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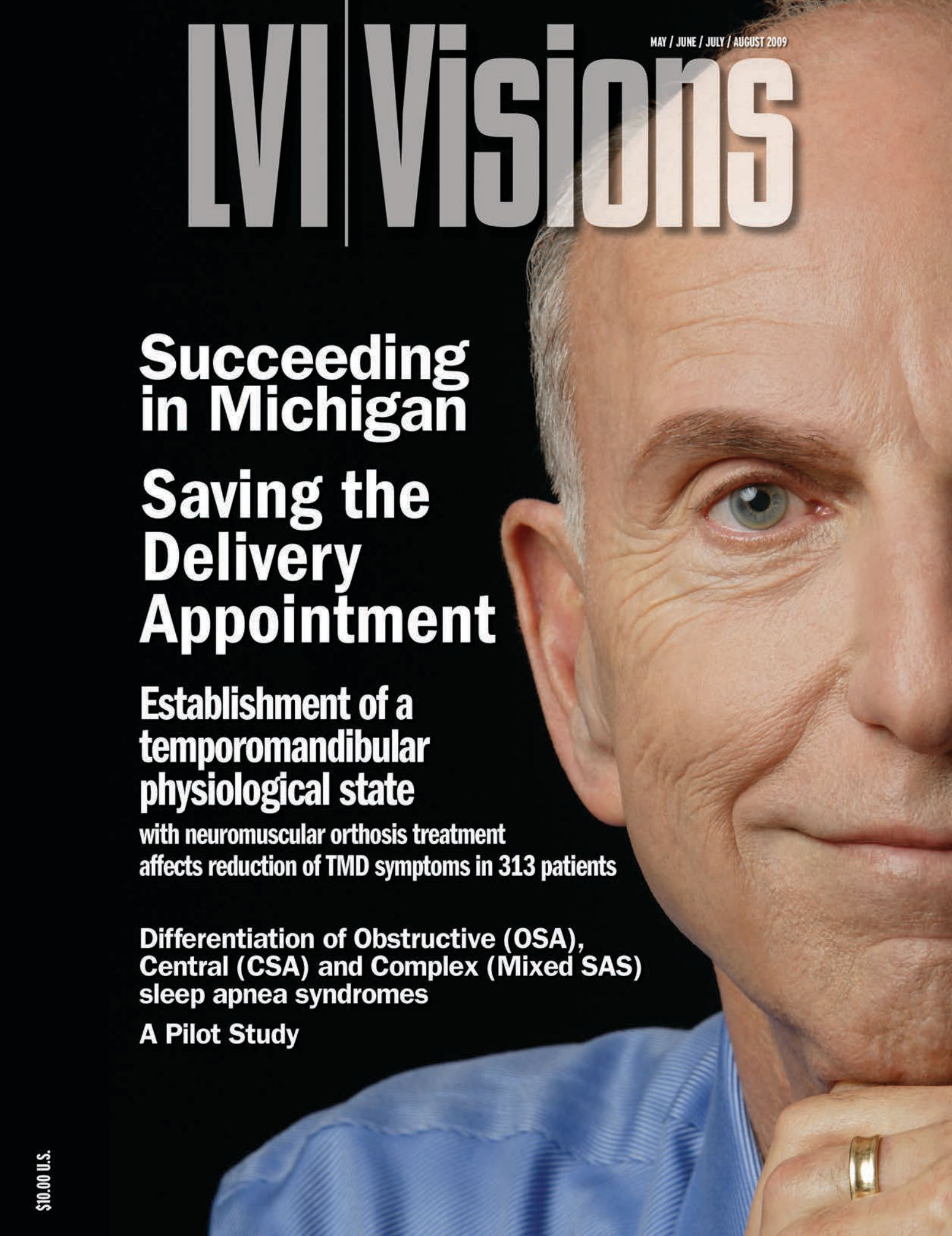

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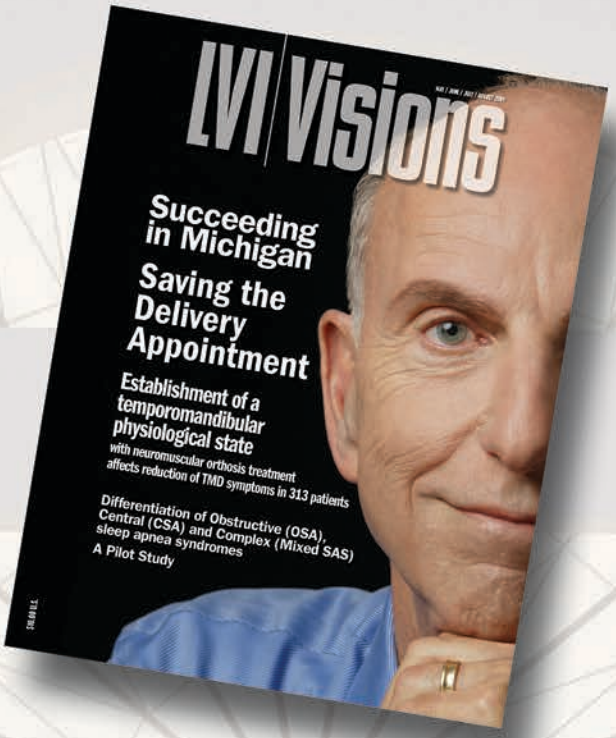

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CORRECTION: In the January 2009 issue, page 14, "A Perfect 10" ProTech Dental Studio, not ProWest Laboratories, contributed to the gift given to Dr. Bill Dickerson during the 10th Anniversary Celebration.

The Las Vegas Institute for Advanced Dental Studies (LVI) publishes LVI Visions. Please send any comments or suggestions to 1401 Hillshire Drive, Suite 200, Las Vegas, NV 89134. Telephone (888) 584-3237 or (702) 341-7978. Web address • www.lviglobal.com.

CHANGING DENTISTRY. CHANGING LIVES.

EDITORIAL

DAVID MILLER, DDS, LVIF

Ethics and the Expert Witness

"The dental profession holds a special position of trust within society. As a consequence, society affords the profession certain privileges that are not available to members of the public-at-large. In return, the profession makes a commitment to society that its members will adhere to high ethical standards of conduct. " **ADA Code**

The ADA Principles of Ethics and Code of Professional Conduct (ADA Code) is the guideline for the interaction between patients, colleagues and society. The ADA defines five Principles of Ethics included in the Code. The Principles comprise the moral basis for the Code of Professional Conduct. These five principles are: patient autonomy, non-maleficence, beneficence, justice and veracity. Dentists who serve as an expert witness are obligated to follow ethical guidelines when they provide this service. Expert testimony can affect the standard of care applied to future dental procedures; so acting as an expert witness falls under the definition of the practice of dentistry. Dentists involved with the legal system are obligated to meet the same ethical standards that the ADA Code applies to clinical practice. In fact, the ADA Code directly addresses these obligations and the application of the Principles to the acts of the dental expert witness. While all five principles apply to expert services, the Code directly discusses this aspect of dental practice under the fourth Principle: justice.

The principle of Justice means that dentists have an obligation to treat people fairly. The Code states: "This principle expresses the concept that professionals have a duty to be fair in their dealings with patients, colleagues and society. Under this principle, the dentist's primary obligations include dealing with people justly…" Section 4.C of the Code discusses "Justifiable Criticism". Dentists are required to report incidents of gross or continued faulty treatment by other dentists. However, dentists are required to inform

patients of their dental status without making disparaging comments about prior services. The operative word here is "Justifiable". The Code defines "Justifiable" in its accompanying Advisory Opinion 4.C.1. It states that the dentist must be careful that his statements are "truthful, informed and justifiable." Differing opinions of treatment options should avoid unjustly implying mistreatment. Many cases will require the dentist to exercise discretion and suggest care not to make "unknowing or unjustifiable disparaging statements against another dentist." Unsupported and thereby unjustifiable statements theoretically can lead to disciplinary proceeding against the dentist making such claims. Unfortunately, malpractice suits are often triggered by the current dentist disparaging the work of the prior dentist, often without an understanding of that treatment. And too often this vocal critic of the prior dentist's quality of care becomes both the subsequent treating dentist and the testifying expert, thus taking a double dip at the financial fountain. Unfortunately, the image of a dental firing squad being a circle facing inwards too often holds true.

In the courtroom, legal questions are settled by the "triers of fact", the judge or the jury. Judges and juries are not generally knowledgeable about the practice of dentistry or other technical fields. Courts rely on expert witnesses to help them understand complex issues and conflicting claims. Therefore it is ethically and legally acceptable for knowledgeable dentists to testify in malpractice cases. Section 4.D of the Code specifically supports the work of an expert witness stating: "Dentists may provide expert testimony when that testimony is essential to a just and fair disposition of a judicial or administrative action." Dentists have a clear ethical responsibility to be objective, honest and impartial when evaluating whether the accepted standards of dental practice have been breached. It is unethical for an expert to overstate his credentials or opinions, to misstate or inflate the standard of dental care, provide false testimony, to claim a maloccurrence (poor result) as malpractice, or to accept a contingency fee.

"Dentists may provide expert testimony when that testimony is essential to a just and fair disposition of a judicial or administrative action."

The most important qualification of an expert witness is expertise in the area of dentistry in which the defendant is practicing. Expertise is generally established by knowledge and training in the field and relevant clinical experience. Therefore, an orthodontist would not be considered an expert in full mouth reconstruction, yet may testify in matters of occlusion and temporomandibular disorders which are common to both orthodontics and prostodontics. Board certification is considered the gold standard for knowledge in a clinical specialty field. However, some fields, such as implants, occlusion or temporomandibular disorders, do not have specialty status. In some specialty areas there are organizations of general dentists who practice in these fields. In both these cases, certification based on knowledge and expertise by other non-specialty organizations gives sufficient evidence to qualify as an acceptable expert. In some rapidly changing fields, experience should include practice during the time that the clinical incident occurred. This is to ensure that the standards being employed actually reflect the clinical practice being employed in that field.

Experts need to be knowledgeable about the prevailing standard of care. The standard of care is that duty of a dentist to have the knowledge and skill ordinarily possessed, and to exercise the care and skill ordinarily used by trained and skilled members of the dental profession practicing their profession under the same or similar circumstances. While clinical guidelines for many procedures have been published, they are usually carefully worded or carry a disclaimer proclaiming that they are not a standard of care. Doctors know that there is rarely a clear standard of care for any condition because the varying circumstances and patient presentation. It is often said in jest that "the standard of care is established

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the first time someone is successfully sued for not doing something." The expert witness's primary responsibility is to truth. The ethical expert witness must be careful to differentiate for the jury between a clinically acceptable result which meets the standard of care and ideal care provided by the most skilled dentist under optimal circumstances. The expert must also assist jurors in understanding the difference between commonly rendered treatments and equally acceptable but less commonly rendered care which is also a valid treatment option. The expert must also be able to differentiate and delineate between reasonably competent care and treatment that would be considered substandard by the average dentist under any circumstance.

Another problem often seen is the tendency of attorneys and some experts to use the poor outcome to color their presentations with the presumption of guilt. Since "hindsight is 20/20," it is easy for an expert to present their personal opinions as fact, which is misleading and unethical. When presenting personal belief, opinion and preference, this can be ethical but only when these offerings are clearly presented as personal. It is also important for the expert to acknowledge that differences of opinion between competent dentists will exist in the treatment of any case. It must be acknowledged that the preferred course of treatment is usually clearer with the benefit of 20/20 hindsight. It is equally important to differentiate between malpractice and maloccurrence (a poor result). Often the public does not understand that when an untoward outcome occurs this does not necessarily indicate that malpractice has occurred. The ethical expert will acknowledge this truth even if it hurts the plaintiff's case. Too many experts act as an advocate for their client/employer by presenting only those points which support their client's case. Advocacy for a client is the job of the attorney, not the expert. The expert's obligation is to educate the triers of fact to the realities of dental practice. One of the realities that is often misrepresented is the adage "if it wasn't documented, it wasn't done." This is a common criticism leveled by the plaintiff's bar and their expert witnesses. However, this complaint defies all logic. Even an obsessive compulsive cameraman could not document every aspect and circumstance of any clinical encounter. This statement should not appear in any deposition or trial testimony.

We have all heard of "hired guns" making most of their income from expert work. There are also dentists who will commonly find fault with any other practitioner regardless of the merits of their criticism. Unfortunately, there is little accountability for this type, especially made under oath. Courts are reluctant to look closely at testimony unless the testimony is proven to be false. Even then there is little chance of consequences to the guilty expert. Counterclaims for false testimony must be presented in civil court and are daunting because of the time and financial burdens of bringing a lawsuit even when the testimony has been impeached. If the testimony is not impeached (proven false) during the trial, then any civil act must show malice on the part of the expert by providing false testimony to harm the defendant dentist. This high burden of proof is virtually insurmountable.

The expert witness's legal charge is to educate the judge and jury thus serving the needs of the court as opposed to serving the needs of the lawyers and their clients. This responsibility calls for an educated expert who gives unbiased and truthful testimony. Dr. Louise Andrew wrote: "The hallmark of the ethical expert witness must always be the unswerving dedication to truth and, therefore, the integrity of the process."

"The standard of care is established the first time someone is successfully sued for not doing something."

Sources:
ADA Principles of Ethics and Code of Professional Conduct
The Ethical Medical Expert Witness Louise B. Andrew MD, JD; North Carolina Medical Board Forum, No.4, 2003

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"[I] was inspired; was educated; have grown in myself; have realized I have not expressed love and gratitude to as many as I should...IACA was yet again beyond compare!" - Dr. Fred Calavassy

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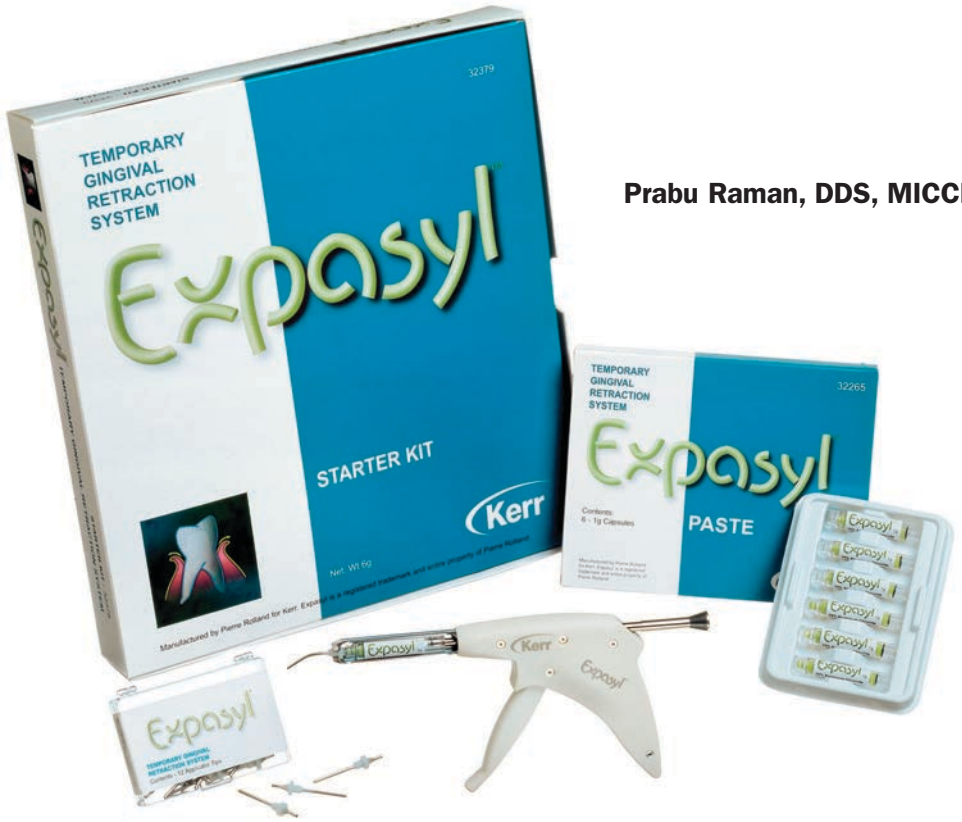
Saving the Delivery Appointment

Prabu Raman, DDS, MICCMO, LVIM



Predictable optimal results in bonding indirect and direct dental restorations are attainable through scrupulous attention to details. One of these important details is moisture control. Blood and crevicular fluid are incompatible with optimal bonding. This is true for both total etch and self etch techniques.

A technique for using Expasyl paste temporary gingival retraction system at delivery of indirect dental restorations in presented here (Kerr Corporation, 1717 West Collins, Orange, CA 92867).

Prevention of gingival hemorrhage is infinitely better than controlling it at the delivery appointment. Some of the strategies to this end are as follows:

• Carefully trim the provisional restorations of any excess material beyond margins.

• Check occlusion carefully and eliminate occlusal interferences.

• Open up the gingival portion of the provisional restoration at the contacts to prevent impingement of the gingival papillae.

• Paint the gingival margins of the provisionals with Cervitec Plus antibacterial varnish (Ivoclar Vivadent Inc., 175 Pineview Drive, Amherst, NY 14228).

• Educate the patient that bonding is an unforgiving process and bleeding gums will ruin the bond of their restorations.

• Emphasize the need for scrupulous daily plaque removal.

• Dispense Gum Soft Picks or Butler rubber tip stimulator (Sunstar Inc.

4635 W. Foster Avenue, Chicago, IL 60630) for daily interproximal plaque removal

• Have the patient use an oral irrigator (Hydrofloss: Oral Care Technologies, Inc. 3030 Dublin Circle, Bessemer, AL 35022) daily with water and H2O2 mix.

• Appoint for a short "trial smile check" visit a week after preparation appointment to check aesthetics and to check the gingival health.

Patients do not always do what we tell them to do or even what they have agreed to do. Some times they drive two hours to see us. The patient may have another person take a day off to accompany them if sedation is involved. We may have half a day set aside for Full Mouth Restoration delivery. Once the patient is seated, inflammation of gingival in some or all areas is noticed. What can we do?

Option 1: Reschedule the delivery and tell the patient to "come back when you've been cleaning your teeth like I told you." There is no guarantee that the same thing will not occur in three weeks at the next scheduled appointment.

Option 2: Figure out a way to save the day. The patient does not have to come back again, make another trip and take up time on our schedule again. I like the idea of a Plan B should Plan A not work out. This technique will work for a single or full mouth restoration delivery appointment. Before beginning, trial-seat the restorations to confirm good marginal fit and proper contacts.

Expasyl is a thick, green-colored paste consisting of kaolin and aluminum chloride. It is dispensed from a cartridge through a pressure syringe and cannula system. To get optimal results you may find the following suggestions useful.

• Dry the prepared teeth and tissue. A wet environment softens the paste and makes it ineffective.

• Direct the flow of the paste into the gingival sulcus while controlling the flow with gloved fingers as a dam.

• If it is a single unit or two, use cotton pellets to press down the paste and leave the pellet in the interproximal to keep the pressure. Cotton roll cut short and used on end as a compression cap over a prepared tooth works very well also.

• Have the patient bite down on another cotton roll laid along the occlusal plane on top of the prepared teeth to maintain dryness and to apply steady pressure for about five minutes or more, while the restorations are prepared for delivery.

