equipment to consider include the compatibility of the dentist-supplied handpieces with the hospital-supplied dental unit, availability and compatibility of water hookups for the dentist-supplied ultrasonic scaling unit, etc.

Also, when bringing powered dental equipment into the operating room from one's private office, the equipment must first be evaluated and approved for safety by the hospital's biomedical engineering department. Such an evaluation should be completed prior to the time of surgery so as to prevent delays with the availability of needed equipment.

### *Hospital Scheduling Issues*

Scheduling is the process by which operating room time is reserved for a

procedure, and it is done through the hospital's surgical scheduling office. Once the procedure is scheduled, appropriate hospital equipment and personnel are assigned to the appropriate surgical suite as necessary. Because of patient differences, variances in surgical techniques, unpredictability of surgical complications, etc., surgical schedules are never precise; however, every effort is made to keep them as accurate as possible. Also, during the course of a operating room's schedule for the day, it frequently becomes necessary to include additional surgical cases to satisfy patients' emergent needs. Life-threatening emergency surgical needs, of course, have precedence over scheduled procedures and are accommodated into the existing surgical schedule by postponing elective procedures. Consequently, the surgical schedule often changes throughout the day.

The fluctuating nature of the hospital's surgical schedule can cause difficulties when one is attempting to merge the hospital's surgical schedule with the more-rigid dental office schedule of patient appointments. The following two tactics are offered as suggestions to assist with avoiding difficulties:

- **Schedule for the beginning of the surgical day.** All hospital operating rooms have a definite time for which the initial surgical cases of the day are scheduled to start. All subsequent procedures are scheduled on a "to follow" basis with their individual start times estimated from the proposed surgical times. Consequently, the initial surgical procedure is subject to less variation in start time.
- **Obtain "block time."** Block time is hospital operating room time that is reserved for the use of an individual staff surgeon on a regular and repetitive basis. The staff surgeon then "fills" the assigned block time with surgical cases, thereby avoiding the need to schedule against other surgical services. This allows for the usual scheduling of patient appointments through the private office at times

other than assigned block times

Block time is usually not granted until one has completed the probationary staff period (see Applying for Hospital Staff and Obtaining Privileges) and has demonstrated an ability to consistently utilize the block time requested. However, when evaluating hospitals, one should inquire about the availability of block time for new staff members.

If the hospital provides dental equipment, the availability and portability of the equipment can have scheduling implications. For example, if the same dental equipment needs to be shared by all dentists on staff and, because of design, its use is restricted to a single surgical suite, the scheduling of procedures utilizing that equipment could become competitive and restrictive. Similarly, the limited availability of hospital-employed dental auxiliary staff could have a restrictive effect on the scheduling of general dental procedures.

### Applying for Hospital Staff and Obtaining Privileges

When desiring to provide patient services in the hospital, the practitioner must first obtain both staff membership and privileges.

Hospital staff membership identifies one's affiliation with the respective hospital and carries with it certain obligations as outlined in the hospital's bylaws. These may include obligations to attend specific staff meetings, to serve on assigned committees, to satisfy hospital continuing education requirements, etc. Hospital staff appointment is based upon an evaluation of requirements as outlined in the hospital bylaws. These requirements usually include education, licensure, degree, health, office proximity, and personal character.<sup>1</sup>

Within each hospital, individual staff members are allowed to provide only those services and to perform only those treatments for which they have been granted privileges. Hospital privileges are specific treatment procedures for which the applicant has demonstrated satisfactory training, experience, and competence.<sup>1</sup>

The list of hospital privileges outlines and defines those procedures that the individual practitioner may perform within the respective hospital. The burden for proof of competence when applying for new or additional privileges is always with the applicant.

### Application Process

The application process begins with a request for a staff application packet from the hospital medical staff office. This request may be made by way of telephone, letter, or personal visit. The request should include the applicant's desire to provide general dental services in the hospital's operating room so that the proper privilege sheet will be included with the applicant's packet.

The formal application includes requests for detailed information regarding the applicant's professional qualifications and character as reported by professional peer references identified by the applicant. Additional information regarding the applicant's current hospital affiliations, professional liability status, and verification of continuing education is also requested. Required supporting documentation usually includes copies of the applicant's current professional state license registration, Drug Enforcement Agency registration certificate, and curriculum vitae.

Part of the application process also involves an interview with the departmental chair (sometimes the department of surgery) who then makes the final decision on which clinical privileges to recommend to the credential committee for approval.

Once the application process is complete, the new medical staff member may be accepted on a probationary status and assigned a proctor for review of the applicant's clinical performance during the probationary period.

The entire application process may require several months to a year for completion. Once the application forms and supporting documentation are completed, however, the applicant may be

granted temporary privileges. Temporary privileges are of benefit for allowing utilization of the hospital operating room during the completion of the formal application process. Temporary privileges are awarded for a finite period and do not excuse the practitioner from completing the entire application process.

