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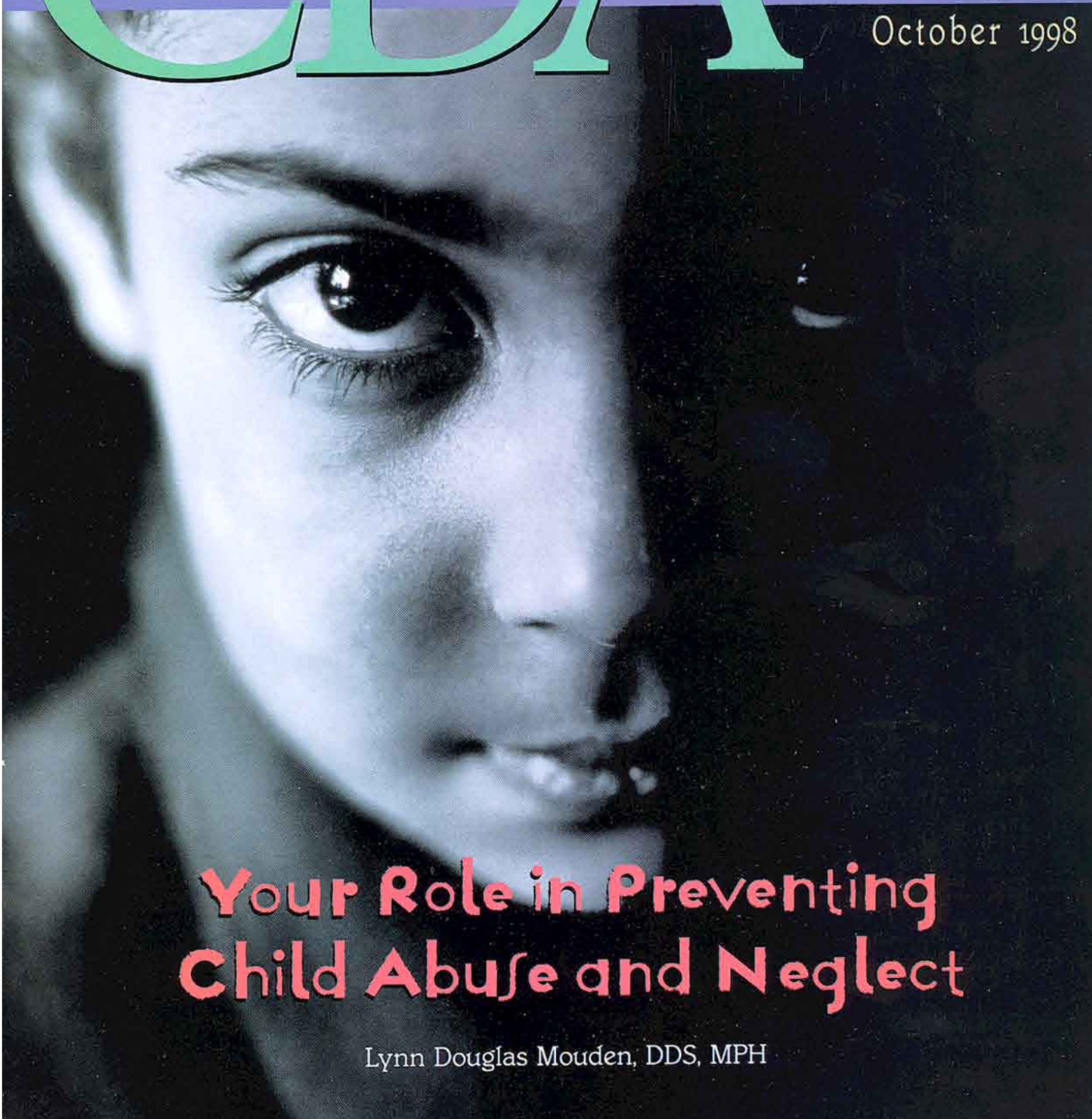

Your Role in Preventing Child Abuse and Neglect

Lynn Douglas Mouden, DDS, MPH

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A Frequent Theme for Discussion

Jack F. Conley, DDS

One recurrent theme for discussion (or in some cases a theme of dissatisfaction, whenever groups of dentists come together to discuss the state of the profession) is the matter of dentist manpower in California. Considered in more specific terms, an oversupply of dentists in this state is usually viewed as the condition that encourages the proliferation of managed care or other contract programs that are viewed as negatives in the contemporary practice of dentistry.

The source of the oversupply of manpower is perhaps the most interesting and complex part of the issue. There are a great number of variables that influence the decisions of dentists to locate their practice within this state, which range from the climate, to the ability to challenge the state board examination without a degree from an accredited dental school.

There is one factor that is intriguing to look at more closely because it is more frequently advanced by colleagues as the etiology of the oversupply here in California. It is advanced, not necessarily because of readily available date, but because of a perception, due at least in part to the high visibility of the five California schools of dentistry! It is easy to calculate the total number of graduates from the collective five each year, and conclude that if a portion of that total were not to settle in California each year, the oversupply of dentists would diminish and there would be no further cause for concern.

Too frequently we heard from some dentists in the wake of the announced plan to close Northwester, that such action was the only solution to the manpower oversupply problem. The solution in California seems even more logical to some critics because five schools combine to make a very large target! Some of the other factors that contribute to the problem such as distribution patterns of practicing dentists, are more elusive to cope with in a society that encourages freedom of movement and decision.

Attendance at a recent ADA Conference on the New Dentist provided an opportunity to personally review some recent data and opinions of those within the profession, that may provide a different perspective on the problem. While this information may not be helpful to modifying the present manpower status in California, it provides useful insight into the complexities of the issue and its solution.

As defined by the American Dental Association, a "new dentist" is a dentist who is "less than ten years out of school." While a new dentist is not synonymous with a new graduate (although the latter is part of that category), it is a useful categorization in our view, because those who generally condemn new or recent grad practitioners ad the cause of an oversupply, usually include the entire mass of more recent graduates other than their own personal era of graduation as the focus of their concern. ADA end-of-year data for 1997 shows the total of all dentists in the United States to be 164,940, with 36,786, or 22.3% of that total categorized as "new dentists". Taking these figures as a starting point, one would expect that if the newer dentists were the major factor contributing to oversupply in California, the California new dentists total would exceed this national average. However, this is not the case. The total number of dentists in California was 20,676, with new dentists totaling 4,372, a 21.1% average. While this data shows that almost 1/8 of the dentists

in the country are in California, and there are higher percentages of new dentists here than in many states, the location of new graduates in the state over the past 10 years does not appear to be the critical factor. Clearly, there is a migration of dentists from other states and other countries more than 10 years out of school that enlarges the dental manpower pool, although these sources are not nearly as easy to identify or account for as the "new" graduates.

Given that the national average of new dentists is 22.3%, what is the manpower situation outside of California? At the previously referenced ADA Conference, a noted, nationally-based practice management consultant made the statement that there is a shortage of dentists (nationally). In a private conversation, two young dentists practicing together, stated that they had started a practice from scratch in a large eastern state less than three years ago and had built a fee for service patient base of over 3,000 in that period of time. Another dentist reported that many dentists in his area were unable to find candidates available for associateships they were offering. While the purpose of this conference was not to discuss manpower issues, we received the impression that nationally, new dentists were generally satisfied with the state of the profession as it pertained to opportunities to initiate their careers.

Clearly, the situation and the attitudes are different here in California, for both the new dentist and the long-term practitioner. But the information does offer hope that some of the national trends toward undersupply might at some point influence the environment here. As dentists old and new move toward areas of greater need, the often reference "Law of Supply and Demand" should eventually help to balance the dentist:patient ratios in this state. In the meantime, this very complex problem will continue to merit discussion whenever groups of dentists or dental leadership come together.

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Laughter Can Be (Chinese) Food for the Soul

By David G. Jones

Who can bone a chicken in under 20 seconds, create a 14-course Chinese banquet before your eyes, and tell you all there is to know about Chinese and Asian cuisine? Yan can.

Celebrated master Chinese chef Martin Yan will make a special presentation of his well-known humor and cleaver-wielding panache to dental professionals from around the country at the ADA Annual Session in San Francisco. Yan will address attendees from 8:30 until 11 a.m. Oct 25.

In his presentation titled "A Culinary Journey with Martin Yan," he will demonstrate his cutlery skills and wok techniques, and talk about the most popular ingredients and seasonings used in Chinese cooking. He'll also demonstrate his great sense of humor which has helped propel him to fame in the culinary world.

"Everyone wants to have a laugh, because when you laugh you show your teeth," Yan says. "And in humor we show a common bond, so it's a better way of looking at life -- not taking it too seriously."

He tailors his presentation to each audience, and the ADA Session is no exception.

"I'll talk about the dental profession, and how important food and teeth are," he says. "You can't enjoy good food unless you have a good set of healthy teeth. And you smile when you laugh, and it's a lot more pleasant to look at someone with a nice set of teeth. I'm going to cook, and smile a lot, and dentists will appreciate that."

Yan said he'll cook something easy on the teeth and to exercise the jaws, but not too hard, too firm, too hot or too cold.

"It'll also be fantastic treatment for the taste buds, like cashew chicken or almond dishes because of the crunch and texture." He wants those who come to view is cooking demonstrations to take something special away with them.

"Take my dirty dishes away. I hate to wash up. Take all the leftovers, too," he says. "But seriously, I hope they have a good time and leave with enthusiasm. It's amazing how many people consider Chinese cooking to be mysterious. If I could, I would debunk that myth one audience at a time."

Born in Guangzhou, China, Yan began his culinary career as a young Hong Kong restaurant apprentice and later graduated from the Overseas Institute of Cookery in Hong Kong. After emigrating to the United States, he earned his MS in Food Science from the University of California at Davis. Moving to Canada, Yan received more extensive restaurant training and was certified as a master Chinese chef by the Ontario Chinese Restaurant Association.

His first television appearance was on a Canadian talk show in 1978. Yan was such a hit, he was subsequently offered his own series, the "Yan Can Cook Show" -- the beginning of a successful television career.

In 1982, San Francisco-based public television station KQED began producing "Yan Can Cook," and it has since become one of the most popular cooking shows in America. The series reaches more than 85 percent of all households in the United States on public television and has been seen in more than 70 countries around the world. The television series is a two-time winner of the prestigious James Beard Award, once for Best Television Cooking Series in 1994, and again for Best Television Food Journalism in 1996. In addition to being a veteran of more than 1,500 cooking shows, he has written 15 cookbooks and is also a cooking instructor.

As an instructor, Yan teaches Chinese and Asian cuisine at many top culinary institutions, including the California Culinary Academy, the Culinary Institute of America, and the New England Culinary Academy, and at Johnson & Wales, one of the world's leading culinary training institutes, where he received an honorary doctorate in culinary arts.

In addition to hosting his televised cooking series and teaching, Yan is a restaurant and food consultant and a much sought-after public speaker, spending more than half of each month on the road.

He is also a popular radio and television guest, and has appeared on such national television shows as The Phil Donahue Show, The Home Show, Live with Regis and Kathie Lee, and The Tonight Show with Jay Leno.

Yan's latest cooking shows, "Yan Can Cook: The Best of Asia," and "Yan Can Cook: The Best of China," are currently airing on public television stations nationwide. Both are co-produced by Yan Can Cook, Inc. and KQED.

The show has found an eager audience around the world, but not in his native Guangzhou, a dilemma he answers with typical wit.

"My dream is that one day I will be seen all over China. I'll be a Chinese, coming from San Francisco, going to China to teach the Chinese how to cook Chinese food," he says.

Technology Day

Most dental practices today depend on the computer to make each day more productive. Computers are put to work on tasks ranging from electronic billing, to practice and accounts management, to scheduling. But that may be just the tip of the iceberg, technologically speaking.

To help dentists and their staffs understand how to get much more out of their computer systems, ADA is sponsoring a special Technology Day on Oct. 23 as a pre-session registered clinic program the day before the ADA Annual Session

gets under way in San Francisco. The all-day program, "Taking the Byte Out of Technology," will offer dental practitioners and office staff a chance to get a more in-depth view of the use of the computer in a dental practice.

"The computer is changing the way we deal with our patients," says Lawrence Emmott, DDS, a private practitioner in Phoenix, Ariz. He is one of two dozen dentists, consultants, and experts who will explain how to maximize office management, insurance interface, clinical applications, information exchange, and marketing efforts by exploiting the capabilities of a computer.

Emmott proposes using the computer in the treatment room, a step he says, "will ultimately enhance patient communication and education, save you time and paperwork, and vastly reduce the errors."

Computers in treatment rooms can give patients a detailed look at treatment that has been proposed, using digital photos and X-rays. Computers can also be used to send digital images to other dentists for consults, and to document insurance claims. They can also be used to market a dental practice through an Internet site on the World Wide Web.

The Tech Day registered clinic will take place from 8:30 a.m.-4:30 p.m. at the Moscone Center Esplanade Ballroom. Attendees must arrange for their own transportation to the convention center since shuttle service begins at 11:30 a.m.

Advance registration is recommended because attendance is limited. Tickets are $225 for dentists and $150 for staff. For additional information, call (800) 232-1432 or (312) 440-2658, or e-mail annualsession@ada.org.

Strolling in the Garden of Technology

The 1998 ADA Annual Session in San Francisco will feature a Technology Day, which will offer a full day of informative sessions and exhibits about emerging technology for dentists.