• If it is a quadrant or full arch, then make a quick impression of the area after removing provisionals from the preparations. Use Sulgimix (Sultan Healthcare, 411 Hackensack Avenue, 9th Floor, Hackensack, NJ 07601) or a similar alginate substitute PVS material.

• Replace the set impression on the preparations over the Expasyl. Have the patient bite down on cotton rolls to maintain steady pressure for about five minutes or more, while the restorations are cleaned and prepared for delivery.

• Once the restorations are appropriately prepared for bonding, isolate the preparations with rubber dam or Isolite (Isolite Systems, 2060 Alameda Padre Serra, Suite #20, Santa Barbara, CA 93103).

• Wash off the paste with air water spray.

• Prepare the teeth for bonding using the appropriate protocol.

• If using viscous 37% phosphoric acid gel to etch enamel only for self etch or enamel and dentin for total etch, be sure to clean off the paste with a microbrush only up to exposing the margins and leaving the rest on the tissue. This is very important.

• Any gel that gets on the paste will turn it white but will prevent the gel contacting gingival tissue and restarting the hemorrhage.

• Wash off the etch and remaining paste with a vigorous air water spray.

• Follow the rest of the bonding protocol.

• The tissue and prepared teeth will remain clean and dry assuring proper bonding of the restorations.

Prabu Raman, DDS, MICCMO, LVIM

Dr. Prabu Raman has practiced dentistry in Kansas City since 1983. He is an alumnus of University of Madras, William Jewell College, University of Missouri - Kansas City School of Dentistry and The Las Vegas Institute of Advanced Dental Studies, where he serves as a Clinical Instructor and as a Regional Director.

His practice, The Raman Center for Advanced Dentistry, emphasizes in three areas of excellence; Temporomandibular Dysfunction, Aesthetic Dentistry, and Neuromuscular Functional Orthodontics. His team enjoys helping people lead pain free lives through Neuromuscular Dentistry and also helping them gain self-confidence by creating beautiful smiles.

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PRABU RAMAN, DDS, KANSAS CITY, MO

"Without the K7 system and J5 Myomonitor, I would never have achieved the TMD treatment success that my patients now experience. The equipment is easy to employ in a clinical setting and delivers objective data and very accurate measurements.

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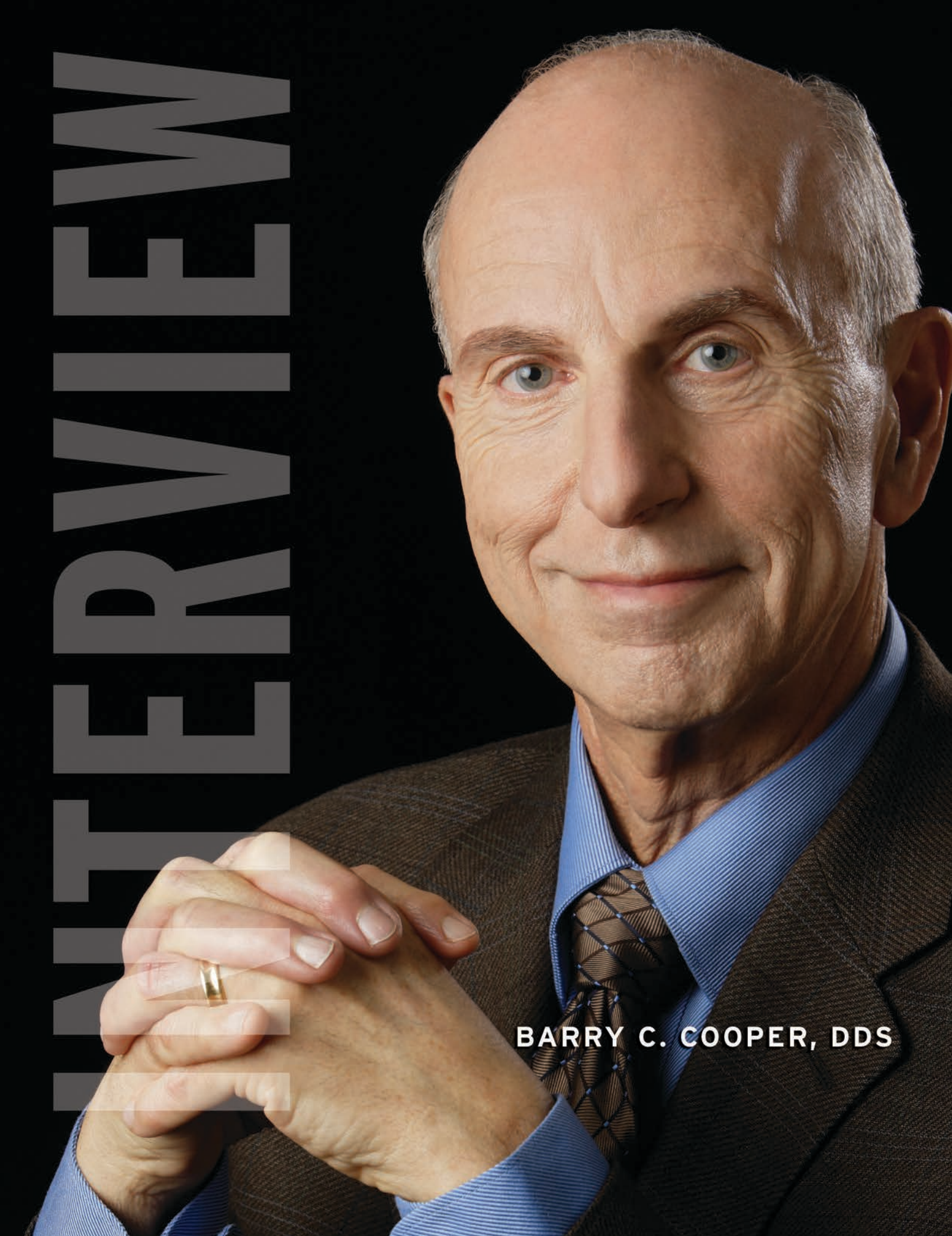


BARRY C. COOPER, DDS

Dr. Barry Cooper graduated from Columbia University School of Dental & Oral Surgery and currently serves as Clinical Associate Professor School of Dental Medicine, Department of Oral Biology & Pathology, SUNY, Stony Brook, NY teaching Neuromuscular Dentistry to third and fourth year students. His practice in Manhattan and Hewlett, NY is limited to the treatment of patients with temporomandibular disorders (TMD).

Dr. Cooper is Past International President of the International College of CranioMandibular Orthopedics (ICCMO). Internationally recognized in the fields of temporomandibular disorders (TMD) and neuromuscular occlusion, Dr. Cooper has been involved in the treatment of patients with TMD and neuromuscular dentistry for 30 years. He has lectured throughout the USA, in Canada, Europe and Japan and has spoken at meetings of the US Food and Drug Administration, the National Institutes of Health/National Institute of Dental Research and Councils of the American Dental Association.

He holds Fellowship in the International College of Dentists and the American College of Dentists, Mastership in the International College of CranioMandibular Orthopedics, is a Diplomat in the American Academy of Pain Management and a member of the American Equilibration Society. Dr. Cooper is a member of the American and New York State Dental Associations, Nassau and New York County Dental Societies.

How did you discover Neuromuscular Dentistry?

In the fall of 1978, my wife developed symptoms of a temporomandibular disorder (TMD). In my search for an available treatment, the only one that sounded credible was one taught by Dr. Bernard Jankelson in Seattle, WA. Indeed his was the only therapy that had a physiological basis and used objectively measurable data. Gayle and I went to Seattle the following spring and studied for two weeks with "Dr. J", as he was called. We were taught the use of TENS to relax masticatory muscles and an oscilloscope a pre-computer jaw tracking device. It was called the Mandibular Kinesograph (MKG). Notably, this was prior to the development of surface electromyography (sEMG) developed in the early 1980's and sonography (ESG) which was developed in the early 1990's.

During a lecture on the first day, Dr. Jankelson asked for a volunteer from the group to be tested and to have a neuromuscular bite registration obtained. I volunteered but requested that an oral orthosis (a splint) be made for me based on that testing. I wanted to experience the scope of the treatment that I was to learn and with which I would treat my wife and patients and hopefully obtain a resolution of years of headaches that had plagued me since I was a teenager. I wore the splint that was fitted and adjusted for me by Dr. J full-time thereafter. Within a day or so of having this mandibular acrylic orthosis inserted, I obtained complete resolution of my headaches. Within the months that followed, I experimented with not wearing the appliance full time. Each time I did so, I experienced headaches. I then decided to have my teeth restored durably in a neuromuscular occlusion position. I returned to Seattle the following summer and Dr. Robert Jankelson performed the necessary dental reconstruction. I am pleased to report that the 1980 restorations are all in place and I have been essentially headache-free for 30 years. Right from the beginning "I was hooked."

What is unique about Neuromuscular Dentistry?

Dr. Bernard Jankelson's extraordinary insight into the interdependent role of healthy relaxed masticatory muscle function, the nervous system, dental occlusion and the temporomandibular joints created the concept of neuromuscular occlusion. It is the basis of the neuromuscular dental treatments we now perform. Originally proposed over 50 years ago, it took the development of sophisticated electronics, sponsored by Dr. Jankelson to enable dentists like us to relax masticatory muscles and to precisely measure and analyze jaw function, masticatory muscle function, occlusion and TMJ joint function and improve them through treatment. What is unique about this concept is that it deals with a dynamic not static relationship. Classical concepts of occlusion, still taught in dental schools, only consider relationships of hard tissues such as cusps to fossae and sometimes condyles to TMJ fossae and a theoretical hinge axis of mandibular rotation. Mechanical paradigms dominate with various articulator based treatment modalities and dental laboratory oriented procedures proposed. These are not valid in a study of live-patient function. In some private teaching venues, manual mandibular manipulation is presented as a way of optimizing maxillo mandibular relationships.

Occlusion that is not based on sound physiological principles will fail; teeth can move, restorations often break and patients may develop symptoms of Temporomandibular Disorders (TMD). As this treatment proceeds with the new occlusal scheme it is only logical that it be a method that is provable, as that should be required prior to changing the functional scheme of a patient. The neuromuscular occlusion protocol provides a healthy physiological (functional) basis for the selected treatment occlusal position and is tested with objective computerized data.

What is the biggest problem in dentistry today and what bothers you the most?

Most dentists in practice today concentrate on esthetic reconstruction and replacement of teeth with implant retained prostheses, but fail to realize the quintessential importance of the creation of a healthy occlusion. Without that, all restorative treatments have the potential of failure and may even contribute to the development of temporomandibular disorders. The overwhelming majority of practicing dentists have not been trained to recognize and effectively treat patients with temporomandibular disorders. Every dentist should be able to recognize TMD's and treat if trained to do so.

The American Dental Association has repeatedly rejected applications for specialty recognition in either Orofacial Pain or Craniofacial Pain by two dental organizations. The overwhelming majority of dental organizations active in the TMD field have also opposed the ADA recognition of any single organization as "the recognized specialty certifying board" in a field that "the community of interest" feels should be part of all dental practice. Further, it is felt that the status of any qualified dentist treating TMD who does not bear that specialty designation would be diminished by the existence of a recognized specialty.

If you could give a piece of advice to all dentists what would it be?

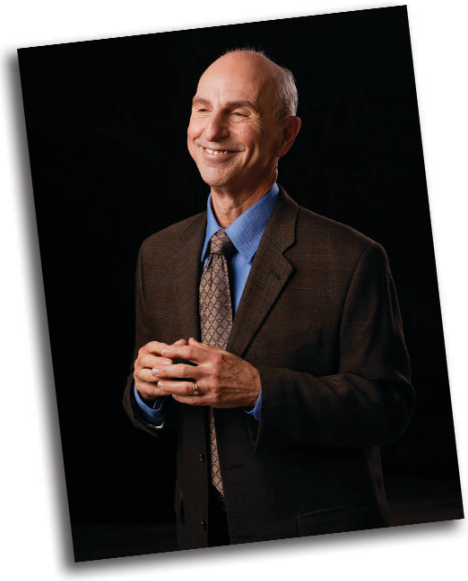
Continue to expand your knowledge in the area of Neuromuscular Dentistry through LVI and The International College of CranioMandibular Orthopedics (ICCMO) and share that knowledge with members of your profession by teaching. Study your science well, practice carefully and continue to scrutinize your work and provide the finest quality dentistry coupled with caring and compassion for your patients. All neuromuscular dentists are judged by the quality of your work and you by theirs.

It is now relatively easy for dentists to become involved in Neuromuscular Dentistry. Extensive courses are now available throughout the world, such as those at LVI Global. Computerized measurement instrumentation is available for purchase. Was this always the case?

The journey has not always been smooth. I have a very long perspective, having witnessed 30 years the growth, "wars", developments and maturation of the concepts first formulated by Barney Jankelson fifty years ago. There have been obstacles placed before manufacturers and dentists over the past four decades which threatened the rights of dentists to freely utilize the computerized devices we now take for granted to create neuromuscular occlusion for patients.

Together with Dr. Bernard Jankelson's two sons, Dr. Robert and Roland Jankelson, I have been fortunate in having the opportunity of playing a major role in fighting the "NMD battles" at the ADA, FDA and at the NIDCR. Our adversaries have been determined to protect the "status quo" that has been the basis of their teaching and they resist implementation of our treatment philosophy and the utilization of the computerized devices we use in NMD. Newcomers to our field may not realize that some opposition still exists at a lesser level in various governmental jurisdictions, in the insurance industry and in some dental publications. Great progress has been made in achieving international legitimacy for our technology. Myotronics has been at the forefront in that endeavor. NMD is demonstrably the most physiological occlusion, and it is definitely worth fighting for.

Why is it that there is some resistance to what you know is the truth about occlusion and the benefits Neuromuscular Dentistry (NMD) offers to our profession and the patients it serves?



It may be that the failure to recognize neuromuscular dental principles is an expression of one of Newton Laws of inertia "a body at rest tends to remain at rest" wherein, dentists in academia refuse to accept innovation and change. I cannot acknowledge with certainty that there is any self-serving reason for resistance to acceptance of the well proven NMD philosophy. The ability to objectively measure the physiological components in mandibular and masticatory function should transcend all occlusal philosophies. Measurement should be required, not denied and sometimes even denigrated.

Beneficial change in dentistry sometimes comes from outside the academic setting. Dental implantology is an excellent example of this. Research and technology developed in the private sector, later became accepted and taught within dental schools and incorporated in the scope of recognized dental specialties. In the United States Neuromuscular occlusion principles and practices are still almost universally being taught in private continuing venues such as LVI Global, ICCMO, Myotronics and by other manufacturers as well as by private dental educators rather than within dental schools.

While Neuromuscular Dentistry has been taught in a small number of US Dental Schools, the philosophy and instrumentation have been much more widely included in dental school education and through dental organizations, such as ICCMO in Italy and Japan. In Japan all 29 dental universities and 23 of 60 medical schools are equipped with at least one K7 evaluation system. In February 2007, Japan's Health Ministry recognized the value of Myotronics K7 system requiring before and after diagnostic information obtained using K7 device for orthodontic treatment under Japan's National Health Insurance program. In Italy, I was privileged to be a guest at the graduation ceremonies of the post-graduate orthodontic program at the University of Turin during which I witnessed each post-graduate student present their graduate thesis that included K7 documentation of treatment.

Not only is neuromuscular occlusion minimally taught in U.S. dental schools, but occlusion itself is not adequately taught in dental schools. I observe that graduates whom I have met currently leave dental school without a valid, reliable, clinically applicable concept of occlusion.

"Thanks a million Dr. Chung for freeing me from life-long neck pain and headaches. I am so comfortable and confident. I love my new smile."

~ Nazli

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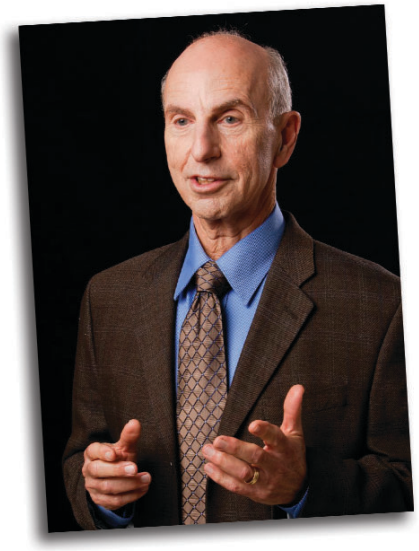
In your experience, how do insurance carriers deal with claims for TMD and specifically neuromuscular dental treatment?



Medical and dental insurance carriers most often deny benefits for treatment of temporomandibular disorders (TMD) unless there is radiographic evidence demonstrating mechanical (structural) disruption within the TMJ and some carriers only pay for joint surgery. Muscle function/dysfunction is ignored.

Specifically, reimbursement for our computerized testing and neuromuscular treatment is often denied based on erroneous advice that it is "unproven, experimental or investigational", all of which are untrue. Those who advise the insurance industry are unfamiliar with the value of the NM philosophy in providing effective treatment or are unwilling to learn about it. It is not neuromuscular philosophy that is wrong.

Some insurance carriers will not pay any dentist for physical treatment of TMD, based on faulty advice that TMD is a biopsychosocial phenomenon rather than a physical/functional disorder. They opine that TMD is either a self-limiting condition requiring no treatment or only requires pharmaceutical and behavioral therapies. In my opinion if the acute structural/functional TMD condition is left untreated, it can deteriorate into a chronic TMD pain dysfunction condition with psychosocial end results. In other words, acute TMD pain/dysfunction can become chronic pain/dysfunction if untreated or inadequately treated. The literature contains numerous articles demonstrating that early intervention to resolve the acute functional disorder can prevent the development of the chronic pain dysfunction state. The chronic state has no long-term cure and is at best only manageable with drugs and psychotherapy.

As a dental educator involved in undergraduate dental education, what do you feel is lacking in the curriculum today?

In the USA, dental occlusion is not adequately taught, nor is the diagnosis and effective treatment of temporomandibular disorders (TMD). Neuromuscular dental concepts are definitely lacking in American dental schools. In several schools there is a presence of NMD and I hope that this will increase as more alumni become neuromuscular dentists and more scientific articles appear in the dental literature. I am pleased that in the SUNY Stony Brook School of Dental Medicine I have had the opportunity for nine years of presenting lectures to the third year students and practical demonstrations on the use of the K7 system in restorative dentistry and in the treatment of TMD to the fourth year students. As I continue teaching undergraduates, I plant seeds in the minds of future dentists who will hopefully seek additional knowledge after graduation by attending LVI and joining ICCMO.

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You have had a long and successful career that has incorporated clinical practice, teaching, research and publication and professional leadership. How did you become involved in the academic side of dentistry?

I graduated from the Columbia University School of Dental and Oral Surgery [now the Columbia University School of Dental Medicine] in 1963. In 1964 I presented a lecture at an alumnae day. After that I joined the Columbia faculty in the Department of Oral Diagnosis. I continued teaching while maintaining a private general dental practice throughout the early 1970's.