### Preoperative Patient Evaluation

Most general dental procedures, whether completed in the private office or in the hospital operating room, are considered "elective" procedures in that their delay provides no immediate threat to the patient's life. As such, any patient presenting for such elective procedures should be in optimum general health.<sup>9</sup> Optimum general health does not imply freedom from health problems but, rather, a state of health in which those problems are being properly managed.

To properly assess a patient's health status, a preoperative patient evaluation must be completed. The goals of the preoperative patient evaluation remain the same regardless of the anesthetic methods utilized or the dental treatment procedures provided. Specifically, these goals include establishing the diagnosis, determining pre-existent medical conditions, discovering concomitant disease, managing emergencies, and patient management.<sup>10</sup>

Establishing the preoperative diagnosis includes categorizing the patient into one of the following groups of increasing anesthetic risk as defined by the American Society of Anesthesiologists:

- ASA I – A normal healthy patient;
- ASA II – A patient with mild systemic disease;
- ASA III – A patient with severe systemic disease; and
- ASA IV – A patient with severe systemic disease that is a constant threat to life.<sup>11</sup>

Classification in this manner provides a generalized impression of the complexity of the patient's medical condition thereby allowing for an estimation of the patient's risk and morbidity associated with the

administration of general anesthesia.<sup>12</sup> Anesthesia staff should be informed when scheduling ASA III- and IV-type patients because a preoperative anesthesia consultation may be required.

The patient's disease status forms the basis of the classification system. Pre-existing medical conditions and the presence of concomitant disease have profound implications for both the risk classification and the patient's specific treatment requirements. Pre-existing medical conditions are documented through the patient history -- including a medical history, relevant family and social history -- and a review of systems. The presence of concomitant disease is discovered through the patient physical examination and diagnostic laboratory studies. Hospital bylaws and practitioner experience, training, and competence determine responsibility for completion of the preoperative patient "history and physical." The authors have found it prudent to order the history and physical through the patient's private physician for preoperative review by both the treating dentist and the anesthesia staff. It should be noted, however, that some hospitals require the preoperative history and physical to be completed by a member of their medical staffs. In some instances, anesthesia staff will complete the history and physical examination during their preoperative patient evaluation. In any event, the treating dentist should clarify the individual hospital and anesthesia department requirements prior to arranging for completion of the patient's preoperative history and physical examination.

Most hospital and anesthesia departments have policies regarding the specifics of preoperative laboratory tests performed and time requirements within which these preoperative assessments must be completed. Commonly, the preoperative patient data must be obtained within 30 days of the surgical procedure; however, individual hospital policies may vary. Therefore, adequate time must be allowed for completion of these studies prior to the surgery date.

**Table 1.** Preoperative laboratory tests for screening healthy patients – general dental procedures

Age (years)	Male	Female
<40	None	Hemoglobin or hematocrit, pregnancy test*
40 - 49	ECG	Hemoglobin or hematocrit, pregnancy test*
50 - 64	ECG	ECG, hemoglobin or hematocrit
65 - 74	Hemoglobin or hematocrit, ECG, BUN,	Hemoglobin or hematocrit, ECG, BUN
>74	Hemoglobin or hematocrit, ECG, BUN,	Hemoglobin or hematocrit, ECG, BUN
	chest x-ray, glucose	chest x-ray, glucose

\*pregnancy test is indicated in females of childbearing age who cannot rule out pregnancy

Examples of specific laboratory studies for the preoperative screening of asymptomatic, healthy patients scheduled for general dental procedures are reflected in **Table 1**.<sup>12</sup> However, the specific laboratory studies utilized depend upon the patient's health status as reflected through the history and physical.

The data obtained during the preoperative patient assessment assist with the management of patient emergencies by alerting the practitioner to those situations that place the patient at risk. As such, the preoperative assessment is critical for appropriate patient management preoperatively, intraoperatively, and postoperatively.

The one aspect of the preoperative patient assessment that remains the responsibility of the general dentist is the oral examination. The detail and complexity of the preoperative oral examination are dictated by the presenting status of the patient. The behavioral patterns of some patients allow for only the most cursory of visual oral examinations. Other patients present with physical limitations that prevent obtaining standard intraoral radiographs. Still other patients are receptive to the full variety of oral and diagnostic procedures available to the general dentist.

The collection of preoperative oral diagnostic data is critical to treatment

planning and surgical scheduling. However, if patient circumstances prevent preoperative collection of this data, then necessary oral diagnostic procedures are completed at the time of surgery utilizing general anesthesia.

### Preoperative Patient/Guardian Discussion

The primary purposes of the preoperative discussion are to obtain informed consent to proceed with treatment and to give preoperative patient instructions.

Informed consent is the process by which the proposed treatment procedures are outlined; the risks, benefits, and alternatives to the proposed treatment are described; and questions are answered, so that a decision can be made as to one's desire to receive the proposed treatment. In the event of treatment refusal, an explanation of the possible consequences of such refusal must also be included.<sup>13</sup> For those patients who are unable to consent for themselves, either due to age or mental status, informed consent must be obtained from the individual who is legally able to render such a decision on behalf of the patient. When dealing with minors of separated or combined households, it is necessary to determine which parent has legal authority to consent for patient treatment.