Following are a few "Technology Quick Tips" that dentists can use now:

- Treatment Room Computers: The single most significant way a dentist can improve the use of technology in the office is to put computers in the treatment rooms. Although that may seem excessive, the computers provide tremendous opportunities for record keeping; faster, more accurate communications; recording of practice data; digital radiography; and much more.
- Imaging Systems: Dentists who have a CCD (digital) X-ray imaging system might try using the "reverse contrast" or "reverse grayscale" mode in such instances as examining the PDL for thickening with a suspected early periapical infection, or with evaluation of the furca area in lower molars that has periodontal involvement. Studies show that this image processing tool is more revealing clinically.
- Electronic Notes: Electronic notes will stand up to legal scrutiny in court, regardless of what the general belief might be. Although it's possible a record can be changed, there are many ways to detect alterations to computerized records, including location on the hard disk.
- Technology Budget: A dental office would plan to invest at least 7 percent of the gross income annually in technology training, software upgrades, technical support, additional hardware and replacement hardware to protect the initial investment.
- Screen Saver: Never leave data relating to one patient on a treatment room monitor for another patient to see. Use a screen saver to inform the patient about new procedures such as whitening or implants.
- Handle emergencies away from the office: Software programs are available that provide home PC or laptop access to an office computer system via modem from other computers with the same software. Access to records provides the patient's history.
- CD-ROMs: Many sources of information are now available via CD-ROM, including drug references, patient education systems, fee surveys, letter files, OSHA manuals, new software and much more.

Internet Provides Sources for Domestic Violence Information

Domestic violence is a universal health care problem, affecting millions of individuals worldwide, as reported in the Journal of the American Medical Association. In the United States alone, approximately 2 million women per year report abuse episodes.

Because of the social stigma of domestic violence, lack of family and community support, risks of escalated violence, and an uncertain future after intervention, episodes are often not reported. Despite the widespread nature of the problem domestic violence resources, and access to them, vary widely among cities and towns. Although not a substitute for direct interventions, the Internet presents opportunities to direct health professionals and their patients to useful resources that could contribute to improved management of this pressing problem.

Following are some useful web sites for medical and community-oriented sites that health care professionals may either reference or recommend to a

patient:

*Minnesota Center Against Violence & Abuse

www.umn.edu/mincava

*Family Peace Project (Maintained by the Medical College of Wisconsin)

www.family.mcw.edu/ahec/ec/medviol.html

*Family Violence Prevention Fund

www.frvpf.org

*Domestic Violence: A Practical Approach for Clinicians

www.sfms.org/domestic.html

*American College of Emergency Medicine (Carries articles and resources about domestic violence.)

www.acep.org

(Mention of a web site does not imply endorsement by the Journal of the California Dental Association. All of the web addresses listed were active and accurate at the time of publication. However, because of technical considerations and other factors, links may change or become inactive.)

Have No Fear

The average dentist has to deal with the psychology of fear and patient anxiety just to stay in business, reports AGD Impact, the magazine of the Academy of General Dentistry.

Dr. Jane Stewart, PhD, a psychologist based in Oregon and a formerly phobic patient, explains what types of situations feed patient anxiety.

"Who wants to be confronted with color photos of inflamed, receding gum tissues while trying to relax in the dental chair?" she asks.

From the patient's perspective, Stewart recommends removal of dental fear cartoons and dental disease photos.

There are many types of fear that practitioners must deal with, including fear of the needle, fear of disapproval, fear of embarrassment and fear of the sound of the drill.

Robert F. Kroeger, DDS, an author of books about patient care, recommends desensitizing the patient to the sight of the needle and giving the patient a form of control. The doctor is asked to make three statements to their patients: 1) If you want to take a break during the drilling, please raise your hand to stop me; 2) I can produce a profound numbness in your tooth that will be effective; 3) If the pain continues, I have a technique that will produce profound numbness in that area.

Dr. Kevin Oreiux of British Columbia tries to change the perception of the dental office for children who have come for treatment. The patient is introduced to the drill as a whistle, not as a high-pitched sound. The dental unit water line becomes a power washer, like a "car wash" in the mouth. Tooth cleaning "gets rid of sugar bugs."

All of the advice from the experts promote an increased communication between doctor and patient. To keep patients, the practitioner has to reach out and address patient fear. Whether it is assisting the patient to overcome fear, or dispelling it before it has a chance to take root, the dentist has methods for allaying those fears, which are a detriment to the patient's health and to the dentist's practice.

Turbo Tea

Tea, be it green, black or oolong, comes from the leaves of a single plant, Camellia sinensis. That evergreen contains some of the most powerful antioxidants known, which is why many scientists now believe tea -- especially green tea with its potent dose of the plant chemicals -- might help stave off cancer.

Human bodies continuously produce oxidants, rogue molecules that, having lost an electron, are extremely unstable and chemically reactive. To become stable, oxidants steal electrons from other molecules in the cell. In the process, they damage critical cell proteins and genetic material. To protect itself, the body makes antioxidants, which scavenge and sequester the oxidants.

Usually the system is in balance," notes Enrique Cadenas, PhD, USC professor of molecular pharmacology and toxicology. But, when the scales get out of whack, the body is thrown into a state of oxidative stress.

"That can lead to mutations and start the process of carcinogenesis, or other disease processes," Cadenas says.

The body's ability to produce antioxidants diminishes with age. Scientists think that oxidation plays a role in many aging-related diseases, including cancer, atherosclerosis, cataracts, emphysema and Alzheimer's disease.

Green tea's most active compounds are a trio of antioxidants called catechins that have been shown to be 100 times more powerful than vitamin C at protecting proteins and DNA from oxidative damage. They are 25 times more powerful than vitamin E, and leagues in front of resveratrol, the antioxidant found in grapes and wine. While black and oolong tea contain the same kind of antioxidants, black tea contains only 40 percent of green tea's dose, with oolong falling somewhere in the middle.

In research studies, the catechins have been shown to halt tumor cell growth as well as to protect healthy cells from damage. Other research has suggested that green tea can protect against changes that can lead to artery disease.

Before scientists can recommend drinking green tea, however, more research needs to be done examining green tea's chemopreventive value for humans, something that is still not conclusive.

"Just because something is an antioxidant doesn't mean it will protect against disease," Cadenas says.

Genetic Programming Could be

Smoking Factor

Genetic factors may determine the degree to which cigarette smokers become addicted to nicotine, suggests Dr. Ernest Noble, Pike Professor of Alcohol Studies at UCLA, in an editorial published in the Journal of the National Cancer Institute.

Noble explains that people whose genetic makeups contain A1 and B1 alleles (variants) of DRD2, the dopamine receptor gene, may be predisposed to start and continue smoking. These less common forms of DRD2 are linked to the brain's pleasure response system. As a result, Noble says, these individuals may prove "less willing or able to give up their smoking habit than those without this genetic variant."

Noble and colleagues previously had demonstrated that individuals who have the A1 allele of the DRD2 gene have fewer than normal dopamine receptors, which provide the basis for the brain's pleasure and reward system. These people appear to have a more biologically based and severe craving for pleasure-inducing substances, including alcohol and nicotine. These substances may help compensate for their reduced ability to feel normal pleasures in life by stimulating their existing dopamine receptors.

Noble notes that smoking rates in this country declined dramatically between 1965 and 1990. Despite increasing public pressure, however, the rate of American people who smoke has leveled off at 25 percent. This percentage of the population could represent individuals who have both a genetic predisposition to smoke and a resistance to environmental influences that might induce others to quit.

Buckle Up -- At the Grocery Store

Falls from shopping carts are the leading cause of head injuries among young children. In 1995, more than 22,000 children age 5 and younger were taken to the emergency room after falling from the seat or basket of a shopping cart, according to the American Academy of Pediatric Dentistry. Half of the injuries suffered were classified as severe, including concussions, broken bones, and broken or chipped teeth.

It's important for dentists to remind patients who have children to use the safety straps and seat restraints on shopping carts. If a store does not have safety straps, they should be requested from the store manager. In some states, manufacturers are required to equip all new carts with safety straps.

Honors

Dr. Donald R. Poulton, professor and director of the University of the Pacific School of Dentistry's graduate orthodontic program, assumed the position of president of the American Association of Orthodontists (AAO), at the AAO annual meeting in Dallas, Texas in May. In addition to being a member of the AAO Board of Trustees since 1989, Poulton was chair of the UOP School of Dentistry's orthodontic department from 1981-1996 and past president of the Pacific Coast Society of Orthodontists. He was also past president of the California State Society of Orthodontists and received the association's 1997 Award of Merit.

Anna Nelson, CDA, RDA, of San Francisco was installed as vice president of the American Dental Assistants Association at the recent ADAA annual conference held in Boston in conjunction with the Academy of General Dentistry. Nelson is director of the City College of San Francisco Dental Assisting Program, a post she has held since 1985.

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The Role for Dental Professionals in Preventing Child Abuse and Neglect

Lynn Douglas Mouden, DDS, MPH, FICD, FACD

ABSTRACT The topic of child maltreatment is difficult because all practitioners wish that child abuse and neglect did not happen. The intent of this article is to show every dental professional that a thorough understanding of their involvement in this issue can lead to a feeling of acceptance -- an acceptance that we can do something to stop this awful epidemic.

AUTHOR

Dr. Mouden is the Associate Chief, Missouri Bureau of Dental Health and an Associate Clinical Professor at the University of Missouri Kansas City School of Dentistry. He is the ADA's National Spokesperson on Child Abuse Prevention.

The topic of child maltreatment is difficult because all practitioners wish that child abuse and neglect did not happen. Also, we would rather not have to deal with some of the emotions these cases evoke in us. Cases of family violence are difficult to deal with because we know they are not the result of some disease process nor some accident. Instead, we know that these injuries are deliberate and preventable.

Dealing with child maltreatment sometimes is similar to the way we deal with death. Many people prefer to deny these problems, or to say that it only happens in someone else's neighborhood. They are angry about child abuse, and what abusers do to children should make them upset, but anger by itself will not solve the problem. They bargain about their involvement, saying that if they get involved with child abuse prevention, they won't need to be concerned with other forms of family violence. They get depressed, feeling that our small victories are inconsequential to fight the huge epidemic of abuse. However, we can show every dental professional that a thorough understanding of their involvement can lead them to a feeling of acceptance – an acceptance that we can do something to stop this awful epidemic.

Child abuse and neglect truly are epidemic in proportion. In 1996, approximately 2.9 million children were reported to child protection services agencies as victims of maltreatment, with over 7,300 cases reported every day.[1,2] To help prevent the growing number of these cases, every state has passed legislation to increase the reporting of suspected abuse and neglect. Under these laws, several classes of individuals are listed in state statutes as "mandated reporters." As mandated reporters, these individuals are required, under penalty of law, to report any child within their purview suspected of being abused or neglected. Although dentists are mandated reporters in every state, they have done a remarkably poor

job of living up to that obligation.

An analysis of 260 documented cases of child abuse at Children's Hospital Medical Center in Boston found that 65 percent of all cases of physical abuse involve injuries to the head, neck, or mouth.[3] Therefore, dentists are in a perfect position to see signs of child maltreatment. However, in states that track cases by the profession of the reporter, dentists have made only 0.32 percent of all reports.[4] If dentists are in the best position to see these injuries, why don't they recognize them? If they recognize child abuse, why don't they report it?

Child abuse and neglect are not new to society. Society's attitude toward protecting children has changed dramatically over the centuries. The Greeks, Egyptians, Persians and other ancient civilizations considered every child to be a charge of the state. Somewhat later, Roman law reversed that thinking by conceding to the father absolute dominion over his children. English common law came to a compromise between these two extremes. Under that law, the parent had absolute control of the child, subject to the power of the King under the concept of parens patriae, the sovereign's right to protect the child. As attitudes have changed, so has the treatment of children.

In this country, early attitudes toward child maltreatment seemed to have been based on denying the very existence of abuse or neglect. No mention of child maltreatment appeared in the literature until 1874. It was in that year that the case of "Mary Ellen" brought the issue of child maltreatment to light. While visiting an elderly parishioner, a church social worker learned about Mary Ellen, a child who had been beaten, bound, and neglected by her foster parents. The social worker found that she could do nothing to have the child removed from the home, so the church sought changes in the law to protect such children.

Following the legal efforts to help Mary Ellen, the New York Society for the Prevention of Cruelty to Children (now called the ASPCC) was formed. It is a sad commentary that the NYSPCC was formed years after the beginning of the New York Society for the Prevention of Cruelty to Animals (now known as the ASPCA). The Mary Ellen case was even championed under the auspices of the SPCA because she was deemed to be a "human animal".

Current attitudes toward child maltreatment arise from the publication of "The Battered-Child Syndrome" by Dr. C. Henry Kempe in 1962.5 Dr. Kempe's message, directed to his medical colleagues, was clear: battered-child syndrome should be considered in every differential diagnosis involving injuries to children. Specifically, he advocated that "abuse should be considered in any child exhibiting evidence of fracture of any bone, subdural hematoma, failure to thrive, soft tissue swelling, or skin bruising." He later expanded the list of symptoms of child maltreatment to include retinal hemorrhages, hand print bruises, human bite marks, genital injuries, intraoral hematomas, and lacerations of the mouth.[6]

Kempe's article immediately heightened awareness in the medical community. Because of the article, the problems of child abuse also gained public recognition for the first time. Within six months the popular press had picked up on the story and spread it to the masses as in Life, 1963, "Cry Rises from Beaten Babies" and Good Housekeeping, 1964, "The Shocking Price of Parental Anger." Further evidence of the effect of the Kempe article was that the federal Children's Bureau authored model legislation in 1963 for the states to address the problems of child maltreatment.

The impact of the Kempe landmark article was admittedly a stroke of luck. For ten years Dr. Kempe had talked about child abuse, non-accidental injuries, and inflicted injury, but no one had paid attention. He coined the phrase "battered-child syndrome" despite its provocative and anger-producing nature to finally get the attention of the medical profession. He got much more attention than he expected.