Soon after joining the neuromuscular dental family in the spring of 1979, Dr. Bernard Jankelson invited me to speak at the Mandibular Kinesiograph Owners Seminar he organized in Hawaii in August 1979. Serendipitously the year 1979 brought together a group of significant world dental leaders who became acquainted with Dr. Jankelson and adopted his "new neuromuscular dental science". With Dr. Jankelson's encouragement that group formed the International College of CranioMandibular Orthopedics (ICCMO) to provide an international forum for the free exchange of knowledge of NMD in a fraternal, professional organization with no commercial ties. After that summer, I began teaching NMD for Myotronics on a regular basis and also returned to academia teaching NMD to dental and medical students and residents. I accepted faculty appointments as Associate Clinical Professor in the post-graduate Prosthodontics Department at Temple University School of Dentistry and also in the New York Medical College Department of Otolaryngology. For eleven years I conducted a TMD/Myofacial Pain Clinic at The New York Eye and Ear Infirmary in Manhattan. In 1999, I was appointed as a Clinical Associate Professor in the Department of Oral Biology and Pathology at the State of New York (SUNY) School of Dental Medicine where I presently continue to teach. I maintain a private practice in Manhattan and Hewlett, New York limited to the treatment of patients with TMD.

Who were your mentors? Whom do you admire and why?

My mentors were Dr. Bernard Jankelson and Dr. Robert Jankelson. I want to acknowledge Dr. Israel Kleinberg, the Distinguished Professor and Chairman of the Oral Biology and Pathology Department of the State University of New York (SUNY), School of Dental Medicine, who is my chairman. Dr. Kleinberg's commitment as an educator and scientist is to expose undergraduate dental students to the best advances in dental science. Through his inclusion of the study of Neuromuscular Occlusion through my lectures and elective courses over the past nine years, hundreds of new dentists have been exposed to and have learned the value of our science.

I admire the dedicated dentist's around the world who have committed their time and passion to share their knowledge of NMD with so many other dentists

for the betterment of care to thousands of patients. These include: Dr. Atsushi Yamashita of Japan, Dr. Norman Thomas of Las Vegas, Nevada, Dr. Maurizio Bergamini and Dr. Franco Prayer-Galletti of Florence, Italy, Dr. Rainer Schottl of Erlangen, Germany, Dr. Carlos Capmourteres of Buenos Aires, Argentina, the late Dr. Jim Garry of Fullerton, California and Dr. Bill Dickerson, founder of LVI. By committing LVI to Neuromuscular Dentistry, Bill exposed the concept to thousands of dentists who might never have become familiar with it.

You have had such a fulfilling life, what would you consider the greatest aspect of your personal and professional life?

That is an easy question, my family and my professional accomplishments. I value the ability I have developed to provide a quality of care to thousands of patients that I could never have provided had I not incorporated neuromuscular principles and technologies in my practice for thirty years. Equally important has been the opportunity to teach physicians and dentists about our philosophy and treatment through lectures and publications around the world. I am proud of the research on NMD that I have been able to conduct and its publication in the medical and dental literature over many years for it has significantly impacted on the proof of the efficacy of NMD. I served as International President of ICCMO from 1993-1999. I have been awarded Fellowship and Mastership in ICCMO and Fellowship in the American College of Dentists and in International College of Dentists. Finally, the friendships I have developed over these thirty years with extraordinary, caring and talented dentists throughout the world have been and continue to be a special part of my life and that of my wife, Gayle.

What do you feel is the future related to Neuromuscular Dentistry?

In my opinion, the dental profession is becoming increasingly aware of NMD. In the United States, LVI Global has been instrumental in a tremendous growth in the number of dentists who practice Neuromuscular Dentistry. I meet new enthusiastic young dentists at Myotronics Anniversary Seminars and at ICCMO meetings who have been trained at LVI. As past International President of ICCMO, I am pleased at the increasing number of students and faculty from LVI who have joined ICCMO. They realize that the College augments their knowledge of NMD and exposes them to experienced practitioners throughout the world, providing them with an opportunity to share their knowledge with others through USA and international lectures and publishing in the ICCMO biannually published bound Anthologies.

By including Neuromuscular Dentistry in its restorative curriculum, LVI has enabled NMD to take a quantum leap into the 21st century. The expansion of LVI

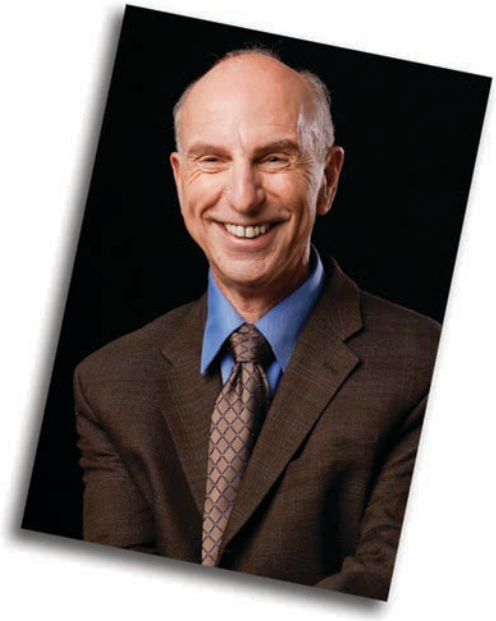
Global has further spread the neuromuscular philosophy internationally. I feel that together with the activities of ICCMO in the USA and internationally, Neuromuscular Dentistry will achieve the prominence in dentistry that it deserves. Hopefully, more dental school faculty will become involved in our science and bring it into dental school curricula and then we will finally see NMD take its rightful place in the mainstream of dental education in all disciplines.

The proof of the validity of Neuromuscular Dentistry lies in continued research and publication in refereed scientific journals. This is not an easy task, but one that is very rewarding and essential. I challenge all serious neuromuscular dentists to publish in their component and state journals and then in national publications. Speak at local study groups, dental society meetings and then move up to larger national venues. I invite you to visit my website www.tmjtmd.com to read abstracts and full articles and obtain an extensive bibliography of NMD articles. The Journal of Craniomandibular Practice (CRANIO) has published my most recent co-authored article in the April 2009 issue, Vol. 27, No. 2, Pgs. 101-108 titled: "Relationship of Temporomandibular Disorders to Muscle Tension Type Headaches and a Neuromuscular Orthosis Approach to Treatment."

Do you have any final thoughts you would like to share with the readers?

Regardless of one's occlusal philosophy, objective measurement should be the rule not the exception. The NM protocol incorporates optimum muscle and mandibular function with stable occlusion and proves that it is so. Currently teaching esthetics without stressing healthy occlusion is unfortunately common. Dr. Bill Dickerson and LVI have put esthetics and a physiological occlusion together in a clinically useful manner. Bravo! LVI has expanded the teaching of neuromuscular dentistry in the USA and overseas. ICCMO has done this for over 25 years, currently with active sections in the USA, Canada, Italy, Germany, Japan and South America. There is definitely a place in your NMD professional life for ICCMO along with the IACA. I encourage you to join the International College of Craniomandibular Orthopedics (ICCMO) as most of the key LVI senior instructors have done.

In order to optimize the skills necessary to achieve NM occlusion, I encourage LVI students and experienced neuromuscular dentists continue to learn, practice carefully to constantly strive to improve their techniques and thereby provide the best dental patient care possible.



I have always considered NMD to be the "thinking man's dentistry".

Neuromuscular dentistry affords committed dentists the opportunity of providing the most precise and healthy dental occlusion possible. I have always considered NMD to be the "thinking man's dentistry". It requires diligence and meticulous techniques. Our patients are entitled to no less. In addition to practicing comprehensive restorative dentistry and orthodontics, I encourage you to become involved in the successful management of patients who suffer from TMD. The personal and professional rewards of all of these areas of practice will be forthcoming.

Thank you for inviting me to share my ideas, my research and my 30 year passion for Neuromuscular Dentistry.

Succeeding in Michigan

Jeffrey S. Haddad DDS

News of the economy continues to be the top story in the media and I imagine most people, like me, have grown tired of hearing about how bad the economy is. Please know I do not mean to make light of the current economic situation, because I take it very seriously.

I practice in a suburb of Detroit, Michigan. Chrysler Headquarters is literally in our backyard, so I am definitely in touch with the state of the economy. However, it is extremely disappointing to see it become a media-fueled, self-fulfilling prophecy that alters sound business policy and actually prevents success. It does not have to be that way. In fact, our practice experienced a record year in 2008 with production up over 20% from 2007 and 2009 has been just as promising. January marked a record month and production goals were exceeded in February and March. More importantly, the number of new patients continues to increase each month. It is phenomenal that our business is succeeding and even growing, especially since we are located in one of the most affected markets in the country. My hope is that after reading this, others will realize that what you do, and how it is executed, is much more important than where your business is geographically located.

During down economic times, people look for answers to help them succeed or simply survive. Too many dentists continue to practice and run

"My story is a great example about the importance of education."

their business the same as when they graduated dental school. Clinical techniques, dental materials and business practices have changed significantly in the last decade making it impossible for most to continue to practice the way they first learned. The world is changing as drastically as dentistry has changed and unless you choose to change as well, the economy will be the least of your worries. Over the last few years, several of our business practices have evolved in order to keep us ahead of the curve. Although I do not have all the answers, many of the ideas and methods that have been successful for our practice can be beneficial to other dental practices.

I am sharing some easy-to-follow guidelines categorized under three areas: Education, Exposure, and Referrals.

EDUCATION

Becoming successful and continuing that success almost always requires a continuation of education. It is imperative to keep abreast of the latest in dental procedures and technology as well as keep a fresh mind. By doing this you will continue to be able to provide the best care for your patients and they will appreciate it. If you are beginning to see a slowdown in your practice and the negativity from the media is invading your thoughts, spending money on your education may not seem like the right approach. Do not make this mistake. Increasing your skill set and allowing yourself to be the expert in your area is priceless. Most people who suffer from headaches or jaw pain will continue to seek care despite the economy. The desire to live pain-free is far too important, and you can provide this care to many patients!

My story is a great example about the importance of education. After graduation from dental school in May 2001, I received my license in the fall that same year. I was fortunate to have the opportunity to become an associate of Dr. Kurt Doolin who had been in practice for almost 20 years and just started his LVI journey. Kurt would not hire me unless I agreed to further my education at the Las Vegas Institute for Advanced Dental Studies. In fact, he offered to pay for half of my entire tuition because of how strongly he believed the importance of this education was to our success. This was a huge decision for both of us. First on Kurt's part to invest in my education knowing that it would benefit him and the practice as a whole, and secondly for myself to spend this large amount of money that I truly did not have at the time. Luckily, we chose to make education a priority. I know now that our successes are due largely to the initial decision to attend LVI, our commitment to completing the curriculum, and our continual attendance of the latest courses offered.

EXPOSURE

Perfecting clinical skills and increasing knowledge alone does not guarantee a larger patient population. Being a great dentist does not create a path to your door. An investment of time, effort, and money is required to create awareness and increase exposure in your market. Patients need to know who you are, what you can offer them, and how they can find you. Your practice must stand out from the rest. Since forming our partnership almost five years ago, Kurt and I have continually worked to build our reputation and promote ourselves through advertising, charitable events, and other standard forms of marketing.

Our efforts in more recent years have been modified to accommodate the changing world of advertising and marketing. The best example of this would be web-marketing. A presence on the web is no longer something that you can afford to ignore. Every progressive dental prac-

tice should have an attractive and informative website that accurately reflects the high-quality dentistry that is provided. When your patients perform an internet search for certain dental services and procedures, are they finding you? How many new patients are a direct result of the internet and your practice website? We receive approximately 60% of our new patients from the internet and this continues to increase every month. Without fully utilizing search engine optimization (SEO) and statistical data the internet would not be an effective tool in growing the business. We have exercised all of the SEO tactics to optimize our website presence and it has served us well in the past. However, Social Networking sites are changing the way in which the market works. People are flocking to sites like Facebook and MySpace because it allows them to connect with others and share their life experiences. Today, websites must be interactive for a desirable search engine placement. Patients should have access to informative content and a platform that allows them to submit responses. Patients want a voice. This is the future and dentists must be part of it.

Dentists are in the perfect position to capitalize on Social Media tools because of the positive experiences that happen every day in the dental chair. At completion of a smile makeover the patient is beaming ear to ear often with tears in their eyes. When they turn to you and say "how can I ever thank you", what is your response? More than likely the standby response is something like; "If you know anyone else who would benefit from this type of dentistry, please let them know." This business practice does not take full advantage of the opportunity. You should leverage these types of scenarios to market yourself. There are several ways that your existing patients can help you sell the amazing services you have to offer. Get creative! Have a patient experience testimonial form at hand to give to patients at those opportune moments. Take it to the next level and get permission to showcase their entire experience in your next e-newsletter or blog. You can capture their emotions, include quotes, and even have them directly praise you and your office to other potential patients. Patient quotes and testimonials can be utilized in advertising, on the practice website, and on blogging platforms. The benefits of positive patient experiences are immeasurable!

About a year and a half ago, we decided to try something new. We invited 15 of our patients to attend a professional photo shoot and cocktail party at the office. The group was comprised of maxillary veneer cases, full mouth reconstructions, and even some small veneer and whitening cases. The original objective of the photo shoot was to gather a huge portfolio of photos to use on our website and for other advertising materials; however it turned into something much more. Our patients were very appreciative and flattered that we invited them to be part of the event. More importantly, we provided an experience that they wanted to talk about. News of our event spread throughout town, including other patients from our practice who jokingly asked why they were not invited! Consider how this helped to distinguish our practice from the others. This event accomplished several things:

1. Allowed us to capture many beautiful photos of our own patients. Actual patient photos are one of the most powerful tools you can have at your disposal.

2. Promoted our cosmetic and dental skills by the most influential marketing tool of all; word-of-mouth. The word-of-mouth was created without direct effort or selling on our part.

3. Most importantly, it largely increased the exposure in our market through the conversations about us personally, our office as a whole, and how much we are thinking outside the box.

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If you are not educating patients about your training, and what you are capable of, then you have missed an opportunity with your most captive audience. Take advantage of these occasions by showing patients your skills and telling them about your specialized services - initiate conversation. The majority of patients have minimal amounts of dental work completed, so do not limit your efforts to only large-case patients. Patients trust you and believe that you are a great dentist, however they cannot recommend you to their friend who is suffering from daily headaches if they do not know you can help them.

The walls of our office feature framed portraits of patients from the photo shoot. There are also photo albums in the reception area and operatories but the portraits in the halls are the most visible and generate the most conversation. This is not a new idea, however in my opinion, not enough cosmetic dentists are doing it.

We also utilize the Pure Power Mouth Guard to educate patients on the services we provide. Last year, attendance at the ESPYs put us in contact with some very elite professional athletes. Many of them were fitted with the PPM. So that our patients would be informed of our training and services we decided to showcase signed jerseys and photos of all of the athletes we fit. There were numerous inquiries about why these jerseys were on the walls. This opened the door to talk about how we use the same technology for these athletes as we do to cure headaches and treat TMD. Remember, the more you educate people on what you can offer them and get your patients talking about you, the more you increase exposure and potential for success.

REFERRALS

Building a Referral Network will increase your circle of influence. With specialized training in areas like TMJ, dentists can form valuable relationships with other healthcare professionals such as Chiropractors and Physical Therapists. With extensive knowledge of airway obstruction, tonsils and adenoids, and sleeping disorders, dentists should continually refer to ENT Physicians and sleep centers to help their patients. I once had a patient tell me that I saved her daughter's life because I observed her extremely large tonsils and referred her to the ENT we have worked with for years. Do you know how powerful that is? I was not the one who performed the tonsillectomy, but because I was the one who demonstrated my knowledge and took action to direct this patient to the right person, I became the hero.

From a business perspective, your practice will directly benefit from these professional associations as well. A formal referral network will make you the dental expert in your area and bring in new patient referrals. Consider the mutually beneficial relationship a cosmetic dentist, a plastic surgeon, and a dermatologist could have. These professionals have a similar patient pool that could benefit from services of all three. Because patients trust you and value your opinion, they will often ask you who they should see for a particular service or procedure. Make it easy for them by introducing them to other health professionals and health-related businesses in your area. Your patients will thank you and talk about you. Again, it is this dialogue that will increase the public's awareness of you and your practice.

Our office has a formalized alliance in several areas of medicine plus a large family practice and a high-end salon. This network has been successful for several years because our patients need services from these other professions and we

"Building a Referral Network will increase your circle of influence."

have experienced a consistent source of referrals for our services. Networking like this generates a huge return with very little investment.

Unfortunately, referring patients to other professionals often fails because of inconsistency, inefficiency, or one-sidedness. Mentioning a name to a patient is not enough. The key to successful referrals is to first build a relationship then educate the other professionals on what you are able to offer their patients and vice versa. Provide those in your network with brochures, business cards, and referral slips and be sure to get the same from them. Once this mutually beneficial referral relationship is in place, everyone will succeed.

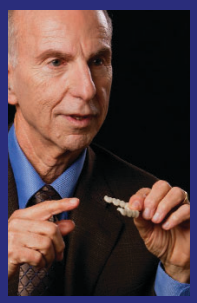
As the world evolves so too must the dental profession. Forget about the way things have been done in the past. Set out to distinguish yourself from other dentists in your area. Do not let economic fear prevent you from investing in yourself or the advancement of your practice. Build awareness by stimulating discussions about the life-changing dentistry that you provide. Maintaining and increasing the visibility of your practice will not only help you succeed today, but will help you thrive when the economy rebounds. Think outside the box. If you do not – some other dentist will.

Jeffrey S. Haddad D.D.S. received his Bachelor of Arts degree in Psychology from the University of Michigan in 1997. He completed his dental education at the University of Michigan in 2001. Since graduation, Dr. Haddad has been immersed in his training at the prestigious Las Vegas Institute for Advanced Dental Studies. Dr. Haddad lectures locally on cosmetic dentistry, TMD, and practice marketing. He lives in Rochester with his wife Melissa and his beautiful baby girl, Brooklyn.

If you have any questions or would like further information from Jeff, please contact him at drhaddad@rochesteradvanceddentistry.com or call him at (248) 656-2020. To visit his website referral platform, go to www.mybodynetwork.com/healthyliving

Establishment of a temporomandibular physiological state with neuromuscular orthosis treatment affects reduction of TMD symptoms in 313 patients.

Barry C. Cooper, D.D.S.; Israel Kleinberg, Ph.D., D.D.S., D.Sc.



Dr. Barry Cooper graduated from Columbia University School of Dental & Oral Surgery and currently serves as Clinical Associate Professor School of Dental Medicine, Department of Oral Biology & Pathology, SUNY, Stony Brook, NY teaching Neuromuscular Dentistry to third and fourth year students. His practice in Manhattan and Hewlett, NY is limited to the treatment of patients with temporomandibular disorders (TMD).

Dr. Cooper is Past International President of the International College of CranioMandibular Orthopedics (ICCMO). Internationally recognized in the fields of temporomandibular disorders (TMD) and neuromuscular occlusion, Dr. Cooper has been involved in the treatment of patients with TMD and neuromuscular dentistry for 30 years. He has lectured throughout the USA, in Canada, Europe and Japan and has spoken at meetings of the US Food and Drug Administration, the National Institutes of Health/National Institute of Dental Research and Councils of the American Dental Association.