Since significant amounts of dental treatment are often rendered during a single operating session, part of the preoperative discussion should include the financial obligations for treatment. In the experience of the authors, most patients receiving hospital dental services are Medi-Cal beneficiaries; and a discussion of financial obligations is, therefore, not relevant. Occasionally, however, the patient requiring hospital dentistry is either the beneficiary of privately funded insurance or has no insurance involvement. Financial obligations and payment arrangements for these situations should be established prior to the initiation of treatment.

As uncooperative behaviors often prevent an accurate preoperative evaluation of the hospital dental patient, it is many times impossible to compose an accurate preoperative itemization of dental services and associated charges. During financial discussions, therefore, it must be emphasized that the estimated charges are based upon a limited evaluation of the patient and that final dental charges will be based on the actual treatment rendered in accordance with the oral findings discovered at the time of treatment.

Additionally, whenever services are provided within the hospital, hospital-related charges accrue. These charges are often based upon the use of equipment, use of disposable materials, and length of treatment time. With the utilization of anesthesia services, additional anesthesiology staff charges also accrue. During financial discussions, therefore, it should also be emphasized that hospital and anesthesia related-charges are not within the purview of the general dentist and that relevant financial arrangements should be discussed with the respective medical insurance company and/or the hospital and anesthesiology group.

Preoperative instructions to the patient should also include directions to the hospital and the preoperative area within the hospital, arrangements for personal transportation to and from the hospital, preoperative management of medications,

**Table 2.** Summary Of Fasting Recommendations To Reduce The Risk Of Pulmonary Aspiration <sup>1</sup>

Ingested Material	Minimum Fasting Period <sup>2</sup>
Clear liquids <sup>3</sup>	2 hours
Breast milk	4 hours
Infant formula	6 hours
Non-human milk <sup>4</sup>	6 hours
Light meal <sup>5</sup>	6 hours

<sup>1</sup> These recommendations apply to healthy patients who are undergoing elective procedures. They are not intended for women in labor. Following the guidelines does not guarantee a complete gastric emptying has occurred.

<sup>2</sup> The fasting periods noted above apply to all ages.

<sup>3</sup> Examples of clear liquids include water, fruit juices without pulp, carbonated beverages, clear tea, and black coffee.

<sup>4</sup> Since non-human milk is similar to solids in gastric emptying time, the amount ingested must be considered when determining an appropriate fasting period.

<sup>5</sup> A light meal typically consists of toast and clear liquids. Meals that include fried or fatty foods or meat may prolong gastric emptying time. Both the amount and type of foods ingested must be considered when determining an appropriate fasting period.

provisions for personal and oral hygiene, and preoperative dietary orders.

Preoperative dietary guidelines usually include nothing by mouth in healthy adults and children for two to six hours preoperatively, depending upon the material ingested.<sup>14</sup> The goals of preoperative fasting are to decrease both gastric pH and stomach content to reduce the severity of pneumonitis associated with the aspiration of stomach contents. Fortunately, clinically significant aspiration of gastric contents is rare in healthy patients undergoing elective surgical procedures.

Studies have shown the absence of untoward effects on gastric fluid volume and pH with the ingestion of up to 250 ml of clear liquids two to three hours preoperatively.<sup>15,16</sup> The American Society of Anesthesiologists has developed fasting guidelines relevant to different classifications of ingested materials (**TABLE 2**).<sup>14</sup> Inquiries regarding preoperative dietary guidelines for specific hospitals, however, should be directed to their respective departments of anesthesiology. The importance of these guidelines should be emphasized to the patient and/or

guardian as administration of general anesthesia would be delayed or cancelled for a failure to adhere to them.

### Provision of Patient Treatment in the Operating Room

Most operating room services associated with the general dental patient are provided on an outpatient basis. As such, the patient arrives at the hospital one hour prior to the scheduled surgical time and is released following adequate recovery from general anesthesia (approximately 1 1/2 to 2 hours following completion of treatment) without formal admission to the hospital.

During the hour prior to the initiation of treatment, preoperative vital signs (blood pressure, pulse, respiration, temperature, weight) are obtained; and the patient is changed into a hospital surgical gown. The patient is interviewed and evaluated by a member of the anesthesia staff including a review of the preoperative history and physical and laboratory studies.

Also during this period, the treating dentist visits the patient and/or guardian to review the proposed treatment procedures and answer any final questions.



A surgery consent is signed and witnessed, and a preoperative note is entered into the patient's chart reflecting completion of the informed consent process.

The preoperative preparation also includes the placement of an intravenous catheter to allow for administration of medications during the anesthetic management of the patient. If the patient's behavior is resistant and combative to the point of posing a danger to himself or herself and/or the hospital staff, the administration of intramuscular medications may be required to render the patient safely manageable and to facilitate placement of the IV. Young children are often administered oral sedation to facilitate separation from their parents for transport to the operating room. In the operating room, sedation is enhanced with inhalation agents, via full face mask, to allow for comfortable placement of the IV prior to administration of general anesthesia.