Etiology

Child maltreatment can undoubtedly be considered a breakdown in the parenting skills of the child's caregivers. Many factors can lead to this failure to parent properly. It is most useful to understand that child abuse and neglect may be among many symptoms of a dysfunctional family. One theory holds that parents' unrealistic expectations for the child and for themselves can contribute to the abuse. Another theory is that the abuser's attitude toward children is based on the conviction that children exist to satisfy parental needs. For these parents, it follows that children who do not satisfy those needs should be physically punished in order to make them behave properly.7 Some mothers are simply not satisfied by the unresponsiveness and lack of feedback from an infant. One young mother's tragic lament shows her self-justifying reasons for abusing her baby:

I've waited all these years for my baby, and when she was born she never did anything for me. When she cried, it meant that she didn't love me; so I hit her.[7]

Other abusers explain the maltreatment of children as a suitable means of parenting. In one notable study, Dietrich et al interviewed abusers about their feelings subsequent to the abuse. Of those adults interviewed, 62.5 percent felt justified in injuring the child, 58.9% felt no remorse for their actions, and 50.7 percent blamed the victim for the abuse.

Combining the three factors studied, fully one-third of the adults felt justified, blamed the victim, and felt no remorse.[8]

Dr. Kempe noted that parental attitudes have long been influenced by what he referred to as the "three almost sacred sayings." "Spare the rod and spoil the child" is a time-honored admonition that condones corporal punishment. "Be it ever so humble, there's no place like home" reminds us of the primary importance of parents, even flawed parents.

Unfortunately, places far better than home do exist for children in certain situations. "A man's home is his castle" reinforces the widespread belief that parents have ultimate control over their children, and can rear their children without outside intervention.

Most parents would agree that parenting is often difficult and trying. All parents can feel anger toward their child at some time. Mothering can be even more fraught with broken promises based on our cultural perceptions of the ideal mother. Dr. Kempe said, "The idealized view of the mother as Madonna, sweetly smiling on her child, is in the mind's eye of many people today. However, it is unlikely that any mother or father can be loving and generous 24 hours per day, seven days per week.7 The difference between abusers and non-abusers is that non-abusers find less violent methods to deal with their anger and frustration.

The prevention of child maltreatment would be expedited if one could develop a model for identifying potential abusers. While it would certainly be helpful to be able to identify the perpetrators before they abuse their children, attempts to develop a "personality profile" of the potentially abusive parent have shown little success.[9] Current efforts are aimed at identifying risk factors that may lead to child abuse or neglect. Factors such as brief time of residence in a location, families with more than three children, parents with less than average years of education, and age of the parents at the time of the child's birth are all known to affect the risk of abusive behavior.10 Parents who have one or more of these risk factors may then be targeted for preventive interventions.

Demographics

Early surveys of child abuse cases inaccurately reported that child abuse and neglect occurred mostly in minority and lower socio-economic class families. It is now known that child maltreatment occurs in families in all economic levels and from every ethnic background,[3] although it has been suggested that the poor are more likely to be reported, accused and convicted of child abuse and neglect.[7]

National statistics, compiled from the 47 state agencies that completed the 1992 survey of the National Center on Child Abuse Prevention, show that from over 2.5 million reported cases:

(1) 65 percent of cases involve Caucasian families;

(2) reports cover every socio-economic level; and,

(3) 54 percent of reports are of families in rural settings.[11]

Therefore, no one should assume that child abuse only occurs in poor, minority, or inner-city families. The data clearly show otherwise. The prevalence of child neglect is even higher. For every child seen who is abused, probably ten more children have been neglected.[12] People in health care need to be especially aware of the prevalence of child maltreatment across ethnic, geographic and economic strata. It is said to be highly unlikely that health care professionals in any area have not seen abused children in their practice.[11]

Recent widely reported news stories have highlighted certain high-risk environments for children. Even though court cases involving day care centers have received much attention, less than 1 percent of substantiated cases occur in the day care setting.[12] Divorce proceedings with allegations of child abuse leveled by one or both parents are common in the popular press. However, less than two percent of divorce custody disputes involve allegations of abuse. Unfortunately, more than half of the allegations made, although incidental to the divorce, are nevertheless reported to have been founded.[13] It is unknown whether the abuse is a cause for the divorce, or whether the stresses of divorce are a contributing factor in the abuse, or both.

Sexual abuse is also widespread. At least one in six women and one in 10 men report having experienced intrafamilial sexual abuse before the age of 18.[14] A 1988 Los Angeles Times poll revealed that 22 percent of Americans reported being victims of child sexual abuse.[15]

Legal Issues

Under the provisions of the federal Child Abuse Prevention Act of 1974, passed 100 years after the Mary Ellen case, every state is required to have legislation aimed at protecting children from abuse and neglect. All 50 states have the legislation in place. Each state statute is slightly different, but all cover the same basic areas. In every state, certain citizens are specifically listed as mandated reporters – those individuals required to report suspected cases of child abuse and neglect.

Every state reporting statute contains similar provisions defining child abuse, who must report, immunity for reporting and abrogation of privileged communication. The definition of reportable conditions varies widely between jurisdictions. Some statutory definitions are extremely circuitous, as in the case of Tennessee's statute, which defines abuse and neglect as "... failure to protect a child from conditions of

brutality, abuse or neglect ."[16] Most states, including California, use a definition based on federal law, that refers to "any physical injury inflicted by other than accidental means, sexual abuse, and unjustifiable punishment.[17]

State laws differ widely on situations that may constitute child neglect. Such varying definitions of child neglect underscore the cultural issues inherent in labeling children as neglected. Factors including socioeconomic conditions and access to care have influenced legislative thinking on the definition of neglected children.

Much variation exists in the listing of mandated reporters, those required by law to report suspected cases. Nineteen jurisdictions require that "any person" is required to report suspected child maltreatment. Other states, such as Illinois, list so many specific individuals (including homemakers)[18] that the listing should be "any person." California statute list includes teachers, day care workers, health practitioners (defined as physicians, dentists, podiatrists, chiropractors, nurses, dental hygienists, etc.), coroners and medical examiners.[19]

Every state statute contains language to protect mandated reporters from criminal and civil liability arising from good-faith reports. However, such immunity does not apply to liability arising from willful misconduct or gross negligence.[20] Forty-seven of the states that specify mandated reporting (including California) also provide for criminal penalties for failure to report suspected cases.[21] It is important for mandated health care professionals to note that malpractice insurance does not cover criminal acts. Because failure to report can be a crime, subsequent injuries resulting from failure to report might open a health care professional to exposure to uninsured professional liability.

The abrogation of privileged communication provisions is of paramount importance to the reporting process. From the beginning of their professional education, health care providers are told that what is learned within the doctor-patient relationship is confidential. Therefore, violation of privileged communication is anathema to many providers. Child abuse reporting laws systematically remove doctor-patient confidentiality in suspected

Figure 1. Adult hand prints from a case of Shaken Baby Syndrome.

Figure 2. Adult bite marks reported as a dog bite

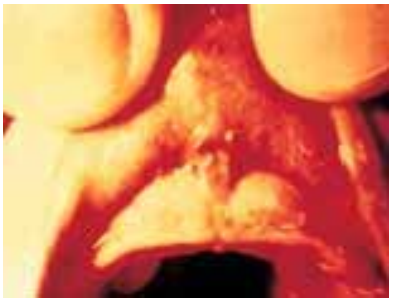

Figure 3. Laceration of labial frenum from forced feeding.

Figure 4. "Slap mark" on a child's face.

Figure 5. Multiple, bi-lateral injuries to the face, consistent with the use of force over a period of time.

Figure 6. Injuries from an open-handed slap to the mouth. Injuries include lacerations of the upper lip and labial frenum, contusions in the vestibule and suluxation of the permanent right central incisor.

abuse cases, and state that patient confidentiality can not be used as an excuse for failure to report.

Clinical Aspects of Child Abuse and Neglect Related to Dentistry

Although the injuries of child abuse are many and varied, several types of injuries are common to abuse. Many of these injuries are within the scope of dentistry or easily observed by the dental professional in the course of routine dental treatment. Other types of injuries are pathognomic to child abuse and easily identified by the dentist. Injuries of this type include those that appear simultaneously on multiple body planes.[22] Injuries that exhibit patterned marks of implements or the adult's hand, or bilateral injuries to the face, carry a high index of suspicion of abuse,[23] and can occur on easily observable areas of the child's body.

The mouth is sometimes injured due to the abuser's desire to silence a crying child.[24] Surveys of dentists who have reported cases to CPS agencies show a trend in the type of oral injuries encountered in child abuse cases. In an American Board of Pedodontics survey of 155 pediatric dentists throughout the nation, the principal dental injuries reported in cases of child abuse include missing and fractured teeth (32 percent of reported cases), oral bruises (24 percent), oral lacerations (14 percent), jaw fractures (11 percent), and oral burns (5 percent).[25]

Even the youngest victims of abuse can have oral injuries. Lacerations and contusions of the oral mucosa, particularly around the anterior alveolar ridge, are seen in cases of forced feeding when the bottle is shoved forcefully against the child's mouth. In older children, gags used to silence or punish a child can leave bruises at the corners of the mouth.[26]

Human bite marks should be easily identifiable by all dental professionals and these injuries carry a high index of suspicion of child abuse.[27] Dentists should be able to see most abuse-related bite marks. Forty-three percent of all abuse bite marks are located on the head and neck,[28] and 65 percent of all abuse bite marks can be seen while the child is clothed.[29] Human bites are painful and represent an assault with a weapon that carries a significant possibility of morbidity or even mortality. It must be remembered that the infection potential of the human bite is significant and serious.

Many of the physical signs of child sexual abuse are also within the purview of dentistry. The presence of oral or perioral gonorrhea, syphilis, or chlamydia in prepubertal children is pathognomic of sexual abuse.[30] The behavioral indicator of exaggerated gag reaction to any oral intrusion with an instrument has been found in cases of oral sexual abuse.[31]

Dental neglect has been defined as lack of care that makes routine eating impossible, causes chronic pain, delays or retards a child's growth, or makes it difficult or impossible for a child to perform daily activities.[25] It is well accepted in health care that untreated dental problems are as serious as an untreated wound in any other part of the body, because neglecting treatment can lead to complications affecting the entire body.[29]

Just as attitudes toward neglect in general vary among states, the practical definitions of dental neglect between particular dental settings may also differ. The American Academy of Pediatric Dentistry has defined dental neglect as the failure to seek treatment for untreated, rampant caries, trauma, pain, infection or bleeding. Also included is the failure to follow through with treatment once the parent has been informed that the above conditions exist.[32] The failure to follow up on treatment needs is probably more germane to dentists. Many practitioners have had parents express that they were totally unaware of conditions in their child's mouth before the dentist's diagnosis. Once the caregiver knows about the child's condition, failure to provide necessary care, within the bounds of their resources, can be reported as child neglect.

The Academy's definition serves neither as law nor as a standard of practice. It is a guideline for those dentists evaluating their patients' oral health in light of societal norms. It is up to the dental professional to weigh the guidelines and legal definitions against regional or local norms and access to care issues.

Attitudes of Dental Professionals About Child Abuse and Neglect

The attitude of dental professionals about child maltreatment has been slow to change. The dentist's role in preventing child abuse and neglect was first addressed by organized dentistry in the 1970s. It was not until 1993 that the American Dental Association (ADA) added required recognition and reporting of perioral signs of child abuse to its Principles of Conduct and Code of Ethics. Under a resolution passed by the ADA House of Delegates, the Code now states: Dentists shall be obliged to become familiar with the perioral signs of child abuse and to report suspected cases to the proper authorities consistent with state law. (House Resolution 23S-1B.)[33]

The resolution goes on to "urge the constituent dental societies to inform their members of applicable state laws relating to reporting of suspected cases of abuse and neglect." Another ADA Resolution (HR 141-RC) reinforces the Association's official policy by saying that members should "become familiar with and report all physical signs of child abuse observable in the normal course of the dental visit."[33] It is hoped that the ethical responsibility to recognize and report child abuse, along with increased awareness of statutory requirements, will encourage dentists to perform their legal duties.

While many dentists report being

leery of bureaucratic entanglements, it is important to remember that the dentist is only required to notify the proper authorities, not pursue any investigatory aspects of the case.[34] All too often practitioners try to be detectives. They waste time trying to find out "who did it?" when the important question for the practitioner to answer is "did something happen?" Dentists also are often unaware that the aim of child protective service agencies is to protect the victim from further abuse and to strengthen the family. In fact, the vast majority of investigated cases result in the family's remaining intact.[35]

Dentistry's Involvement in Preventing Child Abuse and Neglect

If dentists' failure to report suspected cases of abuse and neglect can be considered an indicator, dentistry's level of awareness of child maltreatment is abysmal, because the most important factor in recognizing child abuse is to be aware.[36] Diagnosing suspected abuse or neglect is only the first step – dentists must be prepared to take immediate remedial action on behalf of the victim.[37] Specifically, they must be willing to make the required report to aid the victim. All members of the dental profession must be informed of the health, social, and legal aspects of child abuse and neglect, and they must inform other professions that dental abuse and dental neglect are serious components of child maltreatment.[38]

Recognition of child maltreatment is filled with frustration for most health care professionals. The problem with recognition is the initial, awful realization that parents and care-givers do hurtful things to defenseless, vulnerable children.[39] Educating professionals to recognize child abuse and neglect is only half the battle. Encouraging them to make required reports is the other half.

Conclusion

Awareness programs such as the Prevent Abuse and Neglect through Dental Awareness (P.A.N.D.A.) coalitions may help relieve anxieties of the reporters. P.A.N.D.A's educational and awareness message can alleviate fear of the unknown that may await a practitioner who follows the law. Dental professionals can be expected to perform their duty to help protect our children only after receiving appropriate education about their role in identifying and reporting suspected cases of maltreatment .