He holds Fellowship in the International College of Dentists and the American College of Dentists, Mastership in the International College of CranioMandibular Orthopedics, is a Diplomat in the American Academy of Pain Management and a member of the American Equilibration Society. Dr. Cooper is a member of the American and New York State Dental Associations, Nassau and New York County Dental Societies.

This article is reprinted with permission: CRANIO: The Journal of Craniomandibular Practice (Vol. 26, No. 2, Pgs. 104-117, Establishment of a temporomandibular physiological state with neuromuscular orthosis treatment affects reduction of TMD symptoms in 313 patients).

The objective of this investigation was to test the hypothesis that alteration of the occlusions of patients suffering from temporomandibular disorders (TMD) to one that is neuromuscularly rather than anatomically based would result in reduction or resolution of symptoms that characterize the TMD condition.

ABSTRACT: The objective of this investigation was to test the hypothesis that alteration of the occlusions of patients suffering from temporomandibular disorders (TMD) to one that is neuromuscularly, rather than anatomically based, would result in reduction or resolution of symptoms that characterize the TMD condition. This hypothesis was proven correct in the present study, where 313 patients with TMD symptoms were examined for neuromuscular dysfunction, using several electronic instruments before and after treatment intervention. Such instrumentation enabled electromyographic (EMG) measurement of the activities of the masticatory muscles during rest and in function, tracking and assessment of various movements of the mandible, and listening for noises made by the TMJ during movement of the mandible. Ultra low frequency and low amplitude, transcutaneous electrical neural stimulation (TENS) of the mandibular division of the trigeminal nerve (V) was used to relax the masticatory muscles and to facilitate location of a physiological rest position for the mandible. TENS also made it possible to select positions of the mandible that were most relaxed above and anterior to the rest position when the mandible was moved in an arc that began at rest position. Once identified, the neuromuscular occlusal position was recorded in the form of a bite registration, which was subsequently used to fabricate a removable mandibular orthotic appliance that could be worn continuously by the patient. Such a device facilitated retention and stabilization of the mandible in its new-found physiological position, which was confirmed by follow up testing. Three months of full-time appliance usage showed that the new therapeutic positions achieved remained intact and were associated with improved resting and functioning activities of the masticatory muscles. Patients reported overwhelming symptom relief, including reduction of headaches and other pain symptoms. Experts consider relief of symptoms as the gold standard for assessment of effectiveness of TMD treatment. It is evident that this outcome has been achieved in this study and that taking patients from a less to a more physiological state is an effective means for reducing or eliminating TMD symptoms, especially those related to pain, most notably, headaches.

The term temporomandibular disorder (TMD) is defined as a group of abnormal conditions involving the masticatory muscles, the temporomandibular joints, and the associated neurological and musculoskeletal structures.[1,2] There are numerous published studies reporting on the significant prevalence of this disorder in population groups throughout the world[3-10] and that pain is a major symptom. Relief of pain is a major reason why patients seek professional care.[11,12] In the absence of a clear understanding of the causes of TMD, pain medications are extensively used to ameliorate this condition. This is only a stop-gap measure.

One theory proposed as the basis of TMD is that it is mainly the result of a dysfunctional masticatory system that is characterized by complicated interactions between various muscles, two temporomandibular joints, and a moveable mandible that supports a cadre of teeth that engage in complex and intermittent interdigitations. It then follows that a desired goal of treatment is to identify and improve or correct any dysfunctions and correct the cause or causes of TMD and any related pain.

This would bring TMD study and treatment in line with what is well known in the muscle physiology and physiotherapy fields, namely, that muscles functioning under less than ideal conditions commonly result in compensating muscle activity, which needs to be corrected. Otherwise, deterioration can progress into a self-perpetuating chronic condition of increasing dysfunction and pain.

Over the last several decades, instrumentation has been developed to make it possible to objectively locate and establish what is commonly referred to as a patient's neuromuscular occlusion position. Neuromuscular occlusion is defined as a stable maxillomandibular position at occlusion arrived at by isotonic contraction of relaxed masticatory muscles. This is achieved by stimulation of muscles on a trajectory (arc) from a resting mandibular position. The instrumen-

tation developed has enabled (1) measurement by surface electromyography (EMG) of masticatory muscle activity at rest and under a range of activations, such as clenching of the teeth; (2) tracking of the mandible where its movements and the electrical activity of associated muscles can be followed during jaw opening and closing, and during movement of the mandible forwards, backwards, and laterally as during eating; and (3) scrutinizing and recording sounds, if any, emanating from the temporomandibular joints during jaw movement using electrosonography.

Involved in the surface EMG measurements are the mandibular elevator and depressor muscles. The former includes the temporalis and masseters; the latter involves the digastrics. Recognized, at the same time, as an objective is the having of a strong and bilaterally symmetrical muscular closure of the mandible in preference to having one that is weak and asymmetrical.[15-31]

Mandibular tracking instrumentation is used to precisely record and analyze the speed, fluidity, and range of movements of the mandible. As in other skeletal muscular systems, smooth, fluid, and rapid movements made voluntarily are considered to be a more physiological condition than movements that are irregular (dyskinesic), slow (bradykinesic)[32-34] and/or painful.

Electrosonography (ESG) enables the dental practitioner to listen to joint sounds during movements of the mandible. An ideal temporomandibular joint (TMJ) is one that is silent during such movements, whereas one where sounds are present suggests abnormalities within the joint complex.[35-41]

Over the last several decades, instrumentation has been developed to make it possible to objectively locate and establish what is commonly referred to as a patient's neuromuscular occlusion position.

The objective of this study was to determine: (1) whether patients who presented with chronic symptoms of TMD could be objectively brought from a state of neuromuscular dysfunction to a state of neuromuscular function using the instrumentation mentioned above; (2) whether orthosis treatment can facilitate changing a nonphysiological neuromuscular situation to one that is physiological; and (3) most importantly, whether such alterations result in relief and/or reduction in TMD symptoms, especially one as discomforting as pain.

The current study has tested these hypotheses by retrospective analysis of symptom data obtained in patients examined and treated for TMD in a clinical practice, where objective instrument methodology was used in conjunction with the wearing of orthotic devices to correct neuromuscular malocclusions, and thereby relieve TMD symptoms such as pain.

Materials and Methods

After obtaining a signed treatment consent form from each of more than 1500 patients seeking treatment in a dental office, each patient was asked to complete an in office self-evaluation questionnaire. This enabled assessment of the patient's symptoms and allowed an indication of how long they had them. Each patient was then subjected to a clinical signs examination performed by a single examining dentist. A presumptive diagnosis of TMD was made from the information obtained.

Criteria for inclusion of patients in the present analysis included presence of certain symptoms and signs recognized as characteristic of TMD.[11] There was no attempt to categorize the patients in a private practice reported in this study into TMD diagnostic subgroups. All patients, after initial screening, were assigned code numbers. From among those patients screened and subsequently tested and treated, 313 who showed complete data in all fields reported herein were subjected to analysis in this study. Many of the initially tested patients failed to return for follow-up re-evaluation testing, and their data therefore were not included in this study. The included 313 patients' data consisted of the following: (1) symptoms derived at baseline from a questionnaire; (2) signs obtained by oral examination immediately thereafter; (3) symptoms determined at one and three months by questionnaire as at baseline; and (4) neuromuscular examination information obtained at baseline and at the end of the analyzed treatment period. This consisted of EMG and jaw tracking measurements before and after transcuta-

neous electrical neural stimulation and sonography pre-TENS.

The subject population included 70 males and 243 females with a mean age of 40 for each group. The duration of each patient's TMD problem or problems was determined at the same time. TMD symptomatology prior to baseline in 57% of the patients was between one and ten or more years. In 72% it was ≥6 months and in 21%, it was ≤3 months. It is therefore apparent that for these patients, their TMD were not self-limiting and had not resolved without therapeutic intervention or with other therapies.

After initial symptoms and signs were determined, patients were subjected to the following examinations. First, various mandibular and masticatory muscle levels of activity and function were measured and recorded. Electrosonography was performed. TENS was carried out in order to relax the masticatory muscles after electromyographic determination of the presenting resting state, i.e., when a muscle is at its lowest level of activity. After TENS, a second set of surface EMG and mandible tracking measurements were performed, which was followed by the taking of a maxillomandibular bite registration. Based on the findings, a removable oral orthotic device was designed and constructed (figures 1-4). In each case, devices covered the mandibular posterior teeth and the lingual surfaces of the mandibular anteriors. These were worn by each patient 24 hours a day, and for seven days a week over a period of three months. The appliance was removed by the patient only when doing daily oral hygiene. Patients were able to eat with the appliance in place, because it was designed with an anatomical occlusal surface.

Electrosonography (ESG) enables the dental practitioner to listen to joint sounds during movements of the mandible.

EMG of Mandibular Elevator and Depressor Muscles

Electromyographic devices were used on the patients in this study (EM-2, K-6 EMG and K-7 EMG, Myotronics Noromed, Inc. Kent, WA) to collect baseline data, which consisted of bilateral EMG recordings of the main mandibular elevator and depressor muscles. The former included the anterior temporalis and the middle masseters; the latter included the anterior digastrics. The EMG device used permits simultaneous recording of four paired (bilateral) muscles. However, for this study only, three sets of muscles were monitored. Measurements were performed on each patient after he or she was instructed to assume a resting jaw position where the teeth are not touching. In each case, the patient was seated comfortably in an upright chair and instructed to sit with eyes slightly closed. Three successive sets of data were obtained and were then averaged. Data representing artifacts such as tooth contact or tongue movements during swallowing were discarded. After determining the resting muscle activity condition, maximum muscle activity was elicited by asking each patient to alternately clench his or her teeth maximally three times for two seconds, with two seconds of relaxation between each clenching episode. This clenching exercise was repeated three times and the results were averaged.

Mandibular Tracking

Electronic devices (K-5, K-6I, K-7 Diagnostic Device, Myotronics Noromed, Inc., Kent, WA) were employed to locate and record the postural position of the mandible at rest relative to its position at maximum intercuspation. To facilitate relaxation of the mandibular elevator and depressor muscles, these were stimulated as above with a TENS device (Myomonitor, Myotronics, Noromed Inc. Kent, WA) for 60 minutes. The distance the mandible travels from its rest to its occlusion position (freeway space) and the trajectory of movement of the mandible in three dimensions (vertical, anterior/posterior and lateral) were subsequently determined. This included tracking of these mandibular movements by attaching a small 0.1 ounce magnet to the labial gingiva just below the lower incisors and following its movement electromagnetically. Note: all measurements were made at the incisor point (further details follow).

The TENS device delivers a low-frequency, low-voltage repetitive stimulus of approximately eight to 12

mA for 500 msec. It is powered by a nine volt battery and uses two active bilateral electrodes and a third grounding electrode placed in the center of the back of the neck. Repetitive stimuli were delivered at 1.5 sec intervals for a period of 60 minutes which resulted in rhythmic contractions of (1) the masticatory muscles which are innervated by the mandibular division of the trigeminal nerve (V) and (2) the facial muscles which are innervated by the superficial fibers of the facial nerve (VII).[42-46]

The mandibular division of the trigeminal nerve (V) is located deep to the mandible, which is stimulated superficially through the notch that exists between the coronoid and condylar processes of the mandible, i.e. anterior to the tragus of each ear. The facial nerve that traverses the area beneath the same surface electrode was also stimulated.

The threshold intensity of the TENS stimulus was established for each patient as the minimal amplitude necessary to activate the elevator muscles. This causes a rise in the patient's chin, resulting from each electrical stimulation. By the operator placing his index finger very lightly on the chin, it was possible to check the intensity of TENS stimulation and accordingly make adjustments during the hour of therapy, thereby avoiding overstimulation. The TENS device can be adjusted by the operator to achieve bilateral balance of the magnitude of the stimuli induced muscle contractions that could be determined by manual palpation of the subject's cheeks.

After 60 minutes of TENS, EMG readings were made to assess mandibular muscle electrical activity in the resting state, which ensured sufficient relaxation of the elevator and depressor muscles of the mandible. Again, three sets of measurements were obtained and averaged. Testing for clenching activity post-TENS was deferred until after a bite registration could be made. The delay was to avoid tiring of the relaxed closing muscles.

Mandibular tracking with contemporaneous EMG monitoring of resting muscle activity was then performed in order to locate in three dimensions, the new post-TENS rest position of the mandible relative to the patient's maximum intercuspal position. This served to identify a reference from which a therapeutic occlusal position could be selected and observed on the computer screen. This enabled intraoral recording in the bite registration material to be realized.

With a slight increase in the intensity of the TENS stimulus, the mandible was moved isotonically on a neuromuscular trajectory (arc) from rest to its subsequent altered position which was recorded with the mandibular tracking instrument. A point one mm above the TENS-induced and electromyographically monitored rest position of the mandible was identified on the TENS stimulated trajectory, which became the neuromuscular occlusion, treatment position.

Neuromuscular Bite Registration

An intraoral registration of the neuromuscular occlusal position was made with a soft, low-resistance acrylic impression material (Bosworth Sapphire, H.J. Bosworth Co., Skokie, IL). The bite registration was removed from the mouth in its rubbery, partially cured state. Excess buccal and lingual acrylic material was removed with scissors. The bite registration was then carefully transferred to lubricated maxillary and mandibular study casts for complete curing. Care was taken not to compress the bite registration between the two casts. Any excess registration material was trimmed away to permit clear visualization of the complete seating of study casts into the bite registration. Careful trimming of the bite registration prevents fracture of the stone cast that can occur upon removal of the hardened registration material after its complete curing.

Once cured, the hard acrylic bite registration was removed from the casts and returned to the patient's mouth for mandibular tracking and verification of the accuracy of the neuromuscular position recorded. Improvement of the bilateral clench function was also checked using EMG. The bite registration was then sent to the dental laboratory together with the dental casts mounted on a Terminus Articulator (Myotronics Noromed, Inc. Kent, WA) for the fabrication of a therapeutic mandibular orthotic appliance. The natural occlusion and the articulated neuromuscular maxillomandibular relationship with the bite registration are shown in **Figures 1 and 2**, respectively.

Mandibular Orthotic Appliance Fabrication and Use

The removable mandibular orthotic appliance constructed for each patient was made of either clear acrylic or of a tooth-colored acetal resin material (DurAcetal, Cosmetic Dental Materials, Albany, OR). The occlusal surface of the device was designed to provide a stable maxillomandibular therapeutic occlusal relationship. In doing so, the occlusion was set 1-2 mm above and anterior to the EMG monitored mandibular rest position along the TENS stimulated trajectory (arc) of mandibular movement that begins at the rest position of the mandible. As indicated by EMG measurements, rest position is identified as an equilibrium position where there is minimal electrical activity in the antagonistic mandibular elevator and depressor muscles. The neuromuscular occlusion, thus determined, is stable. The surface morphology of the orthotic device includes mandibular cusps and fossae positioned to occlude with opposing maxillary fossae and cusps. The neuromuscular orthosis is shown on articulated models and intraorally in **Figures 3 and 4**, respectively.

To ensure maximum neuromuscular and bilateral symmetrical function while clenching, the final adjusted occlusion provided by the orthotic appliance was retested using EMG.

Each patient wore his or her oral appliance for 24 hours a day, seven days a week for three months. Then, a complete EMG testing was performed in which the baseline data collection protocol was followed with some modifications. Data were then obtained for muscle activities during rest and clenching with the appliance positioned on the mandibular teeth and when the cured acrylic bite registration obtained at the initial test visit was similarly tested. Maximum voluntary clenching with nothing between the teeth was not tested at the three month retesting visit, since patients had become adapted to closing on the orthotic device.

The accuracy and coincidence of the therapeutic occlusal position pro-

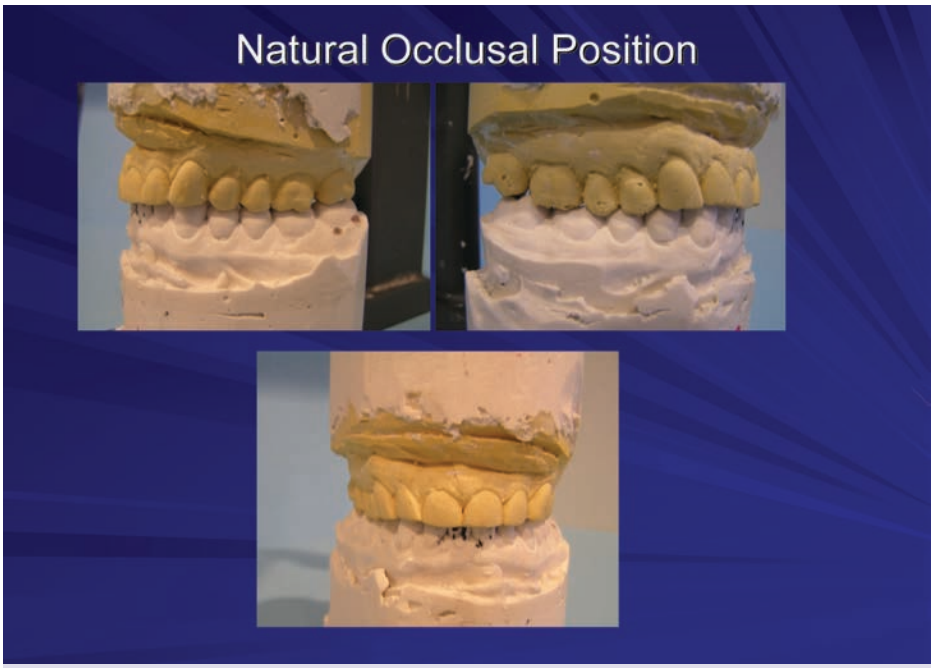


Figure #1
Study casts in natural occlusal relationship; centric occlusion (CO), maximum intercuspation (MIP), intercuspal position (ICP)

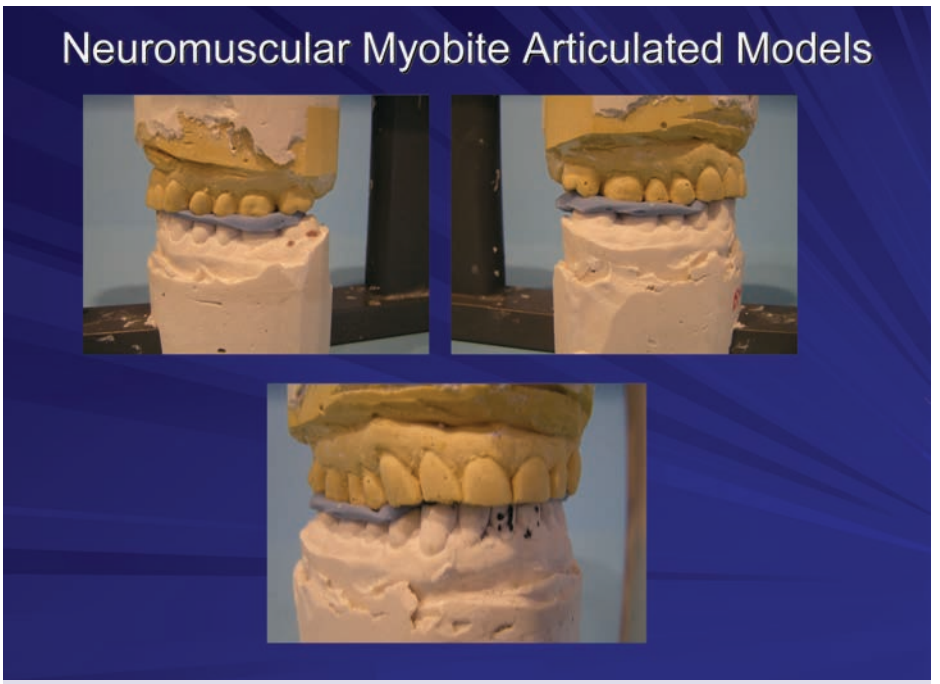


Figure #2
Articulated study casts with bite registration in neuromuscular relationship