Although the immediate preoperative management of the patient is at the direction of the anesthesia staff, a preoperative consultation between the treating dentist and the anesthesia staff is important to the surgical preparation for a patient's special needs. Useful information for this consultation include the following:

- A summary of the patient's psychological and health status;
- The anticipated length of the treatment and a summary of the procedures to be completed;
- The intubation and patient positioning requirements of the procedure; and
- The positioning of operating room personnel and equipment.

A summary of the patient's psychological and health status is valuable to supplement the information obtained from the patient's medical records and to clarify specific patient needs associated with the completion of treatment; such as the need for antibiotic prophylaxis, wheelchair transport, preoperative sedation, and language interpretation, as well as the intellectual abilities of



**FIGURE 2.** Oral position of the endotracheal tube.

the patient, behavioral history, etc. The summary is obtained from the physician's history and physical.

The anticipated length of the treatment and a summary of the treatment procedures are important to assist the anesthesia staff with determining the optimum anesthesia technique to be utilized and with anticipating the immediate postoperative needs of the patient. For example, the anesthesia and postoperative requirements associated with the 45-minute minor restorative dental case are much different than those associated with the five-hour general dental case that includes endodontic procedures, multiple extractions, and gingival surgery. These differences are better addressed by a staff that is prepared to anticipate their needs.

The intubation and patient positioning requirements are critical for achieving optimum access to the oral cavity. Intubation involves the placement of an endotracheal tube into the patient's trachea for preservation of a patent airway and administration of gases (oxygen and/or anesthetic gases). Placement of the endotracheal tube is by either the oral or nasal routes. If placed orally (**FIGURE 2**), the endotracheal tube must be repeatedly repositioned to allow access to all regions of the oral cavity during completion of general dental procedures.



**FIGURE 3.** Nasoendotracheal tube secured with the head drape.

These repositioning procedures not only prove to be a major inconvenience, but also increase the risks for tracheal trauma and for dislodging the endotracheal tube. Additionally, since the oral position of the endotracheal tube places it within the surgical field, there is increased risk for damaging the endotracheal tube during completion of treatment procedures. In the authors' opinions, the preferred route for placement of the endotracheal tube for general dental procedures is, therefore, via the nasal route. Once placed, the nasoendotracheal tube is secured into position and stabilized until the patient emerges from general anesthesia following the completion of all dental treatment (**FIGURE 3**).

Patient positioning refers to the placement of the patient on the surgical table and is determined by the nature of the surgical procedure, the surgeon's preferred approach, and the anesthesia technique. During general anesthesia, patients are immobile and unable to reposition themselves to relieve pressure areas, which puts them at increased risk for joint damage, muscle strain, peripheral nerve damage, interference with peripheral circulation, and skin breakdown.<sup>17</sup> The physiologic positioning of the patient, therefore, is as important to the outcome as adequate preoperative preparation and safe anesthetic technique.

The criteria for physiologic patient positioning to prevent injury from pressure, obstruction, or stretching are:

- No interference with respiration;
- No interference with circulation;
- No pressure on peripheral nerves;
- Minimal skin pressure;
- Provide accessibility to the operative site;
- Provide accessibility for anesthetic administration;
- Maintenance of proper body alignment to prevent undue musculoskeletal strain; and
- Provide for individual patient physical requirements (obesity, scoliosis, joint contractures, arthritis, etc.).<sup>18</sup>

The surgical position of the general dental patient is achieved by placing him or her in a supine position with the body tilted 30 degrees from the horizontal to place the head lower than the feet (**FIGURE 4**). A soft, supportive pad is frequently placed beneath the patient's shoulders to accentuate head tilt for improved visualization of the oral cavity. Depending upon the size of the patient and the design of the surgical table, it is usually advantageous to place the patient diagonally with head and feet directed to opposing corners of the table. The patient's head is placed in the corner of the surgical table closest to the dental assistant to allow for better oral access by both dentist and dental assistant. (Some surgical tables allow for attachment of a narrowed head extension in lieu of diagonal positioning of the patient.)

Once surgical positioning of the patient is achieved, physiologic positioning is completed by ensuring that proper musculoskeletal balance is stabilized for maintenance throughout the surgical procedure. Special attention is directed to the patient's extremities and large joints to prevent complications arising from prolonged pressure. In patients exhibiting musculoskeletal abnormalities, additional padding and draping procedures are employed to maintain the individual's unique physiologic position throughout the surgical procedure.



**FIGURE 4.** Position of the surgical table tilted 30 degrees from the horizontal to place the head lower than the feet.

When positioning equipment and personnel for provision of general dental treatment within the operating room, the primary goal is to simulate the treatment positioning of staff and equipment in the private dental office.<sup>19</sup> Specifically, both the dentist and assisting staff should be seated so they have unobstructed access to the oral cavity and dental equipment (**FIGURE 5**). To this end, both the hospital nursing staff and the anesthesia staff are positioned somewhat remotely from the patient's head. Diagrams A and B identify optimal positions for personnel utilizing one and two dental auxiliaries respectively. These diagrams are modifications from those developed by Drs. Ronald Johnson, Clemens Full and Dale Redig.<sup>20</sup> Also illustrated are diagonal patient positioning on the standard surgical table and patient positioning utilizing a narrowed head extension. Positions are depicted for a right-handed dentist and should be reversed to accommodate a left-handed operator.