Dentists must become more aware of their moral, legal, and ethical responsibilities in recognizing and reporting child abuse and neglect. All dental professionals need to understand the seriousness of the problems of child maltreatment and realize that children do not just get hurt in abuse and neglect – they often die as a direct result of their maltreatment. Dentistry must do its part to help stop the pain, suffering, and death that result from child maltreatment; it has been said that victims of child abuse and neglect fall into only two categories – those who lived through it and those who did not.[40]

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Secrets and Lies: Alcohol and Drug Addiction In Dentistry

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ABSTRACT Dentists, like other health professionals, are at risk for the development of substance abuse disorders. Recent advances contribute to a deeper understanding of the disease nature of these disorders; signs and symptoms as evidenced in dental practice are discussed, along with support resources.

The abuse of mood-altering substances and development of addiction have been called an occupational hazard for health professionals.1 Contributing factors cited often include high stress levels, unrealistic and perfectionistic expectations of oneself, grandiose feelings of invulnerability and knowledge about and access to drugs. A useful working definition of addiction is that used by the American Society of Addiction Medicine: "a disease process characterized by the continued use of a specific psychoactive substance despite physical, psychological or social harm."2 Addiction brings with it a multitude of problems in potentially all the major life arenas. For health professionals, issues of professional competence, public safety and trust, professional licensure, reputation, and credentialling are critical. Dentists run the additional risks of impairment in practice management, jeopardizing livelihood for themselves, their staff, and their families.

Denial and secrecy are hallmarks of addiction. Professionals in general are sophisticated in avoiding exposure of their addictions, and are aided in this by social status and attribution. Robert Holman Coombs, in his recent book, Drug-Impaired Professionals, refers to "pedestal professionals" to make the point that dentists (and other high-accountability professionals) are likely to be seen (and to see themselves) as set apart from the general population.3

The reality is that dentists are human beings first, and dentists second. Addiction is a human disease, and some of the people

who have it are dentists.

Research conducted over the last several decades is bearing fruit in new knowledge about the genetics and neurophysiology of addiction. Family, twin, and adoption studies consistently show that relatives of alcoholics have significantly higher rates of addiction than do relatives of nonalcoholics; for children of alcoholics, this rate is three to four times greater than for children of nonalcoholics.4 In an alcohol challenge study, for example, otherwise similar college-age men were grouped by family history of alcoholism (i.e., positive or negative family histories). Given the same dosage of alcohol and subjected to the same physiological indicators, the group with a positive family history showed a lower intensity of reaction to alcohol than did those with no family history of alcoholism.5 Using laboratory rodents, researchers from Indiana University have been able to breed successive generations of alcohol-preferring and alcohol-nonpreferring animals. Those animals preferring alcohol over water would consume progressively more alcohol over the generations, to a physiological threshold, while the nonpreferrers continue to consume low levels of alcohol in later generations.6 This lends support to the concept of a biological process not subject to peer pressure, social learning, dysfunctional families of origin, cultural norms, liquor company ads or other of the factors often thought to influence alcohol and other drug use among humans.

The genetic studies speak to one aspect of vulnerability to the disease of addiction; research in neurotransmitters and brain structure speaks to another. Numerous studies show that similar substances are abused by animals and humans, that animals will voluntarily self-administer to the point of sacrificing food, water, and sex and that these particular substances (opiates, alcohol, amphetamines and benzodiazepines) acutely enhance brain reward mechanisms.7 The same behaviors can be observed in human drug addicts. Science tells us "the addicted brain is distinctly different from the nonaddicted brain, as manifested by changes in brain metabolic activity, receptor availability, gene expression, and responsiveness to environmental cues."8 Alan Leshner, Ph.D., director of the National Institute on Drug Abuse, puts this succinctly when he says, "addiction is a brain disease."8 That healthcare professionals, including dentists, would risk sacrificing years of academic dedication, the rigors of exacting specialized training, violation of professional ethical codes and practice acts, endangerment of their patients and threats to their own financial security, is evidence in itself of the power of this brain disease.

A recent study by the National Institute on Alcohol Abuse and Alcoholism9 identified lifetime prevalence of alcohol dependence in the general population at 13.3 percent and 12-month prevalence at 4.4 percent. It is generally thought that prevalence of addiction among healthcare professionals is similar to that of the general population, though there are some differences related to drugs of choice.10 These differences reflect familiarity with particular drugs and access to them; not surprisingly, the most commonly abused drugs among dentists are alcohol, hydrocodone, and nitrous oxide.11

The University of Kentucky College of Dentistry and the University of Kentucky Center for Prevention Research, in collaboration with the American Dental Association, the American Association of Dental Schools, the University of South Florida, and the American Medical Association, have recently completed a national survey of dentists and dental students to estimate the prevalence of past and current drug use, abuse and dependence within the dental profession. This is the first study of its kind and sophistication to attempt to quantify this problem for dentistry. Data analysis was still underway at the time this paper was written.

The Council on Dental Practice of the American Dental Association, through its Dentist Well-Being Program, sponsored a stress assessment survey project at annual sessions from 1995-1997. The CAGE12 screening questions for alcohol abuse/dependence were incorporated into the questionnaire; five percent of the dentists who participated had a positive score, and it is reasonable to think this bears a relationship to the current prevalence of substance-related problems among participants.

The criteria identified in DSM-IV, the Diagnostic and Statistical Manual of Mental Disorders (Fourth Edition) published by the American Psychiatric Association, are the standard for diagnosis of substance dependence.13 Those criteria, along with some of the symptoms that may be seen in the dental office, are inserted in **Table 1**.

Drawing on years of clinical experience with addicted dentists, Dr. Jerry Gropper and staff from Talbott-Marsh Recovery Campus have identified a personality profile common to that group.14 In their experience, these dentists were dissatisfied with their career choice; they struggled with fear of causing pain, low professional esteem, obsessive-compulsive and perfectionistic behavior, a high need to be in control while simultaneously feeling very out of control and an avoidant style in interpersonal relationships (especially in the face of any perceived or actual rejection). Others have written about stresses and hazards within dentistry

TABLE 1

CRITERIA FOR SUBSTANCE DEPENDENCE

A maladaptive pattern of substance use, leading to clinically significant impairment or distress, as manifested by three (or more) of the following, occurring at any time in the same 12-month period:[14]

Tolerance, as defined by either of the following:

- A need for markedly increased amounts of the substance to achieve intoxication or desired effect.[14]
- Ordering patterns for stock medications may change; there may be increased utilization of nitrous oxide.
- Staff may be asked to phone in prescriptions (sometimes in other names) for the dentist's own use.
- Markedly diminished effect with continued use of the same amount of the substance.[14]

Withdrawal, as manifested by either of the following:

- The characteristic withdrawal syndrome for the substance.14
- Office staff may notice morning lethargy, irritability, slight tremor.
- Office hours may be changed to accommodate drinking or drug use schedules to avoid acute withdrawal symptoms.
- Nausea/vomiting or diarrhea from opiate withdrawal may disrupt patient care.
- Fatigue and impaired concentration may result from stimulant abuse.

The same (or a closely related) substance is taken to relieve or avoid withdrawal symptoms:[14]

- A dentist may consume enough alcohol in the morning to manage withdrawal symptoms of tremor, irritability or craving; the odor of alcohol may be noticeable to patients or staff because of close proximity during exams or procedures.
- Prescription medications (such as benzodiazepines) may be taken from office stock and
- used to alleviate withdrawal.

The substance is often taken in larger amounts or over a longer period than was intended:[14]

- Loss of control may be evident in intoxication at dental meetings or office functions (like a holiday party).
- References to intoxication may be made by the dentist, spouse or other close associates.

There is a persistent desire or unsuccessful efforts to cut down or control substance use:[14]

- Watch for promises, usually broken, to family, staff or peers to stop drinking/using.
- Rules about drinking/using are often established and rigidly followed; should an office or patient emergency interfere with the 'cocktail hour' a dentist may react inappropriately.
- A great deal of time is spent in activities necessary to obtain the substance (e.g., visiting multiple doctors or driving long distances), use the substance (e.g., chain-smoking), or recover from its effects:[14]
- Dentists abusing nitrous oxide may spend additional time in the office during weekends or off-hours, in order to use more.
- There may be increased use of 'sick time' to recover from using/drinking binges.
- A dentist may become unreliable with the schedule, coming in late, taking long lunches or unscheduled breaks.

Important social, occupational, or recreational activities are given up or reduced because of substance use:[14]

- Office hours may be cut back.
- A dentist may withdraw from professional activities (dental society activities, study clubs, continuing education), often placing blame on others for the withdrawal (e.g., not wanting to be involved in politics, others don't have anything to offer, etc.)
- Practice management tasks and income production may suffer; it is not unusual for serious financial problems to develop.

The substance use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance (e.g., current cocaine use despite recognition of cocaine-induced depression, or continued drinking despite recognition that an ulcer was made worse by alcohol consumption).[14]

that may support the development of an addictive disorder.15,16,17 These include the isolation of solo practice and perceived demands by patients for perfection, availability and empathy.

Beyond the discussion of genetics, neurophysiology, disease prevalence and signs and symptoms, is the impact of this devastating disease on individual dentists' lives, practices and families. There are stories of dentists sneaking into the office after hours to use nitrous oxide, wanting to stop and not being able to, knowing the risks yet feeling invulnerable, some of them using until their fingers go numb with peripheral neuropathy, some of them being found by staff the next day, dead in the chair. There are stories of DEA agents descending on dental offices, closing practices and putting dentists in jail. There have been conversations between two dentists--"I need to tell you I've been getting some of your patients into my practice, and they tell me it's because you have alcohol on your breath." There are dentists telling lies to spouses, children and staff about why they're not on top of things and where the money is going, why they didn't make it to the office or the soccer game. There are patients who have been hurt with poorly handled instruments and improperly executed procedures. There are children who have been terrorized in the dental chair. There are long, sad stories of family devastation, broken hearts, broken dreams and financial ruin.

A full discussion of intervention, treatment strategies, monitoring and regulatory issues is beyond the scope of this paper. Addictive disease, not unlike other disorders, "is a chronic, relapsing disorder".8,18 It is a treatable disorder, fortunately, and treatment outcomes with professionals, including dentists, are particularly good.19 Resources for assistance include dentist well-being programs and peer support networks sponsored by constituent and/or component dental societies, specialized treatment programs, alternative to discipline agreements with licensing boards and the Dentist Well-Being Program sponsored by the Council on Dental Practice of the American Dental Association.

Coming to terms with addictive disease is a difficult process for many. With a cultural legacy of stigma, defining addiction to alcohol and/or other drugs as a failure of will and moral character, it is challenging to take on a new paradigm.8 Dentists, as human beings first and scientifically-trained professionals second, have an obligation to pay attention to the science. Out of this comes the possibility of treating themselves and their fellows with compassion and accountability, saving practices and lives from ruin.

TABLE 2

Available Resources

Confidential assistance with chemical dependency is available to dentists, their families and dental team members through the well-being committees of component societies of the California Dental Association.

California Dental Association
Subcommittee of the Council on Membership Services
Hot Line: 800/807-3268 Northern California
or: 800/969-1393 Southern California\

Bay Area Well-Being Committee Chairman
(800) 807-3268

Southern California Well-Being Committee Chairman
San Diego - (619) 275-7180
Southern California - (213) 969-1393

California dental association
california regional well-being committee chairman

Northern California Regional Committee
George Koerber, DDS, Chairman
3150 Birdsall Avenue
Oakland, CA 94619
(510) 261-6980

Southern California Regional Committee
Bruce Walker, DDS, Chairman
8540 South Sepulveda Blvd. Suite 1212
Los Angeles, CA 90045
(213) 969-1393

California Dental Association
Northern California Component Well-Being Committee Chairmen

Well-Being Committee Chairman
Alameda County Dental Society
c/o Executive Director
1345 Grand Avenue, Suite 102
Piedmont, CA 94610
(510) 261-6980

Domenic J. Cavallaro, DDS
Well-Being Committee Chairman
Berkeley Dental Society
3000 Colby Street, Suite 302
Berkeley, CA 94705
(510) 843-4450

W. Thomas Pelton, DDS
Well-Being Committee Chairman
Butte-Sierra Dental Society
415 Alturas Street, Suite 2
Yuba City, CA 95991
(916) 673-0233
(916) 673-0237(fax)

Thomas J. Becker, DDS
Well-Being Committee Chairman
Central Coast Dental Society
120 N. Miller Street, No. D
Santa Maria, CA 93454
(805) 925-6939
(805) 348-1643(fax)

George F. Koerber, DDS
Well-Being Committee Chairman
Contra Costa Dental Society
1160 Arnold Drive
Martinez, CA 94553
(510) 372-7100

Well-Being Committee Chairman
Fresno-Madera Dental Society
c/o Executive Director
371 East Bullard, Suite 120
Fresno, CA 93710
(209) 439-5280

Well-Being Committee Chairman
Humboldt-Del Norte Dental Society
c/o Executive Director
Post Office Box 6368
Eureka, CA 95502
(707) 443-7476

Thomas E. Jarvis, DDS
Well-Being Committee Chairman
Marin County Dental Society
920 Northgate Drive, No. 1
San Rafael, CA 94903
(415) 479-1840

Well-Being Committee Chairman
Mid-Peninsula Dental Society
c/o Executive Director
125 Willow Avenue, Suite 207
Menlo Park, CA 94025
(415) 328-2242

Well-Being Committee Chairman
Monterey Bay Dental Society
c/o Executive Director
2100 Garden Road, No. B-10
Monterey, CA 93940-5316
(408) 658-0168

Well-Being Committee Chairman
Napa-Solano Dental Society
c/o Executive Director
164 East H Street
Benicia, CA 94510
(707) 745-1994

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Well-Being Committee Chairman
Northern California Dental Society
3020 Johnstonville Road
Susanville, CA 96130
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Additional information is also available through the Dentist Well-Being Program of the Council on Dental Practice of the American Dental Association. The phone number is extension 2622 on the toll-free line, or 312-440-2622. The program is accessible via email at kittelsonl@ada.org. Some information is available on ADA Online as well. All calls and contacts are confidential.