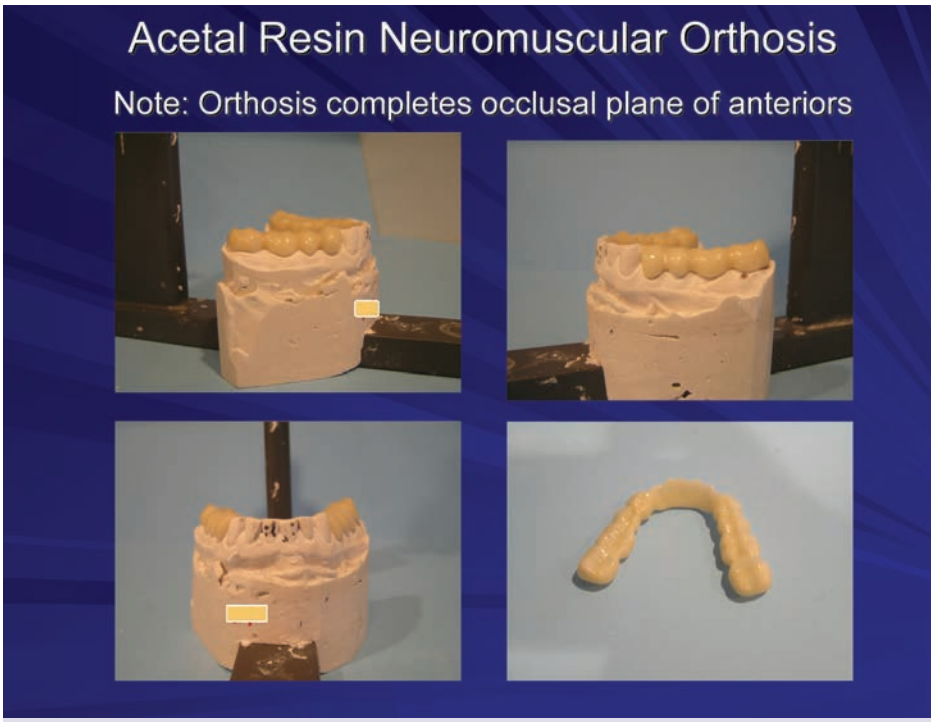


Figure #3
Acetal resin neuromuscular mandibular orthosis; Note: occlusal plane of anterior teeth is continued with occlusal plane of orthosis

vided by the orthotic appliance and by the bite registration with the TENS stimulated arc of jaw movement were also tested with the mandibular tracking device at the three-month test visit. Any inaccuracies were noted. Before bedtime, a neutral sodium fluoride brush-on gel was prescribed for use after regular tooth brushing but without rinsing in order to favor greater fluoride uptake and increased caries resistance.

Figure #4
Figure #4 Intraoral views of neuromuscular mandibular orthosis; Occlusal anatomical form of appliance interdigitates with maxillary teeth providing stable occlusion

Data Analysis and Statistical Methods

All test data were entered into a computerized database using a Microsoft Visual FoxPro program, especially created for this ongoing clinical study. Student's t-test was utilized to determine statistical significance. EMG activity during rest, before and after TENS, was compared before and after three months treatment, as was EMG maximum clench activity. Included was the baseline occlusion position, the treatment occlusal position with the bite registration inserted, and the position where the orthotic appliance was in place. Statistical comparisons of the EMG resting muscular activity (involving middle masseter, anterior temporalis and anterior digastric muscles) and maximum clench activities (involving the masseter and temporalis muscles) were performed. Occlusal positions at presentation and in the therapeutically corrected neuromuscular position were compared and statistically analyzed. Using the Student's t-test, data paired comparisons were made of identical (matched pairs) patient groups, before and after therapeutic interventions to determine the level of significance (confidence) of the differences recorded.

Results

The age and gender distribution of the subjects in this study are shown in **Figure 5**. More females than males made up the patient population studied. This may reflect a sex prevalence difference and has been reported in many studies including one

comprised of 4,528 patients presenting to a dentist for TMD evaluation and possible treatment.[11]

Symptoms Identified and Ameliorated

The symptom results obtained from the questionnaire are shown in Table 1. This shows a dramatic reduction in the incidence of headaches by one month and further improvement at three months. Of the 313 study subjects, 276 initially reported headaches. But, at one month, subjects with headaches decreased to 76 and to 37 at three months (i.e., 75.7% and 80.8% reductions, respectively). Similar large improvements or cures were observed for TMJ, ear, facial, cervical and back pain symptoms at one and three months, respectively **(Table 1)**. It was evident that the total number of symptoms for the total subject population and the number of symptoms per patient decreased dramatically following the diagnoses and treatments that were performed herein **(Table 1)**.

The average number of symptoms per patient fell from 7.7 to 2.4 in one month (68.8% reduction from baseline) and to 1.5 at three months (80.5% reduction from baseline), suggesting overall that a much healthier state was achieved **(Table 1)**.

The prevalence of various TMD clinical examination findings (signs) in the study population determined at baseline before orthosis treatment is presented in **Table 2**.

Electrical Activity of Muscles at Rest

At baseline, where the EMG activities of the main elevator (anterior temporalis and middle masseter) and depressor (anterior digastric) muscles were elevated at rest, reduction in these activities after TENS was clearly evident as shown in **Figure 6**. After three months of orthosis treatment, the resting electrical activities recorded before TENS treatment in these muscles were lower than their resting activities before TENS at initial baseline testing **(Table 3)**.

Most interesting was that EMG activities were similar after baseline TENS, as those recorded after TENS administered following three months of orthosis treatment. This suggests that a true resting muscle EMG level was identified and achieved.

At baseline, the mean resting EMG activity for the combined bilateral activity of the temporalis, masseter, and digastric muscles (using the greater of left vs. right muscles for respective muscle groups in each patient) was 4.3±0.4 μvolts. After 60 minutes of TENS, the mean activity of all three of these muscles was reduced to 3.0±0.6 μvolts. The decrease was highly significant ($p<0.001$). After three months of full time orthosis treatment, the same measurement of EMG resting activity in the three sets of muscles before TENS was 3.3±03 μvolts. After 60 minutes of TENS, this decreased to 2.7±0.4 μvolts. The differences were again statistically highly significant (Table 3; $p<0.001$).

EMG Activity in the Temporalis and Masseter Muscles After Activation by Clenching

At baseline testing, bilateral recordings (using the greater of left vs. right) during maximum clenching

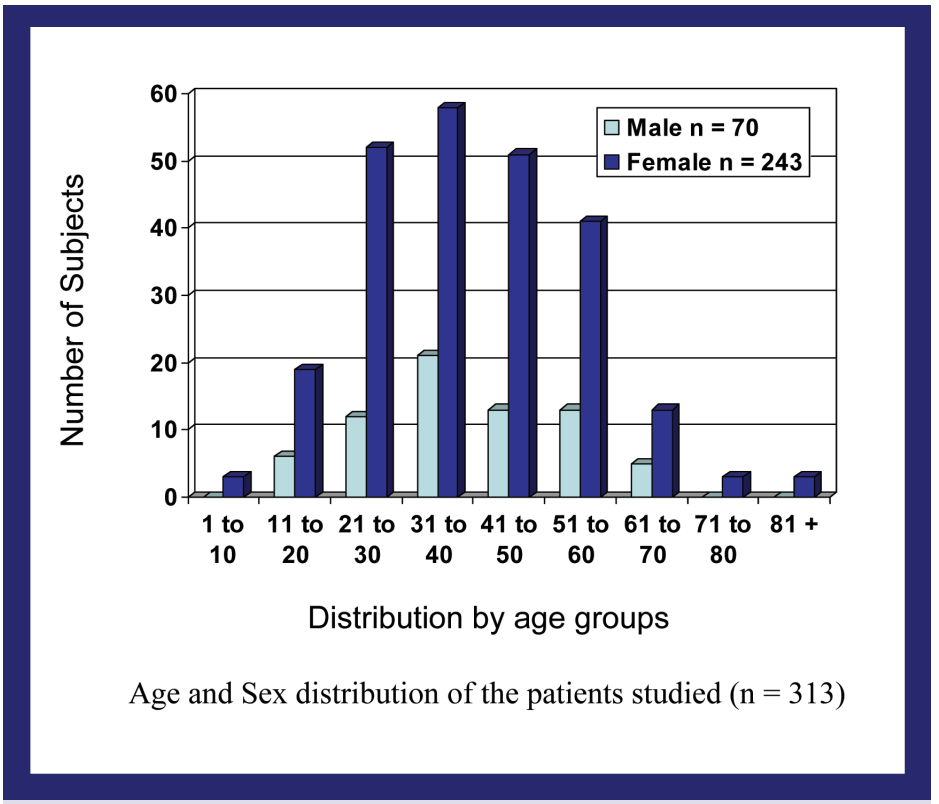


Figure #5
Age and Sex distribution of the patients studied (n=313)

Table 1
TMD Symptom Prevalence in Patients Studied
Before and After Beginning Orthosis Treatment (n=313)

Symptom	No. at baseline	No. after 1 month	No. after 3 months	Δ after 1 month	Δ after 3 months	%Δ after 1 month	%Δ after 3 months
Headache	**469**	**104**	**57**				
Temple	188	43	27	145	161	77.1	85.6
Frontal	137	15	2	122	135	89.1	97.8
Occipital	144	46	28	98	116	68.1	80.6
Any headaches	276	39	23	237	253	85.9	91.7
TMJ	**489**	**163**	**97**				
Pain in joint	192	42	30	150	162	78.1	84.4
Joint sounds	191	75	49	116	142	60.7	74.4
Limited joint opening	106	46	18	60	88	56.6	80.0
Any joint symptoms	269	49	32	220	237	81.8	88.1
Ear symptoms	**519**	**157**	**99**				
Otalgia (no infection)	161	34	19	127	142	78.9	88.2
Tinnitus	124	44	36	80	88	64.5	71.0
Dizziness	117	37	21	80	96	68.4	82.1
Muffled ears	117	42	23	75	94	64.1	80.3
Any ear symptoms	258	43	22	215	236	83.3	91.5
Other symptoms	**919**	**313**	**201**				
Facial pain	146	30	23	116	123	79.5	84.3
Cervical pain	178	59	42	119	136	68.9	76.4
Back pain	140	60	47	80	93	57.1	66.4
Throat symptoms	135	57	22	78	113	57.8	83.7
Uncomfortable bite	118	46	26	77	92	65.3	78.0
Pain behind eyes	125	44	26	81	99	64.8	79.2
Tooth pain	77	17	15	60	62	77.9	80.5
Total symptoms	**2,396**	**737**	**454**				
Mean # of symptoms per patient	7.7	2.4	1.5	5.3	6.2	68.8%	80.5%

Note: Total number of subjects who experienced some symptom improvement or were cured: after 1 month=308 (98.4%); after 3 months=310 (99.04%)

of the natural dentition, averaged 90.1±5.2 μvolts for the temporalis and 87.4±6.3 μvolts for the masseter muscles. After 60 minutes of TENS, when the acrylic bite registration in the neuromuscular occlusion position was obtained and tested, EMG activity with maximum muscle clenching on the bite registration device was significantly elevated to 136.7±5.9 μvolts for the temporalis and 160.6±7.1 μvolts for the masseter muscles **(Table 4)**. The alteration in clench function of the temporalis and masseter muscles was once more highly statistically significant ($p<0.001$) **(Table 4, Figure 7)**.

Interestingly, a shift in dominance at the initial baseline test changed from the temporalis muscles in the natural occlusion position to the masseter muscles in the neuromuscular bite occlusal position. The anatomical direction of force of the temporalis muscle is upwards and backwards, while the masseter is upwards and forwards. The latter is the trajectory of TENS stimulated jaw movement that is used to obtain the neuromuscular bite registration and reflects the natural swing path of the jaw. The shift from temporalis to masseter dominance observed reflects this improved therapeutic functional direction of jaw movement from rest to occlusion.

After three months of mandibular orthotic appliance usage, the maximum clench activity before TENS on the orthosis appliance recorded 101.3±5.6 μvolts for the temporalis muscles (using the greater of left vs. right for each subject). This was notably higher compared to baseline as was the value of 116.1±7.2 μvolts for

Table 2
Prevalence of Various TMD Signs in the Study Subjects
Determined at Baseline Before Orthosis Treatment (n=313)

	Prevalence (no. of subjects)	Prevalence (% of subjects)
Extraoral muscles tender to palpation		
Temporalis	188	60.1
Posterior cervical	115	36.7
Sternocleidomastoid	102	32.6
Angle of the mandible	168	53.7
Trapezius	70	22.4
Intraoral muscles tender to palpation		
External pterygoid	287	91.7
Internal pterygoid	223	71.3
Masseter	24	7.7
Other clinical signs		
Pain on TMJ palpation (with or without jaw movement)	209	66.8
Pain on ear palpation	145	46.3
Palpable condylar heads	196	62.6
TMJ sounds with stethoscope	113	36.1
Limited opening (<35 mm interincisal)	64	20.5
Lateral deviation (opening or closing)	126	40.3
Slow or staggered movement (open/close)	144	46.0
Dental findings*	202	64.5

*Any of the following: worn incisal edges, missing posterior bite, bi-level occlusion, deep overbite, severe overjet, midline discrepancy.

the masseter when compared to its baseline reading. After 60 minutes of TENS therapy, maximum clench activity was tested using the same bite registration that had been obtained at the baseline test visit. It was inserted between upper and lower teeth instead of the mandibular orthosis. This demonstrated further elevated functional activity for all muscles with average recordings for the temporalis being 133±6.1 µvolts and for the masseter muscles being 159.6±7.2 µvolts, ($p<0.001$) for both comparisons.

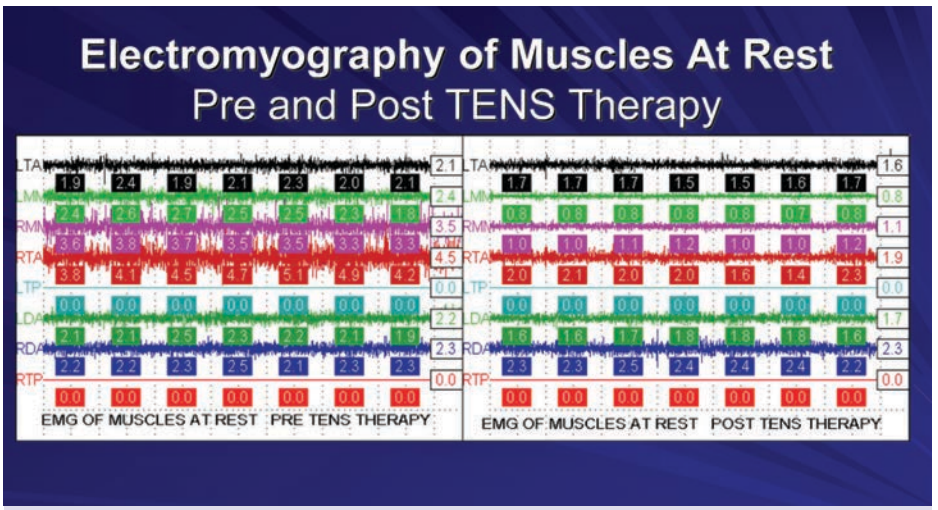


Figure #6
Electromyography comparison of selected masticatory muscles at rest at presentation, pre-TENS therapy where electrical activity is elevated (left). After TENS therapy resting electrical activity is significantly reduced (right).
LTa & RTa=left and right anterior temporalis
LMm & RMm=left and right middle masseter
LDa & RDa=left and right anterior digastrics
LTp & RTp channels were not tested in this study

Table 3
Average EMG Values in Micro-Volts (±SE) of Several TMD Related Muscles Measured at Rest Before and After TENS-Induced Muscle Relaxation Before and After Three Months of Orthosis Treatment (n=313)

	Before othosis treatment at baseline		After three months orthosis treatment at retest	
Muscles measured*	Before TENS	After TENS	Before TENS	After TENS
Temporalis anterior	3.4±0.2	2.4±0.5	2.7±0.2	2.1±0.3
Middle masseter	2.4±0.2	1.5±0.1	2.1±0.1	1.3±0.1
Digastric anterior	2.9±0.4	2.1±0.3	2.4±0.3	2.0±0.3
All six left and right muscles	4.3±0.4	3.0±0.6	3.3±0.3	2.7±0.4

*Greater left vs. right muscle values for each patient.

These data are similar to values for the same bite registrations tested at baseline. The change in temporalis muscle activity between the clench into the orthotic device (pre-TENS) and the clench into the bite registration device (post-TENS) represents an increase in electrical activity in the temporalis and masseter muscles. Also observed was a perpetuation of masseter over temporalis dominance over that of the temporalis as demonstrated previously at baseline. Both occlusal positions tested after three months of orthosis treatment (orthosis and bite registration) represent therapeutic interventions.

Maximum clenching activity for the natural dentition was not tested at retest in either the pre-TENS or post-TENS protocol because subjects had adapted to the full time presence of an oral orthotic device in their mouths by the end of the three month treatment period. Even though the appliance lost some of its anatomical details during the three months because of attrition, the Blue Sapphire bite registration obtained at the initial visit was unchanged from that tested at baseline **(Table 4)**. This made it possible to compare the function and accuracy of the neuromuscular occlusion of the orthotic appliance after three months of usage to that recorded at baseline.

Table 4
Average EMG Values in Micro-Volts (±SE) of Muscle Activity During Maximum Clench on Natural vs. Therapeutic Occlusion Before and After Three Months of Orthosis Treatment (n=313)

	Clench EMG values before orthosis treatment at baseline		Clench EMG values after three months orthosis treatment	
Muscles measured	Teeth to teeth Before TENS	Teeth to bite registration After TENS	Teeth to orthosis Before TENS	Teeth to bite registration After TENS
Temporalis anterior*	90.1±5.2	136.7±5.9	101.3±5.6	133.1±6.1
Middle masseter*	87.4±6.3	160.6±7.1	116.1±7.2	159.6±7.2
% subjects where TA>MM**	56.9%	32.4%	39.9%	28.9%
% subjects where MM>TA**	41.9%	66.8%	57.4%	69.6%
% subjects where TA=MM**	1.2%	0.8%	2.7%	1.5%

*Greater of left vs. right for each patient
**Average of left and right
TA: temporalis anterior; MM: masseter middle

Mandibular Tracking

Tracking of the movements of the mandible electronically enabled recordings to be made of the movement of the mandible in millimeters from its rest to its occlusion position at the incisal point and the ability to display these movements as separate vectors, viz. vertical, anterior/posterior and lateral. It was also possible to display sagittal and frontal recordings of the same mandibular movement trajectories from rest to occlusion as well.