Depending upon the design of the surgical table and the position of the controlling levers and pedals, it is usually advantageous to reverse the surgical table prior to patient positioning to allow for placement of the dentist's knees and legs beneath the surgical table while seated. Following reversal of the surgical table, the patient is then positioned as previously described; and the surgical table is tilted and lowered to allow the dentist and auxiliary staff to remain seated throughout the procedure.

Most hospital operating rooms are larger than dental operatories, and the use



**FIGURE 5.** Treatment positioning of dentist and assistant for unobstructed access to the patient's oral cavity and the dental equipment.

of fixed dental cabinetry and equipment can present a distinct disadvantage when seeking to focus equipment and personnel on the patient's oral cavity. The use of mobile equipment (dental cart, storage cabinet, X-ray equipment) and preset instrument trays allows for the most efficient delivery of general dental treatment within the hospital operating room<sup>21</sup> (Figures 6a and b).

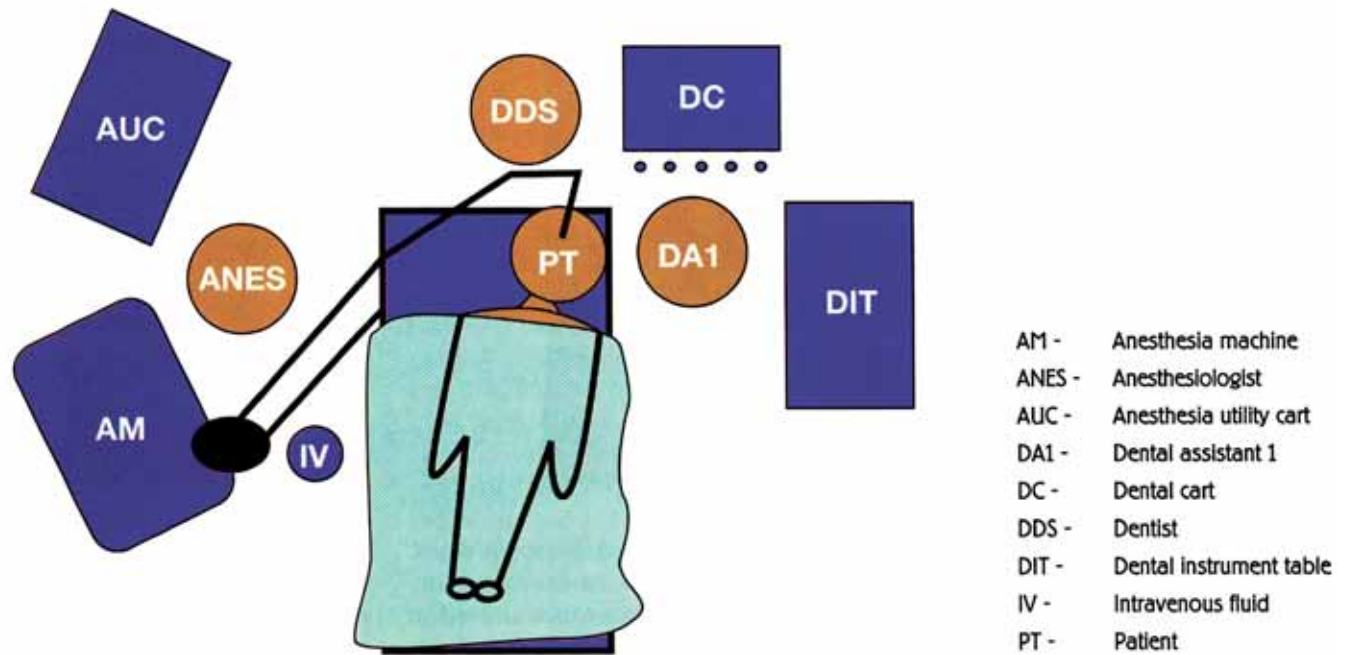
## Dental Treatment in the Operating Room

Provision of general dental treatment within the hospital operating room includes the following phases:

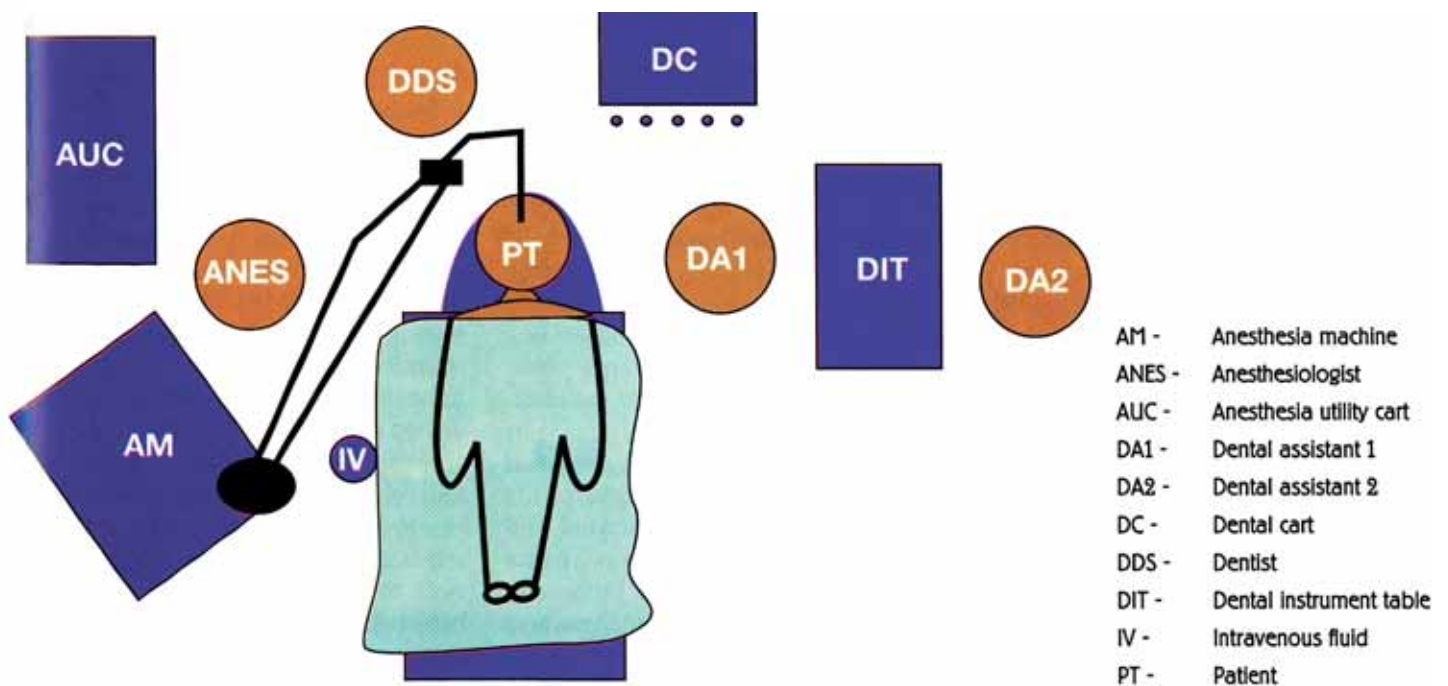
- Isolation of the surgical field;
- Collection of dental diagnostic data;
- Composing the treatment plan; and
- Completing the dental procedures.

### Isolation of the Surgical Field

Isolation of the surgical field refers to procedures employed in an attempt to separate the surgical area from the rest of the operating room environment for the purpose of preventing cross-contamination. Most medical surgical procedures are considered sterile, and surgical isolation is directed toward the preservation of sterility in the immediate vicinity of the surgical site. Intraoral procedures, however, are considered clean or clean-contaminated, as it is impossible to sterilize the oral cavity.<sup>22</sup> Consequently, neither the treating dentist nor the auxiliary staff are bound to adhere to the strict guidelines of surgical scrub technique. Appropriate gowning, gloving,



**DIAGRAM A.** Position of personnel and equipment for utilization of a single dental assistant and "diagonal" patient positioning on a standard surgical table.



**DIAGRAM B.** Positioning of personnel and equipment for utilization of two dental assistants and the use of a narrowed head extension on the surgical table.

eye protection, and masks are employed as are appropriate in the dental office setting, with the addition of hospital-required surgical attire ("scrubs," hair covers, and sometimes shoe covers) while in the operating room.

The following additional patient draping techniques are utilized, however, for increased protection of the general dental patient during general anesthesia:

- Head drape;
- Body drape;
- Throat pack; and
- Rubber dam.

**Head drape:** The head drape is placed for the purposes of protecting the patient from contaminated and abrasive debris created during the provision of restorative dental procedures and for securing the nasoendotracheal tube. Particular attention is directed toward protection of the patient's eyes and the nares through which the nasoendotracheal tube is placed. During the head-draping procedure, some practitioners prefer the patient's eyes to be lubricated with an ophthalmic ointment, covered with a 2-inch-by-6-inch petroleum-jelly-impregnated gauze, and taped shut. Other practitioners consider just taping of the patient's eyes to be adequate. A standard surgical towel is then used to wrap the head, and the edges are securely taped to seal against the patient's face. The nasoendotracheal tube is supported over the head wrap utilizing a folded surgical towel and is positioned to prevent blanching of the adjacent nares. (Prolonged blanching of the nares can result in tissue ischemia to the point of necrosis, resulting in a potentially serious cosmetic nasal defect.) Once properly positioned, the nasoendotracheal tube is secured by passing surgical tape completely around the patient's draped head (**FIGURE 6A**). Alternative head drape designs are sometimes employed to achieve the same goals and to satisfy an individual practitioner's preferences.