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Bonding of Fractured Tooth Segments: A Review of the Past Twenty Years

ANTHONY J. DIANGELIS, DMD, MPH

Twenty years ago this year, two separate papers reported the reattachment of fractured tooth segments utilizing only the micro-mechanical properties of the acid-etch resin adhesive technique.[1,2] Prior to this the literature described reattachment of tooth fragments utilizing conventional cements and cast posts, as well as mini pins in combination with the new light-cured resins.[3,4] Over the next several years a series of case reports appeared further documenting the utility of this relatively new application of resin-bonded materials.[5,6,7,8] Authors explored various tooth and fragment preparations, methods of pulpal protection and resin types.[9,10,11] In the mid 1980's several authors described successful reattachment even in instances of frank coronal amputation.[12,13] In 1985 Ludlow and LaTurno introduced dentinal bonding together with acid-etching advancing the short-term success of reattachment advanced one step further.[12] Croll, Baratieri, and Santos in independent reports incorporated the use of glass-ionomer cements to enhance dentinal bonding in such injuries.[14,15,16]

While much of the literature on reattachment focused on restoring function and esthetics to anterior teeth, Santos and colleagues published a technique for rebuilding caries devastated molars using coronal tooth segments harvested from extracted third molars, glass ionomer cement and dentin-enamel bonding materials.[16] Additionally, Jackson in 1993 described a conservative method of restoring fractured posterior teeth by reattaching fractured cusps coupled with adjunctive composite restorations.[17]

In separate articles both Croll and DiAngelis suggested that placement of direct composite veneers after reattachment of anterior tooth fragments not only enhanced esthetics in certain instances but probably strengthened the reattachment due to the increased surface area of the bond.[18,19,20] The latter hypothesis however, has not been tested in either clinical or laboratory experiments.

For years reattachment was regarded with caution and viewed at best as a transitional or interim restoration. However, laboratory studies conducted by Andreasen and colleagues, altered our thinking on the longevity of such restorations.21 In a series of experiments the authors demonstrated that the placement of bonded porcelain laminate

Figure 1. Fractured maxillary central incisor with fracture segment available for reattachment.

Figure 2. Reattached coronal segment.

Figure 3. Coronal factures of both maillary central incisors.

Figure 4. Fractured segments available for reattachment.

Figure 5. One year postoperative follow-up of reattached maxillary central incisors.

Figure 6. Coronal facture of maillary right central incisor.

veneers over reattachments substantially strengthened their resistance to future fracture. In fact results demonstrated that previously fractured and reattached teeth which had porcelain laminate veneers placed showed the same or greater fracture strength as intact incisors.

Technique

The clinical methods for reattaching fractured tooth segments are adequately described in the previously cited literature. Essentially it consists of the following:

1. Cleaning the tooth segment and fractured tooth with pumice and water.

2. Determining the reattachment path of insertion. When the fracture is relatively clean and in one plane or if there is considerable crushing of the cavosurface enamel rods, refitting the fractured segment accurately can be a challenge. The fragment may be misaligned anteroposteriorly.

3. An internal bevel as described by Simonsen can be placed in the enamel of both the segment and remaining tooth.22 Conversely no bevels need be placed. If the fracture necessitates pulpectomy and obturation of the root with gutta percha, additional mechanical retention can be gained by creating a slight circumferential undercut in the pulp chamber of the tooth and in the chamber of the tooth fragment.

4. A suitable etchant is applied, according to the manufacturers direction, to both the segment and tooth extending 2 millimeters beyond the cavosurface margins. Rinse well.

5. A dentinal primer is applied, followed by application of an unfilled resin.

6. Ultimately, a light-cured composite diluted to a creamy consistency with unfilled resin is applied to the tooth and segment. The segment is carefully reattached, excess removed with a resin coated instrument and the restoration light cured circumferentially while being stabilized by the clinician. Alternatively, a dual cure composite resin luting agent may be used.

7. Polishing requires little more than the use of disks and strips, finishing burs or diamonds.

8. The occlusion is checked and adjusted as necessary.

In short, the procedures and materials necessary to effect reattachment are essentially the same as those utilized in restoring a Class IV fracture with a composite resin. The major difference is conservation of time. Reattachment requires a minimum of finishing and polishing as the correct texture, color and shape of the restoration exists

Figure 7. Utilizing a sticky wax handle to assist in reattachment of coronal fragment.

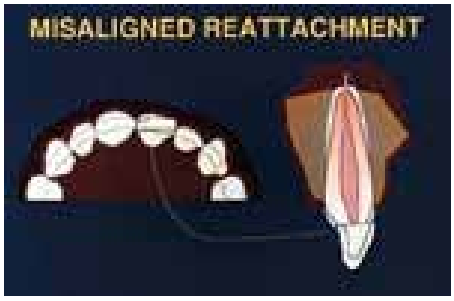

Figure 8. Diagrammatic representation of misaligned coronal fragment.

Figure 9. Esthetic result after modifying misaligned reattachment.

Figure 10. Coronal amputation of maxillary right central incisor. Reproduced by permission from August 1992 Journal of the American Dental Association

within the tooth segment itself. **Figures 1 and 2** demonstrate an uncomplicated reattachment.

Pulpal Protection

In the early evolution of reattachment, prior to the advent of dentinal bonding agents, dycal was placed over the exposed dentin and over pinpoint exposures. When light cured glass ionomer cements became available, this was incorporated into the procedure to seal over the dycal, and/or to protect the dentin. Additionally glass ionomer bonds to dentin and is capable of being etched for additional retention.[23,24] When liners or bases are utilized an equivalent amount of dentin must be removed from the tooth fragment to permit proper apposition to the tooth.

At present, the total etch alternative has been advocated for pulpal protection. The ability of dentin-enamel bonding agents to seal out bacteria and achieve a well-sealed margin greatly reduces the risk of pulpal irritation.[25] Kanca in a recent case report documented a three year uneventful pulpal response to acid-etching of a significant pulp exposure with subsequent resin placement during a fragment reattachment procedure.[26] Management of pulpal exposures in this manner requires further study, however. Other researchers have documented good pulpal response to direct contact with composite resin as long as bacteria are excluded.[27,28]

In instances where there is significant pulpal exposure and incomplete root formation every effort should be made to preserve as much healthy pulp tissue as possible. In these instances a partial pulpotomy technique as first described by Cvek and subsequent authors is the treatment of choice.[29,30,31] The extremely high success rate of this technique permits continued natural root development. If circumstances dictate, complete pulpotomy may be necessary.

In mature teeth with frank exposure, pulpectomy and obturation with gutta percha and sealer is recommended. This can be accomplished prior to reattachment.

More recently Andreasen and colleagues retrospectively reported on the long-term survival of reattached fractured crown segments.[32] Their findings suggest that the use of dentinal bonding in conjunction with acid-etching of enamel insures greater initial strength to reattachment restorations than acid-etching alone and may also provide enhanced pulpal protection. Additionally their results underscore the observations and experiences of many clinicians and researchers that reattachment is a suitable alternative to composite for restoring function and esthetics in fractured teeth.

Case Reports:

The following case reports graphically illustrate challenges and solutions encountered in several traumatically fractured teeth.

Figures 3 and 4 demonstrate fractures of both maxillary central incisors with concomitant pulp exposures in a 23-year-old patient who suffered a blow to the face. The fractured segment of the maxillary right central had sustained a vertical fracture as well. The fractured segments were bonded together prior to reattachment to the fractured tooth. **Figure 5** demonstrates a satisfactory esthetic and functional result one year post treatment.

Figures 6-9 demonstrate the necessity of exercising caution when using a 'handle' to aid in reapposition of the fractured segment. Several authors have recommended utilizing a sticky wax or gutta

Figure 11. Appearance of maxillary right central incisor immediately after reattachment. Reproduced by permission from August 1992 Journal of the American Dental Association

Figure 12. Appearance of direct composite veneer of maxillary right central incisor four years after reattachment. Reproduced by permission from August 1992 Journal of the American Dental Association

Figure 13. Porcelain laminate veneers of maxillary anterior teeth eight years after reattachment of maxillary right central incisor. Courtesy Dr. Patrick Mascia.

percha handle for better control of small fractured segments.[18,33] A problem may arise in that use of such aids result in the loss of fine proprioception. If the fracture does not have a definite index (i.e. the segment fits only one way), misalignment may occur. While that was the case with this 17 year old, a good esthetic result was still achieved by selective enamelplasty and the addition of composite resin.

Figures 10-13 illustrate reattachment followed by a direct composite veneer and ultimately restored with bonded porcelain laminate veneers.

In this era of conservative, esthetic dentistry, the reattachment of fractured tooth segments has established itself as a realistic treatment option in the restoration of fractured teeth. It permits rapid restoration of original tooth contours and overall esthetics with greatly reduced chair time for both the patient and operator.

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Dental and Medical Considerations of Patients with Renal Disease

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ABSTRACT Often a dentist will have a patient with a complicated medical condition that needs to be considered when providing treatment. Following is an in-depth discussion of the medical and dental considerations of patients with renal disease.

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Of the over 260 million people in the United States approximately 257,000 have End Stage Renal Disease (ESRD) of such severity that dialysis or renal transplantation is necessary to maintain life.1 This population of patients with ESRD increases by roughly 10 percent per year,[1] despite a significant coexistent mortality rate of approximately 20 to 25 percent per year.[2] The more common causes of ESRD in the United States are diabetes mellitus, hypertension, glomerulonephritis, chronic pyelonephritis, urologic disorders and autoimmune diseases. The primary causes of death in patients with renal failure include cardiovascular disease, accounting for 48 percent of all deaths, and overwhelming sepsis, which accounts for 12 to 38 percent of all deaths;[3,4] Diabetes and hypertension have been shown to be major contributing co-morbid factors.[3]

Normal Renal Physiology

The functional unit within the kidney is termed the nephron and each kidney contains approximately 1 million nephrons. The major components of the nephron are the glomerulus, where filtration occurs, the renal tubule, where a combination of reabsorptive and secretive processes alter the filtrate, and the collecting system, where final modification occurs, resulting in the waste product urine.[5] Renal failure evolves over time through progressive deterioration and destruction of the nephron units. Though different diseases affect different segments of the nephron initially, the

entire nephron is eventually destroyed. Once a nephron is lost, it is not replaced.

The kidney maintains sodium, water and acid-base homeostasis via glomerular filtration, tubular reabsorption and secretion, Renal excretion is also the major route of elimination for many drugs and for most end products of metabolism. As renal blood flow accounts for approximately 20 percent of the cardiac output, the kidneys can efficiently affect blood composition.[5]

The kidney also functions as an endocrine organ. Ninety percent of the body's erythropoietin, a hormone that stimulates red blood cell production, is renally produced.[6] The renin-angiotensin-aldosterone axis, which is crucial for volume status and significantly affects blood pressure, is largely renally regulated.[7] In addition, the kidneys are responsible for the activation of vitamin D, essential for normal bone and calcium metabolism.[8]

Chronic Renal Disease

Renal function is defined by the rate of glomerular filtration (GFR) and frequently determines the metabolic milieu. A normal GFR is 100-120 cc/min. Physiologic homeostasis can be maintained until approximately 75-80 percent of the nephrons are destroyed and the GFR falls below 20-25 cc/min.[5] When this severe reduction is attained, normal volume and acid-base balance can no longer be maintained and medical intervention with diuretics, dietary restriction, bicarbonate therapy, or other modalities becomes necessary.

Abnormal laboratory tests are common in renal disease. Routine blood chemistries in a patient with advanced renal failure may show hyperkalemia, metabolic acidosis, hypocalcemia, and hyperphosphatemia, as well as the usual markers of renal disease, an elevated blood urea nitrogen (BUN) and creatinine. As renal failure progresses, most patient will develop a normochromic, normocytic, anemia due primarily to erythropoietin deficiency.[9] Though the plasma creatinine is a rough estimate of GFR, glomerular filtration rate is more accurately determined by calculating the renal creatinine clearance from a 24-hour urine collection.[5]

TABLE 1

Drugs Commonly Used in Dentistry in which the Dosage Should be Adjusted or totally Avoided in ESRD

Aspirn
Acetaminophen
Nonsteroidal antiinflamatory agents
Meperidine
Penicillin
Tetracycline

End Stage Renal Disease

Renal failure becomes symptomatic only when metabolic abnormalities become severe. End Stage Renal Disease (ESRD) occurs and treatment is initiated when the patient is clinically "uremic" and/or cannot adequately maintain physiologic balance, despite medical intervention. Symptoms of uremia are nonspecific and include gastrointestinal symptoms, sleep disturbances, mental changes, and an overall failure to thrive. When uremia develops, the patient's GFR will be as low as 5-12 cc/min. Treatment options for ESRD include hemodialysis, peritoneal dialysis, chronic ambulatory peritoneal dialysis, and renal allograft transplantation. If one of these options is not initiated when renal failure becomes severe, the patient will die within a fairly short period, usually weeks.

Hemodialysis is a procedure during which blood is removed from the body, passed along one side of a biocompatible semipermeable membrane, and returned to the body.[10] Simultaneously a "dialysate" (contrived solution) flows in a countercurrent direction on the other side of the membrane. The dialysate contains constituents that will diffuse into the patient's blood and lacks those that are to be removed.[11] Thus, solutes diffuse across the semipermeable membrane according to the concentration gradient of each. Volume is removed by manipulating pressure across the same semipermeable membrane.

Each patient is required to undergo hemodialysis three times a week for about four hours per session. Because adequate hemodialysis requires a high rate of blood flow through the hemodialysis system (250-350 cc/min), surgical creation of an arterio-venous fistula or graft is necessary for sufficiently large size needle for vascular access. The vascular access must be protected at all times, for it is the patient's lifeline. Under no circumstances should there ever be a blood pressure measurement taken or a needle for intravenous access be placed in the access arm.