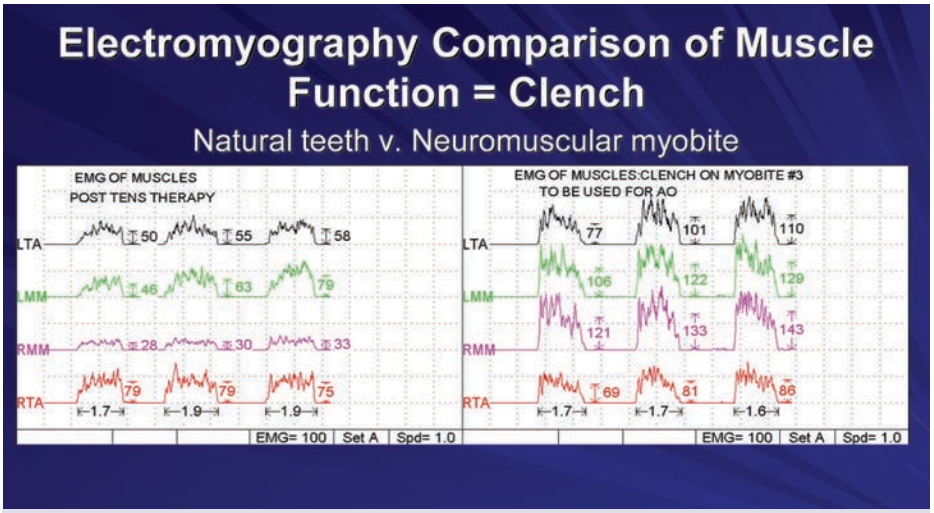


Figure #7
Electromyography comparison of muscles in function during maximum voluntary clench after TENS muscle relaxation therapy. Clench on natural dentition (left) shows weak asymmetrical function. Clench on acrylic bite registration in neuromuscular position (right) shows stronger, more symmetrical activity with masseter dominance over temporalis. Bite registration used to fabricate acetal resin orthosis (AO)

Freeway Space Analysis

Average vertical freeway space measured at the incisor point anteriorly increased from 1.81 to 3.44 mm after TENS therapy at the initial baseline testing. A smaller change in vertical freeway space was observed after three months between pre-TENS (1.33 mm) and after-TENS (1.75 mm) compared to the change in resting freeway space observed at baseline. This was because the corrective orthosis was put in place over the mandibular teeth at the three month test, which corrected for excess freeway space between the natural teeth[47-54] ($p<0.001$, **Table 5**).

Another test of these same parameters was performed for a subgroup of these patients undergoing long-term treatment and was used to validate the accuracy of the bite registration used in the long-term treatment process. These data are not reported in the present study.

Trajectory Analysis

At baseline testing, only 49 patients (15.9% of the test population) had occlusions that were coincident with the TENS stimulated neuromuscular trajectory. In addition, 253 (82.1%) of the patients had over-closures (excess vertical freeway space >2.0 mm), 221 (71.8%) had posterior mandibular displacements and 166 (53.9%) had lateral displacements **(Table 6, Figure 8)**.

After three months of orthosis treatment, when the trajectory of movement (after TENS) from rest to the occlusal position (facilitated by the orthotic appliance) was analyzed relative to the neuromuscular TENS stimulated occlusal position, a significant improvement in coincidence of the occlusion with the neuromus-

Table 5
Mean Freeway Space in mm Between Rest and Occlusal Positions
Determined by Mandibular Tracking Recorded at Mandibular incisors (n=313)

	Before orthosis treatment at baseline (natural teeth)		After orthosis treatment at three month retest (w/orthosis)	
	Before TENS	After TENS	Before TENS	After TENS
Vertical freeway space	1.81±0.15	3.44±0.11	1.33±0.09	1.75±0.09
Anterior/posterior freeway space	0.88±0.90	1.46±0.11	0.74±0.07	0.90±0.09
Lateral freeway space	0.36±0.04	0.61±0.06	0.32±0.03	0.38±0.05

Table 6
Comparison of the Natural Occlusion with Neuromuscular Occlusion Position of the Subjects Studied Before and After Orthosis Treatment (n=313)

Condition	Condition prevalence: Natural occlusion at baseline teeth to teeth No. of subjects and %	Condition prevalence: Therapeutic occlusion at three mos. teeth to orthosis No. of subjects and %	Prevalence changes: No. of subjects w/changes after three mos.	Prevalence changes: % of subjects w/changes after three mos.
Not on neuromuscular trajectory	264 (84.3%)	24 (7.7%)	↓ 240	↓ 90.9%
Over-closed (>2 mm)	253 (82.1%)	57 (18.9%)	↓ 196	↓ 77.5%
Posterior displacement	221 (71.8%)	85 (28.2%)	↓ 136	↓ 61.5%
Lateral displacement	166 (53.9%)	52 (17.2%)	↓ 114	↓ 68.7%

cular trajectory was observed in 140 subjects. This is a positive treatment outcome. There were 196 (77.5%) of the subjects with less negative findings of excess vertical freeway space (over closure), 136 (61.5%) with less posterior displacement, and 114 (68.7%) with less lateral displacements. These too are positive treatment outcomes **(Table 6)**.

Oral appliances in full-time use undergo some attrition and lose some occlusal anatomical form and accuracy that is peculiar to each patient. Because of this, in addition to simultaneous remodeling of muscle, joint and vascular supply during the treatment period, some inaccuracy in the occlusal position of the appliance resulted and became evident at the time of retesting. This was observed by comparing the data obtained with the orthosis in place to that observed testing with the original acrylic bite registration.

Discussion

The findings in this study have clearly demonstrated that there is a physical dysfunctional basis for TMD, which can be corrected by establishing a neuromuscular occlusion and the use of an oral orthosis that provides this corrected occlusion. A drastic reduction of many of the symptoms associated with TMD was observed. Most importantly, this finding confirmed the conclusion drawn by the authors in an earlier extensive survey that a wide range of symptoms and signs are associated with the TMD condition[11] and indicates that this is a major factor responsible for the complexity, confusion, and difficulty of study of TMD.

The present study has also shown clearly that using EMG and mandibular tracking of a TMD patient's neuromuscular occlusion, and correcting such by using orthotic devices, can result in disappearance and/or substantial reduction in the number and magnitude of many of a TMD patient's symptoms. This includes headaches, which in this study resulted in a 91.7% reduction in their prevalence at three months. The significance is that these results support the view that most patients seeking relief from headaches and other painful symptoms are not doing so for psychological, but rather for physiological reasons.

Besides demonstrating that the patients in this study can be effectively and objectively treated, the data demonstrate that, the TMD patient on average has (1) elevated resting EMG activity in mandibular postural muscles, (2) weak and/or asymmetrical functioning of their masticatory muscles, (3) temporalis over masseter dominance when exercising maximum voluntary clenching of the teeth, and (4) occlusion of the teeth

that is not coincident with an optimal functioning neuromuscular masticatory system.

The data also demonstrate that TENS lowers the resting EMG activity and enables the identification of a neuromuscularly directed therapeutic occlusion with significantly improved muscle function. They also show that treatment with a neuromuscular mandibular orthotic device enables functional parameters related to mandibular and masticatory function to be brought from a less to a more physiological state. This should be the goal of good treatment and this study has demonstrated how and why it should be done.

Earlier studies identified the parameters of a physiological state for the masticatory system.[34,55] The data presented in the present study have demonstrated in 313 patients that a less physiological state can be moved to a more physiological state through the diagnostics and treatments used in this report.

Some of the patients who were treated successfully for TMD, as described herein, elected to undergo long-term treatment to perpetuate the altered neuromuscular state achieved. The treatment consisted of full or part-time use of removable orthotic appliances, dental restoration of certain posterior teeth, orthodontic treatment and in a very small number of cases, TM joint or orthognathic surgery.

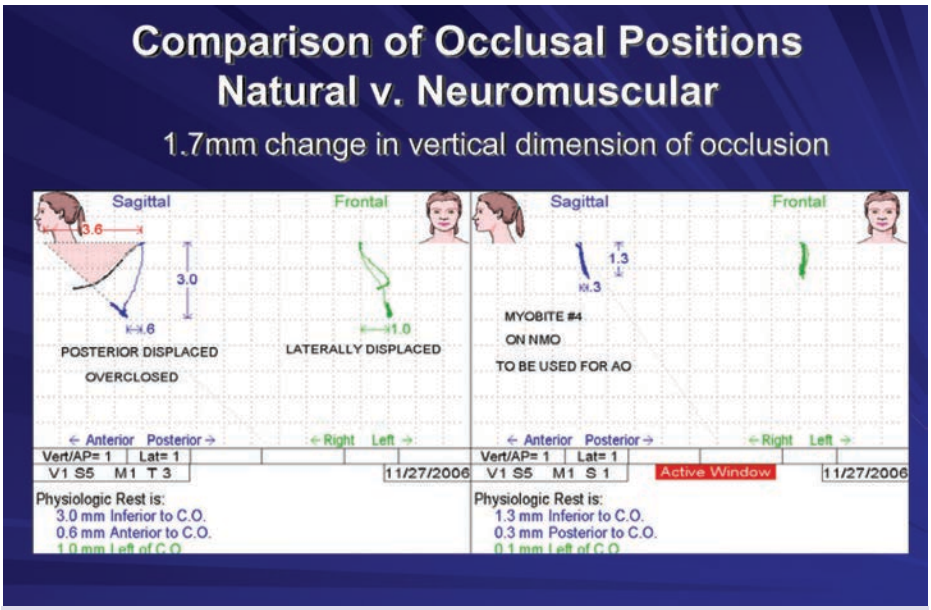


Figure #8
Comparison of occlusal positions after TENs natural (left) and neuromuscular (right). In these two sets of sagittal and frontal views, the TENS stimulated trajectory of mandibular movement from rest position creates an arc, which ends at the neuromuscular occlusion position (NMO). The patient then voluntarily closes to the natural occlusal position (CO) on the left recording and to the neuromuscular position on the right recording. Left: natural occlusion is overclosed, posteriorly and laterally displaced v NMO. Right: with bite registration voluntary closure and TENS stimulated arc are coincident (CO=NMO) Vertical dimension has been increased 1.7 (measured anteriorly)

Conclusion

TMD is generally associated with abnormalities of mandibular and masticatory muscle function. Dentists have traditionally evaluated patients relative to a functional versus a dysfunctional state based on patients' subjective symptoms and a dentist's visual and palpable observations. By using precise computerized measuring devices, it was clear that objective rather than subjective measurements could be made to augment such diagnoses and as a consequence to carry out more complex and precise treatments.[56,57]

The data presented in this study demonstrate that EMG and mandibular tracking devices in conjunction with low frequency, low voltage TENS can be effectively used to establish a neuromuscular physiological occlusion and through the use of fabricated neuromuscular occlusion orthotic appliances, relieve painful and unsatisfactory TMD conditions. This approach has demonstrated that drastic reduction in the magnitude and number of TMD symptoms can be achieved in a relatively short period of time.

This is consistent with the ultimate goal of therapeutic intervention, which is to bring patients from a less healthy to a more physiological and healthy state and to reduce the need for medications to control pain which at best can only be a temporary and incomplete solution.

Acknowledgement

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Ask Heidi

Q

Dear Heidi,

We have several patients that snore and are asking us if we can help them. A show was on TV in our area and said that "your dentist might know about ways to stop snoring". What appliances work and where does our doctor learn this?

Thanks,
Megan
Team Member, San Diego, CA

A

Dear Megan,

Sleep and breathing disorders are serious and more common than you think. Snoring is the first sign that someone has a problem. The bigger issue is they may have sleep apnea. To keep it simple, Apnea is basically when a person stops breathing during their sleep. This can happen hundreds of times during the night. You can imagine you would not be getting much oxygen to your system if this were occurring and your quality and quantity of sleep would be poor as well.

There are about 12 million Americans that suffer from this, according to the National Institute of Health. Sleep apnea sufferers may have high blood pressure, cardiovascular disease, memory problems, weight gain, impotency, headaches and other issues.

Fortunately this can be treated and there are many options that exist. Your doctor could be literally extending and saving lives by properly screening and treating patients who have this condition. I would strongly recommend taking Dr Kent Smith's course at LVI on Sleep and Breathing Disorders. It will get you on a path to helping these patients in just a few short days. I have personally taken the course and found I was helping my patients right away with solutions. Call LVI at 888.584.3237 for more info.

Heidi

Q

Dear Heidi,

I have a dental invention that is cool! Of course, I cannot tell you what it is or someone will steal it but, I know it would be big in our field. It is something I came up with after 20 years of practice and "jerry-rigging" my own equipment to make a procedure easier. (I figure if someone can invent a stick to put in your Starbucks cup to keep it from spilling…that I need to do something with my invention as well!) I am seriously so excited about it. I have drawings and a prototype but I have not patented it yet. Do you know of anyone in the dental field that I could go to regarding this invention? My wife says I should go on the show, American Inventor but, I thought I'd ask you first! Thanks for your help. I hope you pick my email and answer it in Visions.

Thanks,
Dr. S.E., Inventor Extraordinaire

A

Dear S.E.,

Or should I say, 'Dear Inventor Extraordinaire'! I had so much fun reading your email. You are obviously excited about your invention. So many people I know come up with great ideas and do not have the energy, time, resources, and/or connections to see that idea become something great. You are in luck! Bill has joined with a group of 65 international opinion leaders and industry experts to help people just like you! Just email **ideas@dentcubator.com** to get started.

Whether you have an original idea, need a patent or have a patent but need a prototype, or have all of these but need distribution, this group can help you. And when you become a big wig inventor please don't forget us…the little people that were here for you.

Good luck and keep us posted.
Heidi

Q

Dear Heidi,

Our office has a sterilization center located between all our ops. We have a small refrigerator that is supposed to be used for materials that need a cool environment. So, what's the problem? Well, I am very frustrated. Everyone in the office keeps putting drinks and food in there! Just today there was a turkey sandwich right next to a bottle of bonding agent! I have discussed this several times w/ the team however, they just laugh it off. What do you suggest? I don't want to make anyone mad at me…but I think the situation is unprofessional.

Thanks for any advice,
Sarah
Dental Assistant, Iowa

A

Dear Sarah,

Your problem is more common than you think. Many offices lack any sort of polices regarding food/drink in the operatories, lab, or sterilization areas. I'd first look into OSHA rules and regulations to see if any apply and present these to your team. Doing so might stop the problem immediately. Next I'd talk to the doctor and have a written office policy regarding food and drink in these areas put into effect. That way everyone will be on board with what is expected of them. If the office does not have a refrigerator or break room for the team, maybe you can discuss this with your doctor as well. Lastly, you may want to explain to the team that it is for their own personal benefit not to put consumables near things that contain bacteria, chemicals, or toxins. After all, if something were to get into what they were eating or drinking they might get very sick!

Keep in touch with the outcome,
Heidi

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PRODUCT REVIEWS

Mark Duncan, DDS, LVIF

A 1995 graduate of the University of Oklahoma, Dr. Duncan vigorously pursued continuing education to grow beyond what was taught in dental school; twice being recognized as the leader in Oklahoma for Continuing Education. He completed the surgical and prosthetic sections with the Misch Implant Institute earning a Fellowship with the Institute as well as holding Diplomate status with the International Congress of Oral Implantologists. He has also earned the Fellowship with the Academy of General Dentistry in the shortest time period allowed by the Academy. He considers his real advance in education to have started with his journey through the Las Vegas Institute where he earned a Fellowship and currently works full-time as Clinical Director. Dr. Duncan is a member of the International Association of Comprehensive Aesthetics (IACA) and holds a position on the Board of Directors.

D.T. Light-Post Illusion

A friend's wife needed a tooth retreated because it had broken loose from the bulk of the core and was retained only by the post in the root. Initially, the tooth needed a post because of the amount of tooth missing. The tooth was built up and restored with a PFM. While this is not normally exceptional or unique, issues can stem from the materials that are used. A metal post was used and along with it the typical complications are expected. When the treatment is successful it does not make a significant difference what material you choose for placement however, when it does not perform appropriately several complications can arise: difficult removal, tooth extraction and/or fractured root. What we need to examine is the reason behind these complications and if they even need to happen in the first place.

In the example, the cement retained crown was only cemented to the post and some of the core. It had broken loose from the bulk of the core and was retained only by the post in the root. Being tooth number two, access is difficult. The challenge is to remove the crown from the post or the post from the root without breaking the root and forcing this woman to lose a molar. Oftentimes this procedure seems simple until you are knee deep in trying to get it out and that dreaded bead of sweat drips from your forehead. You become increasingly worried that the post may fracture the root or other issues may arise should it come out. The longer that pressure is applied to the tooth, the more likely it will be

that the periodontal fibers are traumatized. The patient could suffer post operative discomfort and potentially end up with a fracture through the furcation. This result would force the removal of the tooth anyway.

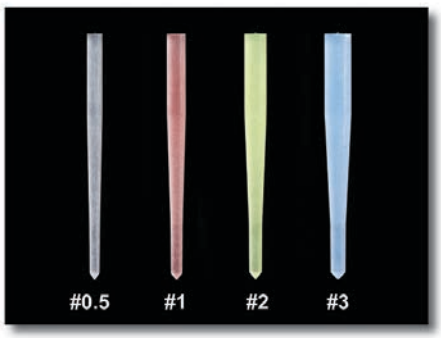
Wouldn't it be awesome if there was a post that could be easily placed, and actually bonded in place? Imagine a post that can bend and flex with the tooth structure and not put the root at risk of fracturing under load; a post designed to allow for easy identification and removal if the need arose. Bisco has created such a product - D.T. Light-Post Illusion. The primary reason to use a post is to retain the core. The ideal core material to use would be bonded to the tooth and it makes sense to have a post system as narrow as possible to eliminate weakening the root system and have it bonded to the internal of the roots. The resin post systems are able to bend and flex with the tooth structure because of the similarity in their modulus of elasticity to dentin. The huge advantage is significant reduction in fracturing the root at the apical third where the tip of the post is. Bonding to the tooth will create a unified support system in the core and retain the final restoration. A unique feature of the D.T. Light-Post is that it has a dual taper design which allows it to more readily adapt to the root contours and be widest in the body of the core. With this resin post bonded into the tooth, you can create a core buildup that becomes an ideal internal support. Using the D.T. Light-Post would have eliminated the frustration and sweat experienced with the failure and retreatment of tooth number two in the example.

Ideally, the product should be easy to use and straight forward. Patients typically do not appreciate their doctors reading the instructions as they place these new materials. Bisco's D.T. Light-Post is color coded so that the size can be easily identified by matching the color on the post drill to the color of the post. Unlike the post design that engages the root from within or hollowing out the root to build a cast dowel core, the literature supports placing the thinnest post possible as long as the apical seal can be maintained and there is adequate length of the post to resist the leverage created by the crown. A general rule of thumb is 3-4mm of intact seal or gutta-percha and a length at least equal to the height of the crown. The D.T. Light-Post has a single drill system for preparing the post space that is colored to match the post.