**Body drape:** The body drape extends from the area of the patient's neck to beyond the feet and laterally beyond



**FIGURE 6A.** Mobile X-ray equipment.



**FIGURE 6B.** Mobile dental cart.



**FIGURE 7.** "Surgical field" isolated with the rubber dam in place.

the borders of the surgical table to cover the patient's entire body inferior to the mandible. When the body drape is placed, particular attention is directed toward arrangement of leads from monitoring equipment and IV lines to ensure proper functioning without interference from surgical procedures or placement of excessive pressure against the patient's skin. During dental radiographic procedures, a lead apron is placed over the patient's neck and torso and removed immediately following completion of radiographs.

**Throat pack:** During general anesthesia, the patient loses the ability to swallow and cough. Also, particularly when using an uncuffed endotracheal tube, leakage can occur between the endotracheal tube and the wall of the trachea. The patient is, therefore, susceptible to contamination of the respiratory and/or gastrointestinal tracks from dental debris and oral irrigants associated with dental procedures. Dental personnel are also susceptible to the effects of anesthetic gases that leak from a poorly sealed endotracheal tube. To prevent these untoward occurrences, a continuous gauze throat pack is placed between the tonsillar pillars to isolate the oral cavity from the patient's respiratory and gastrointestinal tracks.<sup>23</sup>

**Rubber dam:** The rubber dam is utilized during provision of all restorative and endodontic procedures within the operating room. The rubber dam assists

with the retraction of tissues, provision of a clean and dry operating field, protection of the patient's respiratory and gastrointestinal tracts from misplaced or broken instruments, medicaments, irrigants, and/or dental debris, isolation of the teeth for improved restorative technique, and protection of dental personnel from contamination with the patient's oral secretions<sup>24</sup> (**FIGURE 7**).

### *Collection of Dental Diagnostic Data*

The collection of diagnostic data is the process of accumulating information regarding the patient's dental condition. This information is obtained through dental examination procedures and dental diagnostic testing procedures. Ideally, these procedures are completed preoperatively. However, when the patient's physical and/or psychological status dictates, these procedures are completed following the administration of general anesthesia. During general anesthesia, the patient is unable to actively participate in these procedures, so that only objective diagnostic techniques may be utilized. Subjective diagnostic techniques, i.e., those requiring interpretation and reporting by the patient, are of little use during general anesthesia.

In the operating room, dental examination and radiographic procedures are completed following patient draping procedures (with the exception of rubber



dam application). Dental radiographs are developed immediately and evaluated. The diagnostic data is recorded and analyzed to arrive at a dental diagnosis.

### *Composing the Treatment Plan*

Establishing a treatment plan involves organizing treatment procedures to satisfy the patient's dental diagnostic needs. When prioritizing dental procedures in the operating room, treatment usually progresses from least traumatic to most traumatic. Performing the most traumatic procedures toward the end of treatment prevents associated bleeding and swelling from interfering with subsequent procedures. Prophylaxis procedures are completed first, often before the dental examination, to expose tooth surfaces for complete evaluation and facilitate placement of dental restorations. Endodontic procedures are completed before restorative procedures; and restorative procedures requiring isolation for bonding are completed prior to other restorative procedures. Extractions and other surgical procedures are completed last, unless required to facilitate completion of restorations.

### *Completing the Dental Procedures*

Completion of dental procedures then progress according to the treatment plan. Restorative procedures and techniques are utilized in the operating room as they are in the dental office. Endodontic treatments are completed as one-appointment procedures because of patient limitations for follow-up care. Extractions employ the use of resorbable sutures and hemostatic agents (surgicel, gelfoam) to assist with management of postoperative bleeding.<sup>25</sup> Soft-tissue surgeries are completed utilizing electrocautery techniques, laser techniques, or primary tissue closure with resorbable sutures.

Following completion of the patient's dental treatment, the oral cavity is inspected to ensure removal of all foreign debris; the oral cavity is irrigated and suctioned; and the continuous gauze

throat pack is removed. Extraction sites are covered with 4-inch-by-4-inch gauze, folded to allow a free end to extend from the oral cavity for easy removal. Some dentists also secure the free ends of the oral gauze to the patient's face with tape during the early postoperative period. (It is beneficial to utilize gauze containing radiopaque markers to assist with postoperative patient assessment in the event that a gauze pack becomes "lost.") The patient's face is then wiped clean, and all surgical drapes are removed. The anesthesiologist allows the patient to emerge from general anesthesia; spontaneous breathing is restored; and the nasoendotracheal tube is removed. The patient is transported to the postanesthesia recovery room for management of continued recovery for eventual release from the hospital's care.

### *Hospital Charting Requirements*

Charting requirements refer to the documentation that must be included in the chart of a patient receiving hospital outpatient treatment utilizing general anesthesia. Individual hospitals have differing requirements as to both the identity of the documents and the content of each of the individual documents. It is beyond the scope of this article to present an outline of hospital charting requirements, except to mention that they may include the following:

- Preoperative history and physical;
- Preoperative laboratory values;
- Preoperative note;
- Operative note;
- Postoperative note;
- Surgical dictation;
- Discharge note; and
- Discharge orders.

The practitioner should inquire with the individual hospital to clarify the institution's specific charting requirements.