Peritoneal dialysis also uses the principle of a diffusion gradient to effectively dialyze the patient. However, the semipermeable membrane used is the peritoneal membrane itself.[10] Again, the dialysate, which is infused into and out of the peritoneal cavity at regular intervals (usually four exchanges per day), is a contrived solution containing solutes to be given to the patient and lacking those to be removed. Volume is removed by manipulating the osmolality of the peritoneal dialysate. Surgical intervention is needed to place the peritoneal catheter, which remains in place permanently unless removed surgically.

From those 257,000 patients within the ESRD pool, an estimated 11,900 per year will receive renal allografts,1 mostly from cadaveric donors. One year kidney survival is approximately 97.5 percent for kidneys donated from living relatives,

and about 93.5 percent for cadaver kidneys.1 After five years these figures fall to approximately 90 percent for related donor transplants and 78 percent for cadaver transplants.[1] The primary cause of graft loss is rejection, despite the use of potent immunosuppressive drugs such as imuran, prednisone, and cyclosporine. Moreover even with close monitoring, transplant recipients have a higher incidence of bacterial, viral and opportunistic infections than the general population, as well as an increased risk of developing an occult malignancy, due to chronic immunosuppression.[12]

Complications of ESRD

Fluid and electrolyte disturbances

Patients with chronic renal failure can neither concentrate nor dilute their urine properly, and they are extremely sensitive to both volume expansion and volume depletion. Most patients on dialysis make little or no urine, so fluid administration should usually be limited, and possibly avoided. Volume expansion may cause hypertension, pulmonary edema with cardiomegaly, and/or peripheral edema. Many patients have an underlying cardiac condition and can easily develop congestive heart failure.

Electrolytes

The major route for elimination of potassium, magnesium, and phosphate is via the kidney. Therefore, ESRD patients should never be given these substances unless deficiencies are clearly documented and blood levels are monitored. Hyperkalemia can be life-threatening because it increases neuromuscular excitability and can result in heart block, ventricular arrhythmias and cardiac arrest. Hypermagnesemia may suppress muscular contraction and lead to ventilatory collapse.13 Hypocalcemia and hyperphosphatemia are common in renal failure due to the decreased urinary excretion of phosphate and decreased production of vitamin D and the rise in parathyroid hormone.8 Conscientious management of calcium and phosphorus levels is crucial to prevent osteodystrophy.

Acidosis

Almost all patients with renal failure develop a metabolic acidosis due to decreased hydrogen ion excretion.[14] Symptoms such as anorexia, lassitude, and dyspnea may occur. This acidosis is classified as an "anion gap" metabolic acidosis due to the excessive accumulation of plasma anions (sulfates, phosphates, etc.) That would normally be excreted in the urine. Physiologic pH is partially maintained by compensatory hyperventilation. Alkali therapy with sodium bicarbonate or sodium choate can help ameliorate symptoms.

Hematologic and immunologic disturbances

Anemia

Most patients with chronic renal insufficiency (CRI) and ESRD have a normochromic normocytic anemia with hemoglobin ranging from 7-9 grams per deciliter (20-27 percent hematocrit). This anemia is multifactorial, resulting from to a decrease in red blood cell (RBC) production, a shorter half-life of those cells produced, and blood loss.[15] The factors responsible for decreased production include erythropoietin deficiency; possibly iron, folate and vitamin B12 deficiencies; and aluminum toxicity. The exact mechanism for the shortened RBC survival is unknown, but perhaps the uremic milieu, along with the acidosis, is responsible. Many patients have chronic blood loss through the gastrointestinal tract and some blood loss is obligatory with hemodialysis.[16] Parenteral use of human recombinant erythropoietin helps alleviate the anemia in ESRD patients. Blood transfusions are reserved only for severe symptomatic anemia because they may cause production of an antibody response that can make future transplants difficult.

Bleeding disorder

Hemorrhage a frequent complication of uremia and presents as prolonged bleeding, bruising, nose bleeds, gastrointestinal bleeding, gingival bleeding, etc.[15] Measurement of routine laboratory parameters of hemostasis, prothrombin time, partial thromboplastin time, and the platelet count are normal. However, template bleeding time, however, will frequently be prolonged.[16] Prolonged bleeding is due primarily to a qualitative, not a quantitative, platelet disorder involving abnormal platelet aggregation, a decrease in platelet factor III, and possibly, a defect in factor VIII affecting the clotting cascade. Platelet function may be improved by chronic dialysis. In acute situations, bleeding can be treated with either cryoprecipitate and/or a synthetic analogue of antidiuretic hormone, 1-deamino-8-D-arginine vasopressin, desmopressin or conjugated estrogens.[17]

Compounding the already tenuous state of hemostasis in these individuals is the routine use of heparin during hemodialysis. Anticoagulation is necessary to prevent blood from clotting the dialysis system, although a minimal amount of heparin is used. Even though the half-life of heparin is short at three to four hours, most surgical procedures should be scheduled on non-dialysis days, if possible. Less efficacious alternatives to anticoagulation may be used by the dialysis center, if necessary.[15]

Immunocompromise

Azotemia is associated with abnormalities of the immune system and involves both cellular and humoral immunity.[18] A higher incidence of infection exists in renal failure patients, implying the need for special precautions. Many centers recommend prophylactic antibiotic therapy prior to invasive dental treatment and various other procedures to avoid bacterial seeding of the patient's vascular access and also cardiac valves.

Because of the even higher risk of infection in transplant patients, dental clearance thorough oral examination and treatment to reduce possible oral sources of infection is necessary prior to transplantation. Maintenance of oral hygiene is crucial. Peculiar to all post-transplant patients maintained on cyclosporine is the potential development of gingival hyperplasia, which often requires resection.

Viral Infections

All dialysis units routinely screen patients for hepatitis B. Many patients have been exposed to the virus usually due to transfusions, drug use, etc., and about 3-10 percent carry the antigen for hepatitis B. Many dialysis units now vaccinate patients with the hepatitis B vaccine. The patient's serology status can be obtained from the dialysis center or checked by determining the HbsAg level in the blood. Approximately 1 percent to 30 percent of dialysis patients also carry the diagnosis of hepatitis C (nonA-nonB).20 Most of these patients are positive for antibody to hepatitis C (anti-HCV), but not all units routinely screen for anti-HCV.

Most centers also screen for the HIV virus, and renal failure is not uncommon in patients with HIV/AIDS. Patients who have renal dysfunction due to the virus are usually quite ill and have a poor prognosis.

Endocrine-metabolic disturbances

Aberrancies can be found in almost all of the endocrine axes.[21] Renal osteodystrophy is one of the more clinically prominent and serious of the metabolic disturbances,[8] and stems initially from the body's inability to clear phosphate. Hyperphosphatemia, in conjunction with a decreased vitamin D production, leads to hypocalcemia which, in turn, induces hyperparathyroidism. Under normal conditions, parathyroid hormone will inhibit renal reabsorption of phosphate, stimulate production of vitamin D, and enhance gastrointestinal absorption of vitamin D. However, in renal failure, these effects are blunted and the results can be disastrous. The increase in calcium mobilization, along with defective bone mineralization, can lead to osteomalacia, osteitis fibrosa, and metastatic calcification of soft tissues and blood vessels. It has been shown that aluminum accumulation complicates the bone disease in many patients.[22] Severe bone loss after years of renal failure predisposes patients to spontaneous fractures, aseptic necrosis, and tooth loss.

Cardiovascular disease:

Patients on dialysis experience a substantially increased risk of atherosclerosis.[23] Many patients have peripheral vascular insufficiency, cerebral vascular compromise, and coronary artery occlusion. These processes are complicated by the high incidence of hypertension (usually due to hypervolemia and occasionally elevated serum angiotensin levels) and hypercholesterolemia found in this population.24 Another cardiac finding, not uncommon in chronic uremia, is pericarditis.

Gastrointestinal abnormalities:

Anorexia, nausea and vomiting, diarrhea, and gastrointestinal ulceration and bleeding are not uncommon in these patients.[25] This can lead to malnutrition and, rarely, vitamin deficiencies.

Neurologic abnormalities:

Uremic encephalopathy, ranging from mild sensorial clouding to coma, can develop in patients with severe renal dysfunction who are not yet on dialysis.[26] Moreover, there can be an aluminum-related neurologic abnormality that improves with aluminum removal. Dialysis patients also develop a peripheral, stocking-glove, ascending neuropathy that can be effectively treated only with renal transplantation.

Dermatologic/oral manifestations:

Those patients with anemia appear pale and those with bleeding abnormalities may have bruises or petechiae. Yellowish-brown hyperpigmentation can occur over time due to the accumulation of carotene-like uremic toxins.[27] Excoriations are common due to the severe pruritus suffered by many patients. This may respond to phototherapy and IV lidocaine. With the availability of dialysis, the classic "uremic frost" due to residual urea crystals left on the skin when perspiration evaporates is rarely seen today.

Oral findings of azotemia include stomatitis, candidiasis, xerostomia, gingivitis and the classic uremic fetor, an ammonia-like odor of the breath. An unpleasant metallic taste also may be present. Bone resorption can lead to pathologic mobility of the teeth.[28] The triad of localized radiolucent jaw lesions, loss of lamina dura, and demineralized ("ground glass") bone can be seen with renal osteodystrophy.[29] Particular to the patients on cyclosporine is the gingival hyperplasia previously mentioned. Tooth erosion from

persistent vomiting may also be seen.

Special Considerations

Renal dysfunction is a matter when considering drug therapy. Many drugs (and/or metabolites) are excreted renally and should be administered in a reduced dose, or completely avoided.[30] In general, the full dose of most drugs can be given if the patient's GFR is greater than 20-30 percent of normal (GFR>20-30 cc/minute). Patients with lower GFRs, or with ESRD, usually require dose adjustments.

Drugs

Antibiotics

Oral penicillin can be given in the standard dosage for a short course of therapy (less than a week). However, high dose intravenous penicillin therapy has been associated with seizures, and should be avoided. Aqueous penicillin exists as either a sodium salt or a potassium salt, and the potassium salt should be avoided. Other commonly used antibiotics that should be used cautiously in the patient with renal failure include tetracycline and trimethoprim/ sulfamethoxazole.[30] Tetracycline has been associated with episodes of acute renal failure, and it also increases catabolism, which can cause an increase in BUN. Trimethaprim/sulfa has been associated with the development of an acute interstitial nephritis and acute renal failure, but it can also competitively inhibit renal creatinine secretion and raise plasma creatinine without a change in renal function.

Erythromycin and clindamycin are metabolized by the liver and do not require dosage adjustments in patients with renal failure. However, erythromycin decreases the metabolism of cyclosporine, and should be avoided in patients taking this drug.[31]

Table 2

Dental Management of Patients with ESRD on Dialysis	
Potential Complications	**Management**
1. Bleeding	A. Consultation with M.D. Treat on the day following dailysis.
	B. Protamine sulfate will counteract heparin if dental treatment must be performed within six hours of dialysis.
	C. Blood Tests (i.e., platelet count and bleeding time). Meticulous surgical technique.
	D. Pharmacologic agents to control active bleeding (i.e.,Avintine, desmopressin).
2. Blood pressure regulation	A. Continuous monitoring of blood pressure in nonaccess arm.
3. Anemia	A. Appropriate blood tests (Hematocrit, hemoglobin and differential)
	B. Minimize bleeding.
	C. Discuss with M.D. need for recombinant erythropoietin
4. Drug clearance	A. Avoid or reduce dosage of drugs excreted by kidney
5. infection	A. Meticulous surgical technique with aggressive treatment of existing infection
	B. Copious irrigation of surgical site
	C. Antibiotics
6. Bacterial endarteritis in access arm	A. Antibiotic prophylasix
	B. Preoperative oral rinse with 0.12 percent chlorohexidine
	C. Maintain optimal oral health
7. Hepatitis	A. Determine patient's serologic status
	B. Liver function tests if indicated

Analgesics

Aspirin cannot be used in the usual dose in most dialysis patients. It should only be used when absolutely necessary and then the interval between doses should be increased. Acetaminophen does not cause bleeding and is better tolerated. Nevertheless, chronic acetaminophen use should be avoided in the pre-dialysis patient, because the primary metabolite of acetaminophen is the renal toxin phenacetin. If it is used, the interval between doses should be lengthened.

Non-steroidal anti-inflammatory drugs (NSAID) should be avoided in patients with CRI because they can cause deterioration of already compromised renal function.[32] If an NSAID is necessary, close monitoring of plasma creatinine is essential. NSAIDs can be used in patients with ESRDs where there is relatively little renal function, but one needs to be aware of the increased incidence of gastrointestinal bleeding.

Most narcotics can be safely used. The exception is meperidine, which should not be used in patients with ESRD. Meperidine is metabolized to normeperidine, which accumulates in renal failure and can cause seizures.[33] Indeed, many metabolites will accumulate in renal failure; therefore, long term therapy and/or high dose use of any narcotic or hypnotic should be avoided.

The dosage of lidocaine and other local anesthetics need not be adjusted since they cause little to no problem when used properly. However, the duration of

Table 3

Dental Management of Patients with Renal Transplant	
Potential Complications	**Management**
1. Use of immunosuppressive drugs	A. Medical consultation Treat infections aggressively Maintain optimal oral health Consideration for steroid supplementation
2. Drug induced gingival hyperplasia	A. Maintain optimal oral health Periodontal surgery as appropriate.
3. Infection	A. Consider antibiotic prophylaxis before dental treatment Preoperative oral rinse with 0.12 percent chlorohexidine Maintain optimal oral health
4. Drug clearance	A. Avoid or reduce dosage of nephrotoxic drugs

the anesthetic block can be substantially shorter in patients with renal failure than in the normal subject.[34] Vasoconstrictors should be used with care due to the prevalence of hypertension in renal failure.