Once the post space is created, the D.T. Light-Post is checked for length and then trimmed to size with a diamond wheel. As with all resin posts, once it is placed, the core is built on top and the restorative procedures can continue. In addition, a dual-cure luting resin should be used so that it is bonded in place. Etch and rinse verses self-etch will be addressed in a future article however, Bisco's adhesive is the neutral pH that allows the use of one bonding agent under both light cure and dual cure resins. The seated post can be identified easily as it has excellent radiopacity. A D.T. Light-Post used in the tooth example would have eliminated the need for retreatment.

Bisco has really thought outside the box because the Illusions part of the D.T. Light-Post system is that the resin changes colors! At room temperature the resin is the color of the corresponding drill. It is available in blue, yellow, red and black. This is

very handy for sizing the post. What is exceptional is that at body temperature, the post warms up to turn a translucent white. Now the esthetic show-through of the post is eliminated because it picks up the color of the core. In an esthetic adhesive practice, this is absolutely essential.



On average, about one in four endodontic treatments have to be retreated. While the majority of treated teeth do not require a post, teeth that are more broken down do require a post and likely comprise the bulk of the retreatments. A retreatment is simplified when the post can be easily removed. Out of the choices available, the metal, zirconium and carbon rods are difficult at best. Resin posts are easier to drill out without destroying the root structure however, they are difficult to see. Bisco created the D.T. Light-Post Illusion line so that with a cold water spray the color actually comes back! Simply cut the core down enough to see the top of the post and then spray it with water to recover the color. The D.T. Light-Post has a carbide starter drill that allows for a drop down with the post removal drill to remove the whole post and prevent trauma to the tooth and potential fracture. How amazing is that? Had this been the post placed in the example, not only would it have been less likely to break loose, but it also would have been much easier to remove. Additionally a back up in the doctor's schedule, stress placed on the doctor and peri-apical trauma and swelling could be avoided.

All things considered, the D.T. Light-Post should be your first choice. It is exceptionally easy to use and protects the integrity of the remaining tooth without compromising esthetics. If it ever needs to be retreated, it is safe and simple to do. If you place posts in your practice, you should get the intro kit from Bisco. You will love it! If you do not place posts, introduce your Endodontist to D.T. Light-Post as it makes it much easier to know where you are with the restorative procedures when you can easily identify the post (bisco.com, 800.247.3368). As I write this, the patient in the example is still sore and although she is getting better each day, it could have been avoided had the initial treating doctor used the D.T. Light-Post and a bonded core. This is on your must-have list!

NM Companion

The largest challenge when incorporating new approaches and techniques in the office is being able to discuss them. Clearly some are a trade secret and in other cases the patient does not need to know or may not care to know. However, when you begin offering new services such as orthodontics, implants or neuromuscular evaluations you and your team will need to be able to discuss them with patients. While some things will be simple to educate patients about others require more resources and training. Neuromuscular Dentistry is an area where it is imperative that both doctor and team have been formally educated and trained.

The dental team plays a pivotal role in the occlusal screening process so, it is important for team to attend training right alongside the doctor. Not only will this help to move the practice past the natural resistance to change, it will create informative and productive patient screenings. Follow-up training in the office is the second step to implementing change

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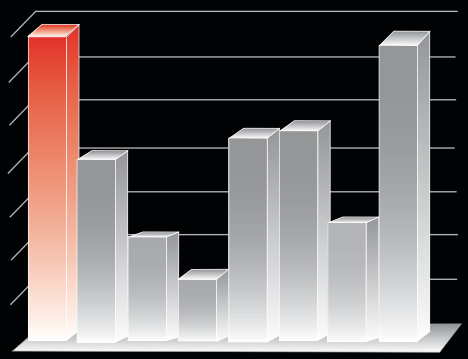

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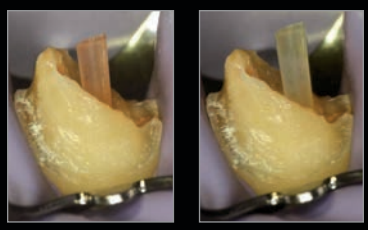
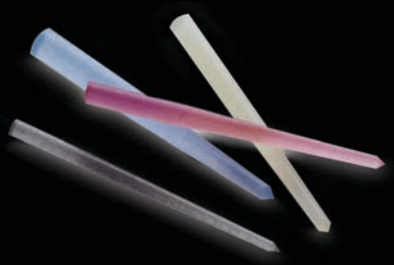


Place post (left). Color disappears and post becomes translucent (right).



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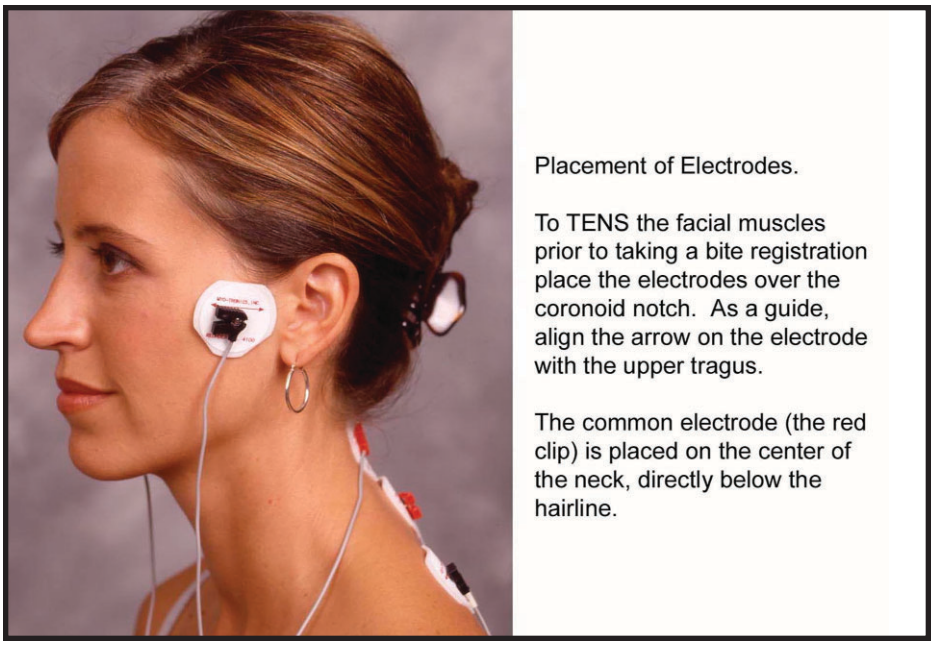


Placement of Electrodes.

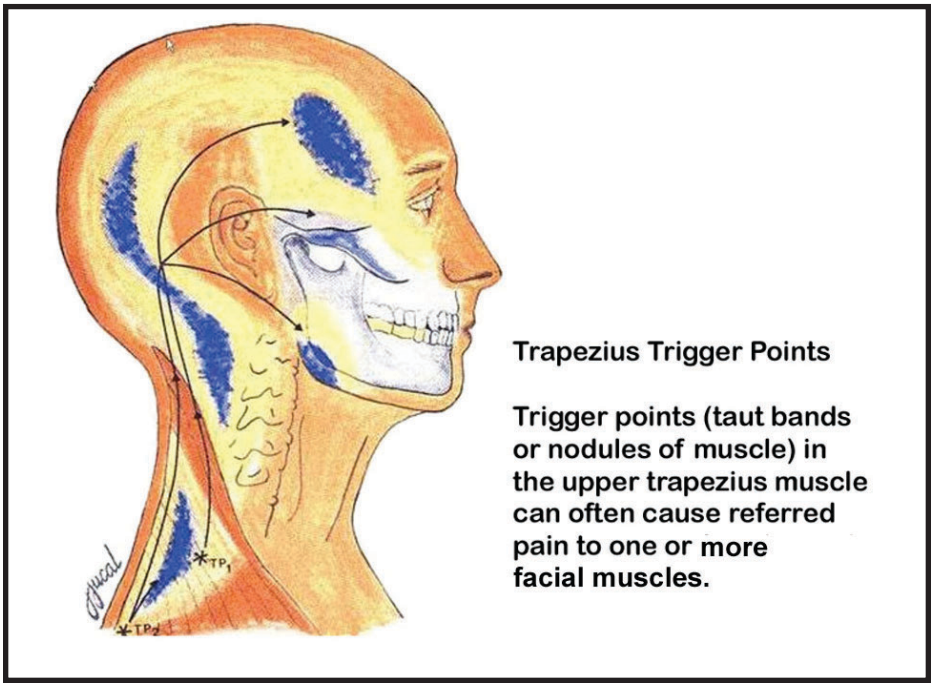
To TENS the facial muscles prior to taking a bite registration place the electrodes over the coronoid notch. As a guide, align the arrow on the electrode with the upper tragus.

The common electrode (the red clip) is placed on the center of the neck, directly below the hairline.

and bringing the team together to support the doctor.

Myotronics, one of the foundational leaders in Neuromuscular Dentistry, has developed a phenomenal in-office software program. It is the NM Companion. Not only does the software provide access to a wealth of knowledge for the team but it allows for transferring that information in a format suitable for patient education. The NM Companion has forms in which to record and print out patient issues and complaints. The LVI Golden Vertical Calculator is also included. Simply enter the patient's Shimbashi and central width measurements to reach the target bite change and LVI Golden Vertical. Videos are available to illustrate trigger points and why a tooth that hurts does not necessarily need to be endodontically treated. Photos representing muscle groups help to describe what could be occurring with these tissues. An educated patient is more likely to accept treatment when they understand what is happening with them and can appreciate the value of the treatment plan.

The NM Companion is not just a knowledge library; it is an interactive teaching and management tool in which both occlusal screenings and protocol can be built. By using its applications the team can identify patients that will benefit from Neuromuscular Dentistry. On average, one in five patients experience pain or suffering and would benefit from accepting neuromuscular support. An office seeing ten patients a day could uncover two people each day that would benefit from occlusal screening. Under this example, working 12 days per month equates to 24 people who could benefit from Neuromuscular Dentistry. The bonus is that most of them will be existing patients. They already like you and your team and trust your opinions. If just one in four accepts orthotic therapy; then six patients per month would move forward with treatment. That is 72 patients a year. At $1500 for orthotic therapy alone, that translates into six figure increase for the



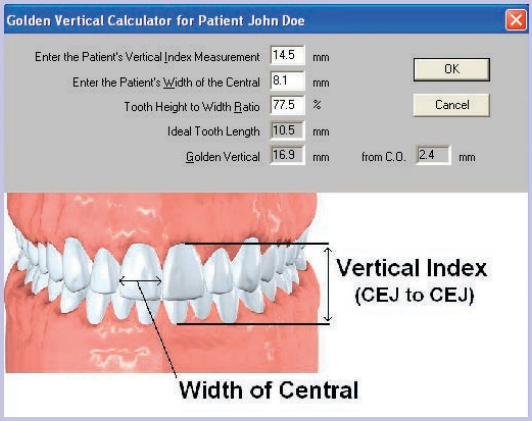
Trapezius Trigger Points

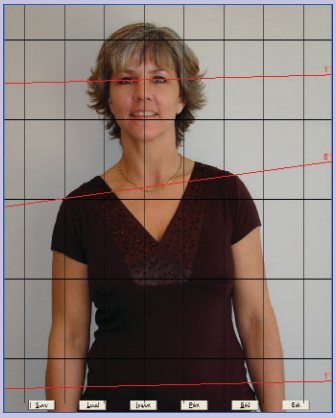
Trigger points (taut bands or nodules of muscle) in the upper trapezius muscle can often cause referred pain to one or more facial muscles.

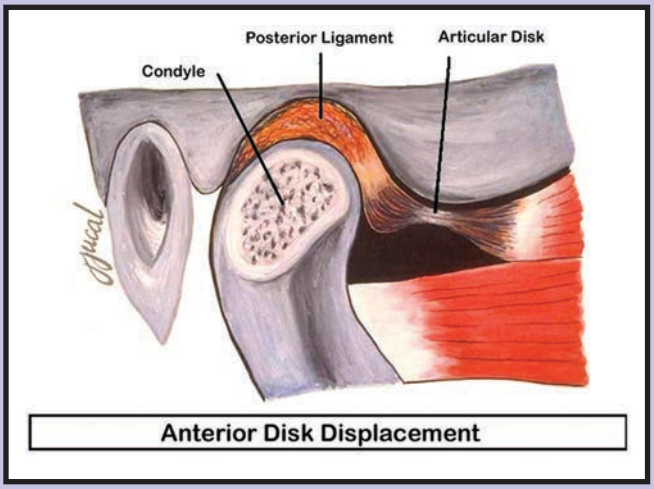
year! As you become more comfortable with talking to patients about treatment and philosophy these numbers will continue to increase. The NM Companion will play a significant role in your best efforts to identify and educate patients.

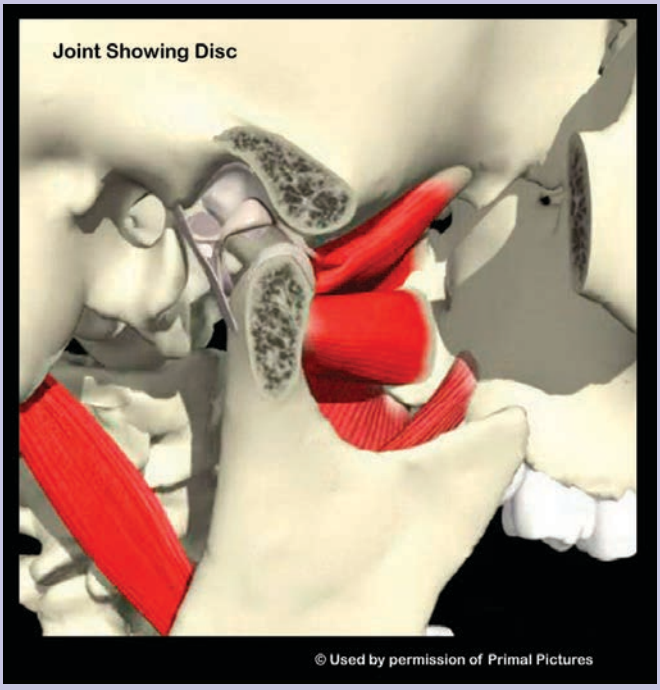
The patients that are helped with Neuromuscular Dentistry will share their incredible stories with you. They will talk about how you eliminated pain that they have suffered with for decades. They will become missionaries for the services you provide. The NM Companion can help you in these areas too. Template letters can be customized and sent to patients, specialists and other referral sources. Build your practice by harnessing the marketing power of word-of-mouth (referrals). Not only can your patients expose you to new potential patients but you can provide better service by referring to other professionals. The tools in the NM Companion make this process simple.

The NM Companion is the perfect companion to grow the neuromuscular component of your practice. Your very next neuromuscular case will more than pay for the cost of the software. Whether you are new to Neuromuscular Dentistry or seasoned, this product will make a significant difference in your practice. Contact Myotronics today and order the NM Companion (800-426-0316 or www.myotronics.com).









REAL-WORLD MARKETING

The Power of the Infomercial

Infomercials are back and back in a BIG way. In fact, they never really left, they just sort of fell out of favor for awhile. Companies, always looking for faster, easier methods to get their advertising messages across turned to shorter commercials and alternate methods like print, web, and the radio to meet their needs.

"But wait, there's more!"

The truth is that infomercials have gotten somewhat of a bad rap. Often considered cheesy, campy, or cheap, their over-exaggerated acting and constant repetition is a turn off to some people. However, more often than not, those infomercials actually work, selling products in large quantities with surprising speed.

Recall the early days of infomercials when Ron Popeil touted the newest, hippest, greatest products that were just guaranteed to make our lives easier? The Veg-O-Matic made its debut in 1963. "It slices, it dices" became a household line. And who can forget the now-ever-famous, "But wait, there's more!" and "You've got to see it to believe it" lines? It was the beginning of a whole new era in advertising that gave way to such famed infomercial stars as Jack LaLanne and his Power Juicer™ and product guru Billy Mays, famous for his OxiClean®, Orange Glo®, and Kaboom® sales pitches. Nowadays, As Seen on TV™ products are a dime a dozen, with products to peel your potatoes, core your apples, slice your eggs, make circus-shaped pancakes, blend your drinks, get you in shape, make you beautiful, or enhance your life.

But all of this infomercial craziness isn't just hype. The people providing these products and services have made a lot of money and done so with astounding quickness. Infomercials have given way to entire TV networks, like the Home Shopping Network (HSN), ShopNBC, and QVC. QVC infomercials play round-the-clock, 24/7 365 days a year. In 2006 they reported a net revenue of 7.1 billion dollars. Yes, that's right— 7.1 BILLION.

There is a method to the madness. And it centers around one main thing: know your audience.

In 2007, George Foreman reported that over 80 million George Foreman Grills™ have been sold, netting him a cool $150 million—far more than he ever made during his professional boxing career. Part of his astounding success was targeting the male market in a way that made his product appealing and masculine. Who better to attest to quality of a manly-yet-efficient grilling machine than a tough, powerful, force-to-be-reckoned-with boxer?

Veg-O-Matic

Thigh Master

You're probably asking right about now how all of this relates to dentistry, particularly cosmetic dentistry, and the connection is actually quite simple. It's no secret that women are the primary spenders when it comes to home shopping, personal care, and health. If you can entice them to buy your product or service through smart, well-budgeted

Captivate your audience at strategically targeted times

advertising like an infomercial, well, you can deem it a success. When it comes to dentistry, women are the primary points of contact for making dental appointments for family members and are the largest investors in cosmetic dentistry. Just like the famed "If you build it they will come" line from Field of Dreams, "If you air it, and air it well, they will buy."

Just think of the Proactiv® skin care and Sheer Cover® mineral make-up infomercials, which have sold millions upon millions of products since they first came out on the market. The makers of those infomercials knew their audiences well, strongly advocating their products' ease-of-use, effectiveness, and guarantees for enhanced beauty (and thus quality of life). Typical infomercials run late in the evening and early morning, captivating their audiences when there is little else to watch. Restless sleepers, late-night moms, the elderly, and early-birds waiting for the news are easily reached through these non-prime-time airings.

It's a given that both women and men care about how they look. In fact, it is estimated that Americans spend over 8 billion dollars a year on cosmetics, and based on statistics from 2004, over 81.5 billion dollars a year on dentistry, with an additional 2 billion a year spent on dental products like toothpaste, mouthwash, and dental floss. Combine the expenditures for both cosmetics and dentistry and you've got significant interest and a deep pocket for aesthetic enhancements. The money is there for dental care, even cosmetic dental care, during in a recession.

So how do you make an infomercial for dentistry? Just ask the LVI Branding Campaign, the first group in dentistry to defy perceived limitations on cosmetic dental marketing by creating a dental infomercial. More than just a plug for the tooth whitening procedures typically seen on TV and set to air for 30 minutes, the high-quality, high definition LVI Branding Campaign infomercial will feature real patient testimonials and before and after images. After all, what is more effective than showing actual patient results?