### *Postoperative Office Visit*

The postoperative office visit is scheduled with the treating dentist's

office one week following completion of the outpatient surgical procedure. The purposes of the postoperative visit are:

- To inspect the oral cavity for evaluation of healing, function of restorations, and adequacy of oral hygiene practices;
- To answer patient and/or guardian questions; and
- To review oral hygiene and dietary guidelines for prevention of future patient dental problems.

### *Conclusion*

The majority of patients seeking general dental care are receptive to the conventional provision of treatment through the private office setting. The physical and/or psychological status of certain patients, however, prevents utilization of conventional office treatment methods. Increasing numbers of these patients are seeking care through their community general dentist because of the following:

- Societal trends toward deinstitutionalizing the mentally retarded/developmentally disabled;
- Medical advances resulting in increased numbers of individuals surviving to the advanced stages of chronically debilitating diseases;
- Legal implications and parental attitudes toward the treatment of uncooperative children; and
- The anatomic and physiologic characteristics of young children complicating the use of sedative techniques in the dental office setting.

For these patients, general anesthesia offers the most predictable and often only avenue for the receipt of general dental care. This paper has presented significant considerations for the general dentist to evaluate when seeking to integrate outpatient hospital dentistry into his or her private practice.



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# All Representatives Are Busy

Robert E.  
Horseman, DDS

**S****cene:** The laboratory of Alexander Graham Bell. It is March 10, 1876. At curtain rise, Bell (played by Charles Durning) enters stage left, obviously in some state of agitation, and advances center stage to pick up phone.

**Bell:** (aside to audience) I must speak to my colleague Thomas Watson, for I am in a state of agitation.

Pretends to dial phone, concealing act from audience because phone is empty Campbell's tomato soup can attached to a string disappearing stage right. Loud ringing is heard. Off stage, assistant simulates ringing by running a thimble finger over a corrugated washboard several times.

**Watson:** (voice of Jim Carrey off stage) You have reached the residence of Thomas Watson. If you wish this conversation in English, press 1. Si desea hablar en español, marque el numero 2. Sorry, je ne parle pas Française.

**Bell:** (agitated) Watson, this is a matter of some urgency. Pick up!

**Watson:** If you know the extension of the party you wish to speak with -- or, more grammatically -- with whom you wish to speak, you may dial it now. Please choose from the following menu:

- If this is in regard to my being late for work, press 1.
- If this concerns the back order for more cans and a longer string, press 2.

■ If you wish ...

**Bell:** Pick up, Watson, you moron! We haven't invented the dial yet; there are no buttons to push. Yell into the open end of the can!

**Watson:** ... to speak to me personally, press zero.

**Bell:** (pretends to push zero) Idiot!

**Watson:** My circuit is busy right now. Your call is important to me. Please hold and your call will be answered in the order in which it was received.

The sound of "Shine on Harvest Moon" as played through a tissue folded over a comb is heard in the background.

**Bell:** (very agitated) What the hell are you talking about? There are only two telephones in the whole world, and I've got the other one.

**Watson:** All my representatives are busy. Please continue to hold. Your call is important to me.

A three-piece kazoo combo plays a selection of popular tunes from *The Mikado* in the background.

**Bell:** Stop clowning around, Thomas. I've got to say "Watson, come here. I want you." It's in all the history books.

**Watson:** Hello? Boss? Is that you? I didn't know you played a kazoo. Hold on a sec. I've got something on the other line.

**Bell:** (with mounting agitation) Now cut that out; there IS no other line!

**Watson:** It's my clothes line; I'm hanging out my laundry.

Online static simulated by crinkling cellophane close to simulated Mattel microphone.

**Bell:** (extremely agitated) Hello!

**Watson:** Hello? Who is this, really?

Operator: Please deposit \$17.85 for another three minutes.

At curtain fall, Alexander Graham Bell, famous for being the first to popularize the three-name craze in opposition to the uni-named Cher, Sting, Madonna, et al., is seen demolishing the prototype telephonic device with a large simulated club in an agitated manner.

The foregoing, of course, is fiction. Unfortunately, the telephone has evolved since that eventful March day in 1876 to dominate approximately 75 percent of our waking hours and interrupt 25 percent of our sleeping hours. After 1895, Bell's interests turned to aeronautics. He foresaw the time a hundred years hence when everyone from age 5 up would have a cell phone surgically attached to his or her ear. Not wishing to leave this catastrophe as his legacy, he took the manly way out and told everyone it was his mother's ("Ma" Bell's) idea.

Thomas Watson never did find out what Bell wanted and assumed it was a wrong number. He later founded five separate telephone companies and spent

the rest of his life calling Bell at his dinner hour importuning him to switch his long distance carrier. Alexander Graham Bell died at age 75 in 1922 from what his doctors labeled "terminal agitation."

If the fear of radiation from the cell phones doing irreparable damage to our brains has some foundation in fact, it may be time for the more progressive of us to lay in a supply of soup cans and start saving string. The system is already deregulated as far as I can tell. The difficulty will be differentiating the brain-damaged folks from the ordinary agitated people.