Antihistamines/decongestants/ barbiturates/sedatives

Most of these agents are tolerated without difficulty. One should use shorter-acting rather than the longer-acting preparations and to avoid chronic use. Be aware that patients with hypertension may show an elevation in blood pressure when placed on a nasal decongestant.

Other Agents

Radiologic studies using contrast media should be avoided in patients with CRI, if possible. If contrast medium is necessary, proper management with intravenous volume expansion may ameliorate some of the complications.[35] However, patients on dialysis usually may undergo studies with contrast medium at no increased risk.

2) Surgery and dental treatment

For the patient with chronic renal failure and ESRD, the goal for treatment should be to establish the best oral hygiene possible and to remove all sources of infection. As the kidney disease progresses, it is important for the mouth to be in the best condition possible.

In the transplant patient, dental hygiene is crucial because these patients are even more susceptible to the highly morbid consequences of infection. Prior to transplantation, it is advisable to remove any teeth that could potentially be a focus of infection.

Dental procedures are best performed on non-dialysis days for two reasons: conflicting scheduling problems and the use of heparin during dialysis. Prior to major surgery, it is important to determine the status of hemostasis and blood potassium with routine studies that include: electrolyte, determination, complete blood cell count, prothrombin time, partial thromboplastin time, platelet count and, when indicated, a bleeding time.

Prophylactic antibiotic coverage (American Heart Association protocol, July 1997) should be considered for all transplant patients,[36] and many dialysis centers also recommend this for all dialysis patients. Most routine dental treatment can be done on an outpatient basis; however, in cases of severe infection or major procedures, hospitalization may be required.

Conclusion

Due to the prevalence of chronic renal failure and end stage renal disease, it is reasonable to assume that dentists will encounter patients with this serious problem. Therefore, to provide optimum care for patients with these kidney disorders, it is important not only to understand the dental treatment but also the medical condition. (See tables 2 & 3).

As the kidneys begin to show limitation in their ability to work properly, blood and urine abnormalities start appearing. When the patient is asymptomatic, but shows only mild changes in their laboratory studies, this is called chronic renal insufficiency (CRI). As damage to the kidney continues, laboratory test values become more pronounced and the patient can show symptoms of abnormal urinary, neurologic, musculoskeletal, gastrointestinal, cardiovascular and dermatologic problems.

The goal of dental care for patients with ESRD is to achieve the best oral health possible and prevent further complications of their compromised medical condition.[29] In most cases when the renal disease is under control, there are no medical contraindications to providing routine dental care. If renal disease is uncontrolled, or if there is severe infection, the dental care may be best performed in a hospital setting. Several important parameters should first be evaluated. Blood pressure should be monitored before, during, and after treatment. Bleeding tendencies, and/or anemia are common, therefore, hemoglobin, hematocrit, bleeding time, and platelet count should be obtained before doing any invasive procedure. Abnormal findings should be discussed with the patient's physician to determine if alteration in planned dental care is necessary.

Patients with CRF have an increased

susceptibility to infection.[37] If an infection related to the oral cavity is found, it should be treated aggressively, including culture and sensitivity tests, appropriate antibiotics, and possible hospital admission.

Pharmacologic therapy requires special care. Drugs that are excreted by the kidneys may reach toxic levels in ESRD patients, even at normal doses. The dosage schedules may need to be altered by increasing the dosing interval or decreasing the standard dose. Drugs that are nephrotoxic have the potential to further injure the already compromised kidney. Although lists of potentially dangerous drugs and nomograms for their altered administration are available, it is prudent to consult with a patients physician before administrating any of these drugs (See Table I).[38]

Bacterial seeding from dental procedures may result in enarteritis which may require removal or replacement of the AV shunt. Since no recognized guidelines exist for appropriate antibiotic coverage, consultation regarding antibiotics prophylaxis should be sought from the Nephrologist.

With appropriate consultation, laboratory tests, and monitoring, most CRF/ESRD patients can be safely treated in an outpatient environment which can lead to a significant improvement in health and quality of life.

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Childhood and Adolescent Obesity: A National Epidemic

WARREN B. KARP, PHD, DMD

ABSTRACT Have you ever wondered if children coming into your dental operatory these days really are fatter, or is it just your imagination? And if they are fatter, how does it relate to what they are eating and what is the approach to treatment? This review article is written for dental health professionals, their own children, and their young patients and families, and will briefly address these issues.

AUTHOR

Dr. Karp, PhD, DMD, is a professor at the Medical College of Georgia in the Medical School, the Dental School, and the School of Graduate Studies. He is a certified nutrition specialist and Director of the Dental School Nutrition Consult Service and a member of the American Institute of Nutrition and the American Society of Clinical Nutrition.

As you have observed in your dental practice and heard on the evening news, children are fatter these days, paralleling what is happening to their role models, adults. Not only are more children obese (greater than 120 percent mean body weight/height), but children in the superobese category (greater than 140 percent mean body weight/height) are making up a larger percentage of the population. The worrisome part is that up to 25 percent of all obese infants become obese adults. Even more impressive, as many as 80 percent of obese adolescents become obese adults.[1] At the same time, it is also clear that there are definite health risks associated with being overweight during childhood itself, not just later on in. Overweight children face immediate health risks such as obstructive apnea, cardiomyopathy, pancreatitis, orthopedic disorders, and respiratory disorders, particularly in children already suffering from asthma.[2] In addition, overweight children may have abnormal blood glucose levels and glucose tolerance tests, have higher blood pressures, and may have abnormal lipid profiles.[3,4] The good news is that if children lose weight, parameters may normalize. For example, both total cholesterol and triglyceride levels significantly decrease in children who lose as little as 10 percent of their total weight in a four-week period. Not only parents, but also many healthcare professionals, are not aware of the health risks during childhood associated with obesity in children,, and only talk about predisposition for chronic diseases associated with aging, such as

heart disease and stroke. For example, the prevalence of non-insulin dependent diabetes in children and adolescents is on the increase and seems to be related to the increasing degree of fatness in children.

One approach that may be helpful with the parents of your young, obese dental patients is to facilitate in the parents an understanding of the immediate health risks faced by the overweight child and the importance of seeking medical help. The key is not to raise the parents' anxiety levels, which can lead to negative behavioral interactions between the child and the parents. The answer, rather, is to motivate the parents to seek help and to refer them to appropriate resources in your community. The treatment of childhood obesity needs to involve all family members, not just the obese child.[5]

Contrary to popular belief, medical causes of childhood obesity are relatively rare, comprising 1-4 percent of all childhood obesity cases. The most common medical causes include endocrine and genetic disturbances. The usual, environmental type of obesity can generally be distinguished from medical obesity by observing the family (family obesity common vs. family obesity rare), the child's stature (tall child vs. a short child), IQ (normal vs. low), bone density (normal vs. retarded), and the presence of physical defects (no defects vs. defects). A "work-up" for obesity in children should include measuring cholesterol and serum lipids, blood pressure, assessing physical activity, smoking, diabetes, psychosocial factors, orthopedic problems, and skin problems. Stretch marks in overweight children and fungal growth in skin folds are a common findings in obese and superobese children.[6]

Are kids fatter mainly because they are eating more calories and, in particular, eating more fat calories? This is an interesting question with unexpected findings. When comparing the years 1977-1978 and 1987-1988, a 3-5% decrease in the intake of total calories was reported over the age range of 2-19 years. Addressing mean daily fat intake (of females) during this period, there was actually a 4-5% decrease in fat grams and percent dietary fat calories during the 1987-1988 period. These results help us understand the importance of decreasing physical activity in increasing fatness in kids.[1]

As a review for the dental health professional, it is postulated that there are three critical periods in childhood for obesity development in adults: the perinatal period, the period of adiposity rebound at about 5 years of age, and the adolescent period. For example, we know that infants born during a famine show lower levels of childhood obesity and adult obesity. Infants born to diabetic mothers are born fatter and, generally, are fatter as children, adolescents, and adults. Body mass index increases in the first year of life and then levels off from ages 1-4. At about the age of 5, BMI again increases. This is called the period of adiposity rebound. We know that being overweight as an adolescent and/or adult is greatest in children who have the earliest adiposity rebound.[7]

Are there ethnic differences in childhood obesity? Certainly. African-American, Mexican-American, Puerto-Rican, Native Hawaiian, and some Native American cultures have the highest rate of childhood obesity. This may be related to mothers gaining greater amounts of weight during pregnancy leading to higher birth weight babies who tend to be fatter infants and children. In addition, gestational diabetes tends to occur at higher rates in these populations. Finally, the earlier introduction of solid foods may also be a contributing factor to childhood obesity in these cultures.[8] One role of dental health professionals is to encourage the family to breastfeed for at least a year. This is the current recommendation from The American Academy of Pediatrics.

The influences upon a child's eating behaviors are many, including parental/childcare provider influences, social/environmental influences, and, of course, media influences.[9] With respect to parental influences, for example, verbal prompting of children to eat does, indeed, work, increasing the amount of food eaten from 42 percent to 71 percent. However, this may not only increase the amount of food eaten by children, but also increase the amount of fatness in children. Nonverbal influences, such as what foods are purchased, how they are prepared, how they are served, the modeling of eating behavior by the adults, and the emotional rather than nutritional uses of food are additional parental influences. We all are aware of the media influences on eating behaviors in children.

The treatment of childhood obesity can be as evasive as the treatment of adult obesity. Weight loss programs for both children and adults have many goals in common (i.e., preservation of muscle mass, safety, etc.). There is an extra consideration with children, however, that one does not want a decrease in linear growth (height of the child). Weight loss approaches include the use of low calorie diets, family-based behavioral intervention, combined sports and nutrition programs, and inpatient rehabilitation programs.[5,6,10] Each of these approaches has been associated with some success, and appear safe and effective. One key is the direct involvement of at least one obese parent, which improves both short-term and long-term weight loss for both the overweight child and parent. Inpatient rehabilitation programs are generally for morbidly obese children and involve a three to four month inpatient regimen. A child is released back into the

home environment when he or she can see an observable weight change, when some of the abnormal biochemical parameters have been corrected, when normal eating patterns have been established and when an increase is seen in social skills and self-esteem. A behavior modification program is an important part of any weight loss program for children.[11]

In summary, what is the significance of this brief overview for a dental health professional? First, there is a relationship between dental caries and risk factors for cardiovascular disease in obese children. Obesity rates and caries rates increase together. Dentists should identify children with these risks and initiate dietary counseling. This is predicted to reduce both caries risk and cardiovascular risk.[12] Second, try to make parents aware of the immediate effects of obesity on the child, in terms of abnormal biochemical parameters, such as elevated blood glucose and cholesterol, blood pressure, and the physical effects of being overweight on the developing skeleton. Third, realize that medical obesity is by far the exception, not the rule. Most obesity found in children is of the environmental type. Encourage breast feeding for at least a full year as an important preventive measure, particularly in high-risk populations. Fourth, physical activity and psycho-social evaluations need to be included in the evaluation of an obese child, not just the obvious clinical, dietary, and laboratory findings. Finally, understand that childhood obesity is a serious problem in American children today and effective treatments exist. It may very well be that you, as a dental health professional, are the first person to raise awareness of these issues with the child and parent. You need to know what resources are available in your community or region and refer overweight children and their families to these resources. There is no "plug-in-and-play" solution for obesity in American children, although it would be great if there was.

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Filmless Radiology – Now and In the Future

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Dr. Jack Hadley is a professor in radiology and director of the emergency clinic at the University of the Pacific School of Dentistry in San Francisco.

Dr. Hadley will present "Quality Intraoral and Extraoral Radiographs" at the ADA Annual Session on Sunday, Oct. 25 from 8:30 am - 11:00 am, and repeating from 1:30 pm - 3:30 pm in the Executive Conference Room at the University of the Pacific School of Dentistry.

Many changes have occurred in the technology used to acquire dental images. Most of the research has been directed to reducing radiation to the patient while maintaining excellent diagnostic quality. With the introduction of computer technology and monitors, the patient is exposed to less radiation while diagnostic capabilities for the dental practitioner are enhanced. When this exciting, emerging technology is more fully utilized in practice, there will be great benefits to the patient and the dental profession alike.

Dental radiology has seen many changes over the past 10 years, leading to new technologies that have had a profound effect on the practice of dentistry. As we move into the next century, dentists will see the results of the advances being made now, and will most likely benefit from easier, more accurate diagnoses and increased patient satisfaction with their overall treatment. Following is a review of some of the recent developments in dental radiology that will make a difference in the future of dentistry.

Xerography

Dental xerography was first introduced about 20 years ago. Xerography is a method of imaging by utilizing a charged selenium alloy plate in a lightproof cassette, about the size of a #2 film. It is placed into the mouth and held with a device and exposed to radiation, at 50% dose reduction relative to D-speed film. This exposure creates a latent image of charge carbon particles. The particles are then transferred between a sheet of transparent polyester and mylar; thus, a hard copy picture is produced. It is viewed conventionally or by reflected light.

There are advantages and disadvantages with this system. Advantages include good diagnostic utility showing the presence of proximal caries and periapical diseases. In assessing periodontal disease, this system shows excellent images of bone trabeculation, lamina dura, calculus and furcation bone loss. There could be up to 80 percent less radiation when compared to D-speed

film using rectangular collimation. It is less expensive than other automatic film processing systems, such as gender-GXP or the PerioPro. Xerography single film production takes less than two minutes to create a hard copy, and is better suited for single film production than for full mouth exposures.

Major disadvantages include high-edge enhancement, which creates radiolucent artifacts around densities such as fillings, which give false indications of caries. Another disadvantage is that xerographic equipment is less reliable than other film processing equipment, and sometimes the cassette is uncomfortable in the patent's mouth. The system has not gained popularity because of the high initial capital expense of the processing unit.[1]

Digital Scanning System

A small corporation, Digiray, is conducting ongoing research in digital radiography. This research emloys a unique reverse collimation of the scanning source of x-ray while directed at an object. The x-ray beam is collimated to the size of a 1mm crystal receptor and changed into light, which goes to a photo multiplier, creating an electrical signal processed by a computer for viewing on a monitor. This reverse collimation is the only type known at this time. It reduces radiation to the object to only 1/10 of the amount of a single D-speed film. Because of many reasons, such as high expense and lack of funding, this concept has not been well utilized.

In 1991, The Department of Radiology at the University of the Pacific School of Dentistry in San Francisco began reducing the number of films in a full mouth from 28 to 20, which reduced radiation exposure to the patient. At the same time the rectangular collimator was introduced along with the Rinn XCP device, which helps to position the rectangular collimator correctly for the right angle paralleling x-ray technique. By using the rectangular collimator, the amount of radiation to the patient is reduced by another third. Kodak Ektaspeed-plus film is used for all intraoral exposures, which reduces the amount of radiation by 50 percent for each film while maintaining excellent diagnostic quality. However, in 1995, only 20 percent of dental offices in the United States and Canada were using Ektaspeed-plus film and only 3 percent of offices were using rectangular collimation to reduce radiation to patients.[3]

Storage Phosphor System

Storage phosphor systems are charged plates which are about the same size as conventional film sizes. They can be exposed a multitude of times, are thin and smooth-edged, and can be used in most holding devices. After having been exposed, the plates are placed into a scanner. (There are several kinds: Digora, Dent-X, and Dentsply.) When the plates are scanned, images appear on the monitors to be viewed and they are digitally manipulated.

In a recent study by Wenzel, it was suggested that the storage phosphor system may not use less radiation than E-speed film, especially even when there is collimator size reduction.[11] Another investigator found that these devices are better than film when measuring periapical lesions. Although these systems give images similar to film, it was concluded that there is a higher image quality with a wider exposure range compared to film and other digital systems.[12]

Storage phosphor systems show improved detection of caries when compared to enhanced computer images and Ektaspeed-plus film. Also, images from these plates showed favorable contrast differentiation and gave good diagnostic quality at even 53% reduction of radiation compared to E speed film.[13]

Digital Imaging

Digital imaging uses intraoral sensors, which is said to reduce the amount of radiation to the patient by 90 percent. Due to the relatively high cost to purchase a digital system, the benefits of utilization have not, as yet, had widespread acceptance. But there are pervasive benefits for the dental practitioner and certainly for the patient. Instantaneous digitized computer images have many wonderful qualities: obviously there is no film5 and the radiation reduction is as much as 70 percent compared to film.[6] It is a fast way to obtain images over a wide range of (KVP) settings.[7]

With inherent benefits from these current technologies, there has been a tremendous amount of in-depth research to gain information about how to use this diagnostic tool and how treatment may be impacted. Still in debate are questions such as whether the patient is really exposed to less radiation, the cost effectiveness of this method, and if the immediate image on the computer monitor provides better diagnostic information than the digitized information from a scanned storage phosphor plate.

Digital radiology can be efficient in clinical use. There is a great capability to store digital information, exchange radiographic material and perhaps improve diagnostic quality and accuracy with automated image analysis.[8] Clinically, images are larger than film because of monitor resolution and digital image size.

A word of caution is that dentists cannot detect altered diagnostic contents of images that have been manipulated. Therefore, digital images must have greater data protection.[9] Investigators who compared film with digital imaging concluded that both film and digital

imaging are diagnostically acceptable for detection of proximal caries and periapical lesions.10 Some professionals feel that more studies need to be conducted to determine if digital imaging is better than film, but as yet little evidence reveals that digital enhancements change interpretation, working practices, or treatment decisions.[11,12,13]

Although there have been many studies done with digital and storage phosphor systems, one researcher who surveyed dental students found that many want digital radiology introduced into the curriculum, at least as an elective course. Although the benefits of such a class would include fewer misconceptions about digital radiography and an understanding of how digital radiology will play a role in the future, it was felt that teaching methods and the content of such courses would need careful consideration.[14]

Conclusion

Most assuredly there have been great changes in digital radiology in the past 10 years. There are many ways now to reduce the amount of ionizing radiation to the patient. This has come about with the help of film companies developing film requiring less radiation while maintaining excellent diagnostic qualities. Computer technology has not only demonstrated the capability for less radiation, but also allows the clinician to view the images in different ways, which will provide data that can be stored and shared, resulting in accurate diagnoses and timely treatments.

As dentists become more knowledgeable about digital radiology and want more information, the industry will comply. Reduced capital expenses will go hand in hand with the demand. There will be more studies to reduce the bulkiness of the sensors to make them patient- friendly. Monitors with a wider range of small pixel sizes will result in better resolution and more accurate diagnosis. The clinician will be able to retrieve diagnostic information more quickly and will be able to more clearly discuss with the patient issues about teeth, the surrounding bone, and others parts of the mouth. The patient will be able to see images--acquired with less radiation--on a computer monitor, helping him or her to understand and accept treatment more easily.

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Table Clinic Winners

Each year the California Dental Association invites dental and dental hygiene students from across the state to enter the Table Clinic Competition that is judged at the Anaheim Scientific Session. The first-place finishers in each category receive certificates, cash awards, and an invitation to write an abstract of their work to appear in the Journal of the California Dental Association. Following are the winners of the 1998 competition.

Dental Student Winners

Comparison of Post and Core systems on Widely-flared Root Canals

Sam Kim, Caroline Le, Dan Nguyen, Junior Dental Students; Douglass B. Roberts, DDS, MS, Faculty Advisor, Loma Linda University School of Dentistry, Loma Linda, California.

Purpose: This study examined four methods of restoring anterior teeth with widely flared root canals.

Significance: Research has been conducted on post and core systems for parallel-sided anterior root canals. However, there remains a need for more research on reliable post and core systems for anterior teeth with widely-flared root canals.

Methods and Materials: Four groups plus a control group of ten maxillary central incisors each were prepared with different post and core systems as follows:

Root canal treatment was performed on all teeth (except Group E) with gutta percha filling the apical 3mm. A cylindrical post space, 2mm in length and 1mm in diameter, was then prepared coronal to the gutta percha. The incisal 6mm of the root canal was flared until a rim of dentin 0.5mm in thickness remained. The post and core restorations were then constructed. The cores, including a 2mm ferrule, were prepared for gold crown placement. Crowns were fabricated with a lingual notch 8mm incisal to the gingival margin and were luted with glass ionomer cement.

Group A: Cast Post/Core
Group B: Composite Post/Core
Group C: Steel Post (1mm diameter)/ Composite Core
Group D: Carbon Fiber Post (1.4 mm diameter)/Composite Core
Group E: Control: Crown Restoration Only (no endo)

All samples were thermocycled for 300 cycles at temperature extremes of five and 55 degrees Celsius. The samples were stressed to failure with an Instron testing machine with the stylus placed in the lingual notch at an angle of 135 degrees to the long axis of the tooth. The forces (in

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kilograms) necessary to induce systemic failure were statistically analyzed using the one-way ANOVA method.

Results: The control group was most resistant to failure. There was a statistically significant difference between groups A, B, C and group E (p..05). Group D, the Carbon fiber Post/Core group, was statistically similar to both the experimental groups A, B, C and to the control group (p>.05) due to the large standard deviation of group E.

Conclusion: The forces necessary to induce failure, averaging 60kg, suggest that any of the four examined post and core systems may be viable treatment alternatives. The Carbon Fiber Post/Core system demonstrated a statistical advantage over the other three experimental groups that may translate into a clinical benefit. Care must be exercised in applying these laboratory results to the clinical situation.

Hygiene Student Winners

Microbial Leakage in Examination Gloves Subjected to ASTM Water Leakage Testing

Rex Gabel, Jill Honce, Jennifer Moon, dental hygiene students; and James Kettering, PhD, faculty advisor; Loma Linda University, Loma Linda, California.

Introduction and Purpose: Concern over infection control in the dental setting has resulted in increased use of examination gloves as a protective barrier. Commercially available gloves are tested for water leakage by a procedure developed by the American Society for Testing and Materials (ASTM). Studies have shown failure rates of two to 35 percent, with a failure of four percent considered acceptable. Interestingly, the ASTM testing standard makes no warranty regarding the size or type of defect that allows water leakage. The purpose of this study was to test four latex brands and one vinyl brand of examination gloves for ASTM water leakage and microbial leakage.

Method: This experiment involved testing 200 latex gloves from each of four brands and 200 vinyl gloves from one brand for water leakage as described by the ASTM method (D 5151-92). Any glove failing the water leakage test was subjected to a second examination for the leakage of Serratia marcesens (S. marcesens).

A pilot study was conducted to determine the type of contamination present on gloves taken directly from the manufacturer's packaging. None of the five brands tested showed contamination with S. marcesens.

Thirty milliliters of a S. marcesens culture were placed inside each glove. The gloves were then suspended in individual containers with 80 mls of sterile trypticase soy broth (TSB) and incubated at 370 C for two days. The TSB was then plated and evaluated after two days for the presence of red colonies of S. marcesens.

Twenty gloves of each brand that passed the water leakage test were also tested for bacterial leakage as a negative control.

Results: The four latex brands had failure rates in the water leakage test of 7%, 6.5%, 4% and 2.5%(p=0.002). All of the latex gloves failing the water leakage test also failed the microorganism leakage test. Of the negative controls, two latex brands allowed 30 percent leakage of S. marcesens, one 5% and one 0% (p=0.000). The vinyl gloves showed no failures in the ASTM water leakage test, however, five percent had bacterial leakage. The results of this study were analyzed using the Chi Square statistical test. The Chi Square for the water fill test was 17.448 and the Chi Square for the negative control was 51.000.

Conclusion: This study demonstrates a need for continued concern regarding the possibility of bacterial and viral leakage in gloves that are commercially available to the dental community.

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The Great Debate

Robert E. Horseman, DDS

Whether to assess each ADA member $300 for the next three years to finance a nation-wide advertising campaign or not, that is today's burning question. And the answer is: 1. You bet! Best idea the ADA ever had! 2. Absolutely not! I'm not giving $300 over to such an ill-founded notion!

This is dentistry at its finest, two opposing factions thoughtfully proposing their views in an atmosphere of give and take and mutual respect, not unlike Israel and Palestine. A profession founded on the Scientific Principle can do no less than question everything, whether it be political or technical, didactic or clinical. For example, the Great Reciprocity Debate, now in its 100th year, has united us all in our amicable attempts to discover if Dental School A in State 1 graduates dentists comparable to those from Dental School B in State 50. If so, then should we allow those malcontents from State 1 to invade our sovereign state? Yes! No! And the beef goes on.

Out of all the debates dentists have had with each other over the years, only one springs to mind as having had a reasonably satisfactory conclusion and it took a war to do it. This had to do with the assignment of a designation, universally recognized, to each of the 32 teeth. It was initially acknowledged that there were, in fact, 32 separate teeth and that each of them should have a name if we were to have any sort of intelligent conversations about them. That was the only point that all parties could find mutually acceptable. An inkling of what lay ahead could be seen when some fancied the name "pre-molars" and others kind of liked "bicuspids" The people who wanted to refer to them as "those two ones just back of the eye tooth" found favor with neither camp. The "cuspid" people bickered with the "canine" crowd, while in the background the "3rd molar" faction snickered at the "wisdom tooth" bunch as being no more dedicated to science than the Tooth Fairy fans.

Things came to a head in Chicago in 1878 at a meeting of dental leaders to determine, once and for all, how to properly differentiate one tooth from another. It was, predictably, a disaster. Delegates had to be restrained from physical contact with one another and cries of "Moron" and "Fathead" could be heard above the din. Families were split asunder, brother against brother, father versus son like the Civil War a decade or so earlier. The upshot was that at least three or four tooth numbering systems, each with its vociferous adherents, became deeply entrenched.

My own dental school, in its infinite wisdom, insisted on drilling this premise into its 1939 freshman class: There are

four quadrants in the mouth. Each quadrant has eight teeth. Each of these teeth has a partner lurking in another quadrant someplace. So the maxillary (upper) central incisors (front teeth) shall be "1," the lateral incisors (those littler ones next to the big front one and between it and the cuspid (eye tooth/ canine) will be "2," etc. back to "8" (3rd molar/wisdom tooth).

Everybody with me so far, students? All righty then, same thing with the mandibular (lower) teeth. Now all we've got to do is figure out how to tell right from left, upper from lower. Here's how: we draw a little bracket like this around the tooth number. So then number "1" has four possibilities. 1 is the upper right central, 1 is the lower left central, etc. In Dental School X the freshman class is being taught the same thing except 1 is the upper left central at that school. This is the same camp that insists on viewing x-rays with the dimple towards the viewer, another area of dissension.

At some point any student with an IQ higher than shrubbery would immediately wonder why all 32 teeth just didn't get a number from one to 32, starting with the upper right 3rd molar and ending with the lower right 3rd molar. No, wait, starting with the upper left 3rd molar, or maybe the lower right 3rd molar. Well, the hell with it, he's only a dental student, what does he know?

In the meanwhile, there are at last count 20 deciduous (baby) teeth waiting to be assigned. We can't have quadrant numbers here, they've already been used, so we'll have four "As" four "Bs," and so forth back to four "Es." The same bracket system is used depending on whether your left is the patient's left or his right. Or your right. A numbering or lettering system from A to T is too simple--unthinkable.

So after about a hundred years or so, we've got that ironed out to the point where most of us agree that "1" is the upper right 3rd molar, "A" is the upper right 2nd deciduous molar. Blessed are those dentists who attended school after WW II when this foolishness was resolved. Regardless, I have no doubt that somewhere is a dentist still busy making little brackets around teeth and confusing the heck out of an oral surgeon asked to extract number 5.

That's what's so unique about our profession, nobody is going to tell us rugged individualists what to do or how to do it, except HMOs, PPOs, DPOs and the government. We don't need any outside help in generating dissent and confusion, we can do it ourselves. Now, about that $300.