Broadcasted at targeted times, the LVI Branding Campaign infomercial has the potential to reach millions of prospective patients. With the lights dimmed and images of real-life cosmetic dental enhancements before them, it's not long before the people watching will begin to evaluate their own smiles and decide that it can't do any harm to at least call and set up a consultation. And who better to contact than world-renowned LVI cosmetic dentists? By then the prospective patients will have clearly

"Clap on, clap off"

seen the astounding smile makeovers and transformations that these dentists can create. Not to mention that the LVI Branding Campaign infomercial is also designed to be customizable for individual Branding Campaign dentists to air in their own local markets. Now that is truly tailored advertising!

Compare the cost of running one 30-minute infomercial in a non-prime-time slot with the cost of running sixty 30-second commercials during prime time and the savings are astounding.

Infomercials have the ability to do what most short commercials, print ads, and web advertising can't and that's repeat their messages and contact information again and again. If you're familiar with marketing than you already know that repetition and top-of-mind-awareness is key to advertising success. Additionally, infomercials are often presented as abbreviated "shows" or forms of entertainment as you may have it. People watch with expectations of being presented with a beginning-to-end broadcast.

Better yet, these infomercials, emblazoned in our minds, stay with us for years to come.

Remember Suzanne Somers Thigh Master? What about Ginsu knives, the Bedazzler™, or Bowflex®? How about Tony Little's Gazelle™, the workout series The Firm®, or the Ronco™ "Set it and forget it!" Rotisserie Oven? And who can forget such classics as the "Clap on, clap off" Clapper®?

If you've watched TV on almost any national network recently than you've most likely seen an infomercials for the Snuggie™, the blanket with sleeves. At first glance most people laugh it off—until they learn that in just under a year the company has reported selling over 4 million of these sleeved fleece wonders.

While some may be cheesy and others offer enough repetition to drive you mad, the simple fact is infomercials work and they're bigger than ever. With entire networks dedicated to them, it's time that dentistry breaks into this rapidly growing market. Not every infomercial has to be 30 minutes nor does it have to be tacky. They can be done with class and elegance and directed towards a targeted audience. Dentistry, and groups like the LVI Branding Campaign, have the ability to utilize the best that infomercials have to offer and create them to be unique, appealing, and informational. The potential is there, we simply have to seize it.

Michael D. Silverman, DMD, DDOCS, DICOI, is an internationally-recognized dental educator, business leader, marketing expert, entrepreneur, speaker, and author. He is the President of b2d Marketing (b2dmarketing.com), a dental and medical business marketing company which manages and facilitates the LVI Branding Campaign along with many other high profile clients. Always at the forefront innovation, Dr. Silverman and b2d Marketing have helped launch and maintain the success of some of the most premier dental and medical products and services on the market today.

Dr. Silverman also serves as the President of RAMP (rampresults.com), the largest dental practice marketing agency in the U.S. Additionally, he the Co-founder and President of DOCS Education (DOCSeducation.org), an organization that provides continuing education training, products, and membership to dentists and team on sedation dentistry and emergency preparedness. Dr. Silverman can be reached at Michael.Silverman@b2dMarketing.com.

STRAIGHT

A potpourri of questions and thoughts on Orthodontics and Neuromuscular Dentistry

Four Bicuspid Extractions in Orthodontics – This commonly practiced technique which is used mostly by orthodontists, has come under much condemnation recently. Many neuromuscular practitioners say that the technique does not provide for stable occlusion and less than ideal facial esthetics. Many of these same critics recommend a 'functional' or neuromuscular approach to treatment.

Complaints include; 1. The technique often fails to address the arch development and vertical corrections associated with Upper Airway Obstruction. 2. TMD symptoms appear to be prevalent in many patients before and after treatment. 3. There is no good research to demonstrate that the technique helps to alleviate TMD.

The NM clinician further questions; "Does this technique fit into the NM philosophy taught at LVI?" When comparing we should first observe lateral and frontal facial profiles that project less than of full dentitions and with an absence of complete wide smiles in the vast majority of extraction patients. The extraction profile is one that does not usually fit a facial type similar nor identical to the LVI Golden Proportion.

When one compares NM treatment goals to that of Tweed (4-biscupid) you will immediately see a vast disparity in width and length of the dental occlusion. The Shimbashi measurements are often less than measurements for an esthetic functional occlusion.

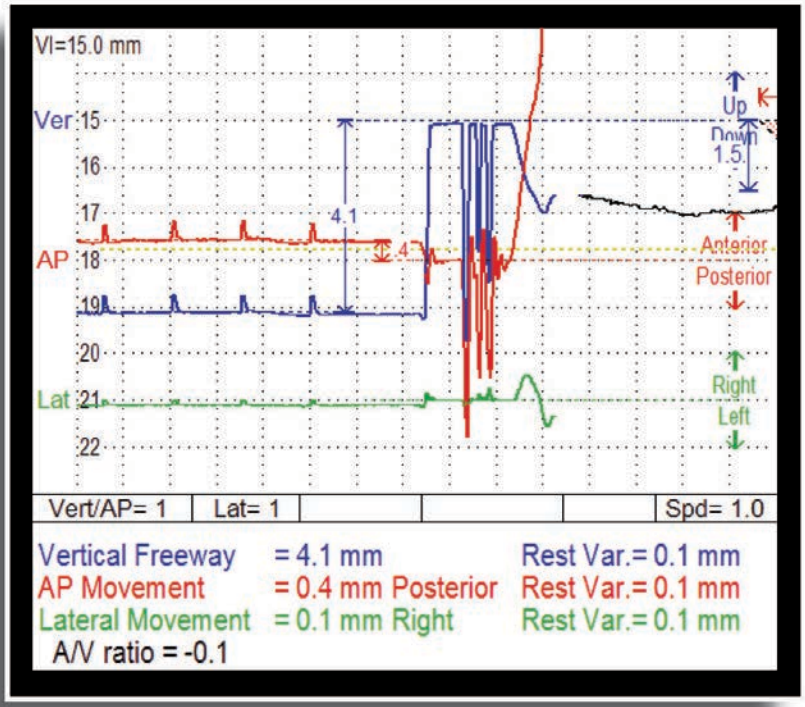
In the extraction faces we observe a lateral profile that is weak or 'sunken-in'. This type of face often resembles that of a much older individual and one that frequently has a retruded mandible when compared to the anterior maxilla position.

Class I Occlusal interferences are regularly present in these individuals. Additionally, we often observe patients with deficient lower facial heights and anterior deep dental bites that promote TMD and NM dysfunction.

TRACKS

RECOMMENDATIONS BASED ON A NEUROMUSCULAR PERSPECTIVE

JAY GERBER, DDS, FICCMO, ABPM
Director Neuromuscular Orthodontics LVI Global



Note: Rest Variances of 0.1 mm in the scan shown. Sweeps are flat, individual pulses are uniform and consistent. The patient is relaxed and positioned for the EMG Bite Registration. RV is the measure of the difference in mm between the highest and lowest point when the patient is pulsing; excluding the spike of the pulse.

Forum Post: Removing orthodontic brackets that were placed by someone else – First, the patient and parents, if patient is not of age, must sign a release. This instrument should be written by your attorney and it should state specifically why the patient wants to discontinue treatment.

Many times patients and or parents simply do not want to continue and are being confronted by the orthodontist or they have issues with the doctor providing the service. These issues may include failure to keep-up with payments, missed appointments or they simply cannot afford to proceed further with treatment.

I currently charge $500 for this service when patients are not of record and they must sign the release form. You may want to contact whomever is providing the original service before proceeding. Remember you must have a release from the patient/parents before contacting other providers.

Recording Resting sEMG and Rest Variances – Many doctors attempt to record the perfect EMG data but start with the patient improperly-seated or positioned. Attempts to

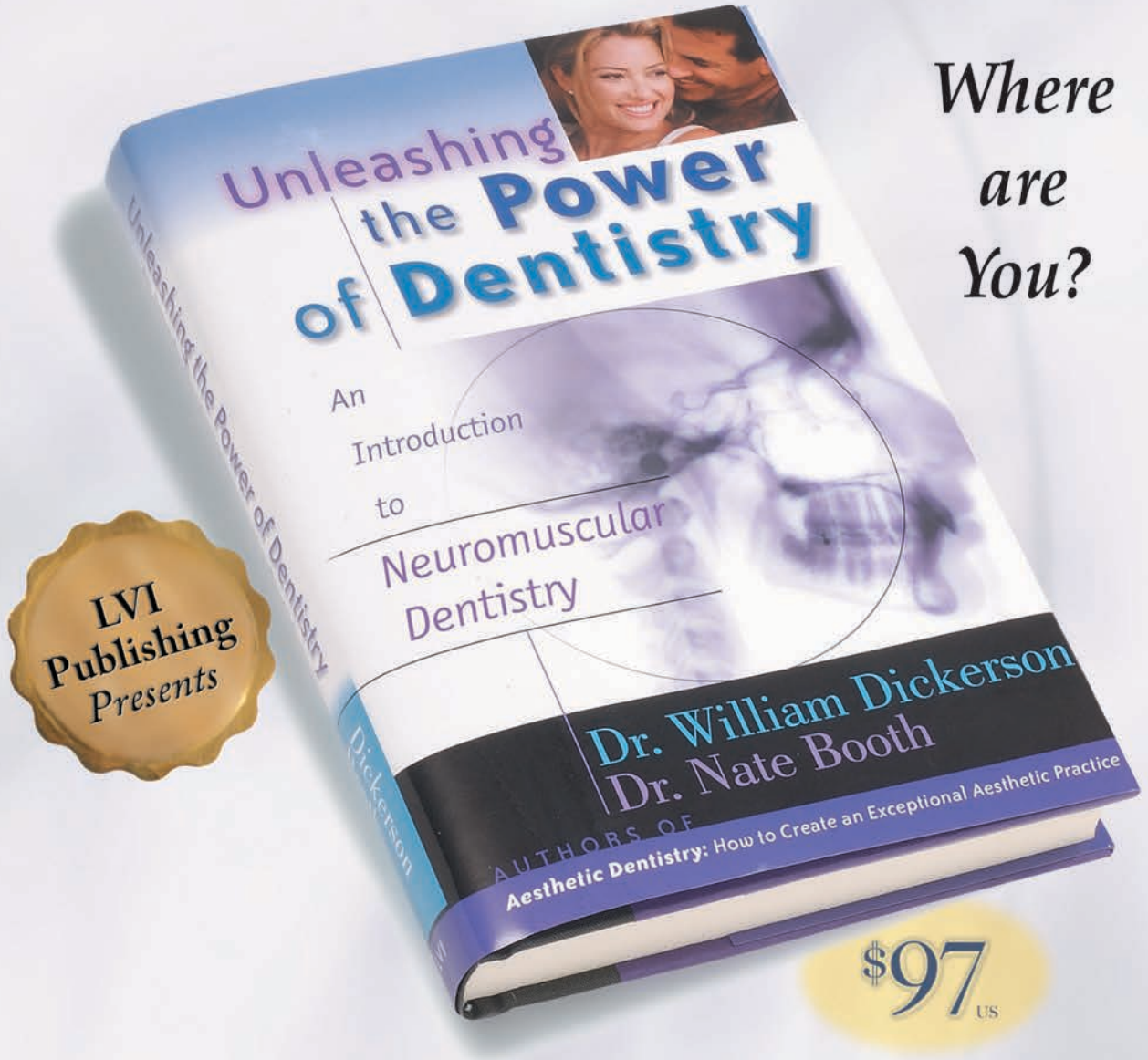
record accurate data may include: standing of the patient, turning out the fluorescent lights in the room, maintaining quiet surroundings, closing the eyes, and no sugar or coffee before the bite registration appointment.

Several points stand out, including correct or ideal postural positioning. Foremost, the patient's head must be stabilized in an upright position after they have exhaled a deep breath. According to Rocabado this is the natural posture from which to evaluate the craniocervical features.

Another critical point is the evaluation of the Rest Variance when taking the bite registration. All three sweeps (Vertical, AP and Lateral) should be relatively level or flat on the screen from left to right as they are recorded. The individual variances from the starting baselines should not exceed 0.2 mm but 0.3 mm is acceptable. We will use 0.3 mm for the AP in the initial bite registration only on ascending craniocervical dysfunctional patients. As manual therapy continues for a number of weeks or months it will be necessary to rebase the orthotic.

Dr. Gerber is the Director of Neuromuscular Orthodontics at LVI Global and serves as the Clinical and Educational Director of the Center for Occlusal Studies. Dr. Jay has clinically treated 1,000's of patients since the early 1980's using the principles of Neuromuscular Dentistry. He has designed and used the Gerber EMG Orthosis in his private practice, which is devoted to treatment of orthodontic and TMD patients. Dr. Gerber is recognized as an early innovator of neuromuscular functional orthodontics and for the applications of the 'EMG Guided' bite registrations. Dr. Gerber has made a commitment to stable, pain-free neuromuscular correction and long-term occlusal stability. He currently maintains a private practice in Parkersburg, West Virginia.

THE FUTURE OF DENTISTRY IS HERE.



Where are You?

- *Why are so many dentists adopting the neuromuscular approach to dentistry?*
- *Why are those that are skeptical being convinced of its value?*
- *Why are many so successful in implementing these concepts into their practice?*
- *Why is case acceptance higher with neuromuscular dentists?*

It's all here in this comprehensive book on this fascinating subject. ***Unleashing the Power of Dentistry: An Introduction to Neuromuscular Dentistry*** by Drs. Bill Dickerson and Nate Booth can show you how to enhance patient care as well as increase your practice success and professional fulfillment through the practice of neuromuscular dentistry.

This amazing book:

- introduces the basics of neuromuscular dentistry
- uncovers the myths surrounding the science
- features 16 success stories of neuromuscular practices told by the dentists themselves
- shares marketing and case acceptance secrets
- shows you how to implement change in your practice

Order your copy today - call **888-584-3237** or visit our web site **www.lviglobal.com**

Differentiation of Obstructive (OSA), Central (CSA) and Complex (Mixed SAS) sleep apnea syndromes

A Pilot Study

Norman R Thomas DDS, PhD, O.Path.MD, BSc.MB (Anat), FRCD(C), DAAPM, AAOMFP, MICCMO Director of NM Research

William G Dickerson DDS, FAACD, FICD

Shamshudin Kherani DDS, FAGD, LVIM Clinical Director

Las Vegas Institute For Advanced Dental Studies

There are three types of sleep apnea: obstructive apnea with collapsed upper airway and tongue intrusion into the oropharynx (OSA) Figure 1; central apnea in which respiratory drive from the respiratory center in the medulla is corrupted or failed (CSA), and mixed or complex (SAS) sleep apnea in which there is both obstructive and central components.

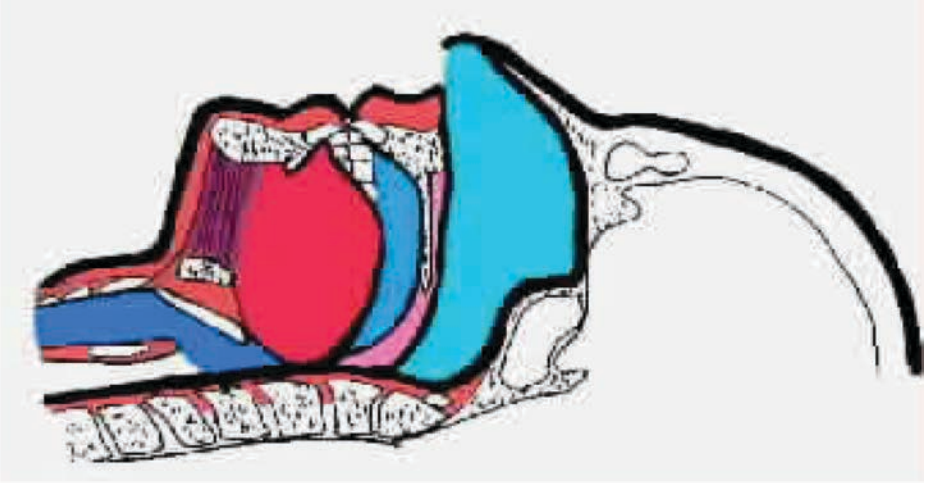


Figure 1
Obstructive sleep apnea.
Note upper airway collapse.

OSA and SAS are characterized by recurrent episodes of upper airway collapse and respiratory arousals (Figures 2 and 3).

These histograms from Morgenthaler et al.(2006) purport to show statistical trends between the various forms of respiratory, non-respiratory, REM and NREM arousals and their AHI indices, however the in-group and between group variances obfuscate their diagnostic significance. Note that total arousals, including NM problems, are more than twice those due to respiratory arousal. Such NM arousals include snoring, nocturnal bruxism and clenching.

It is also noted that mixed or complex apnea (SAS) in which there is a combination of obstructive and central apnea is associated with more severe AHI. This indicates that a combination of OSA and CSA results in more severe central hypoxia and hypercapnia. By extrapolation it is seen that untreated chronic obstructive apnea leads to central hypoxia which may progress to suppression of central respiratory control mechanisms through failed synaptic transmitter and/or respiratory neurone apoptosis, necrosis and death.

It has been estimated that 80% of obstructed apnea patients are not properly diagnosed and improperly treated. Hence by the time that the demise of the patient becomes inevitable the obstructive apneic becomes more severely hypoxic and the question is raised; Does the mixed apneic become a centric apneic where the tongue becomes intruded into the airway due to differential hypoxia of the hypoglossal nucleus which balances tongue retrusion by styloglossus predominance against tongue protrusion by genioglossus hy-

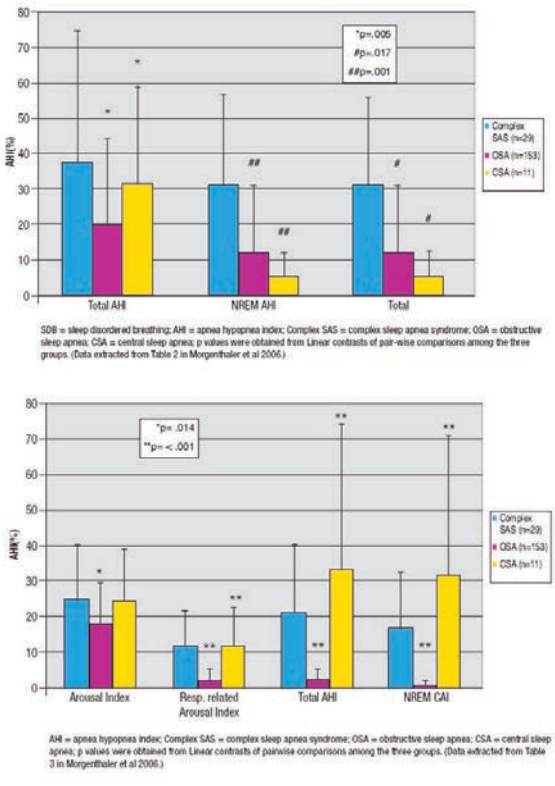


Figure 2 and 3
Apnea Hyperpnoea Indices (AHI) for OSA, CSA and SAS

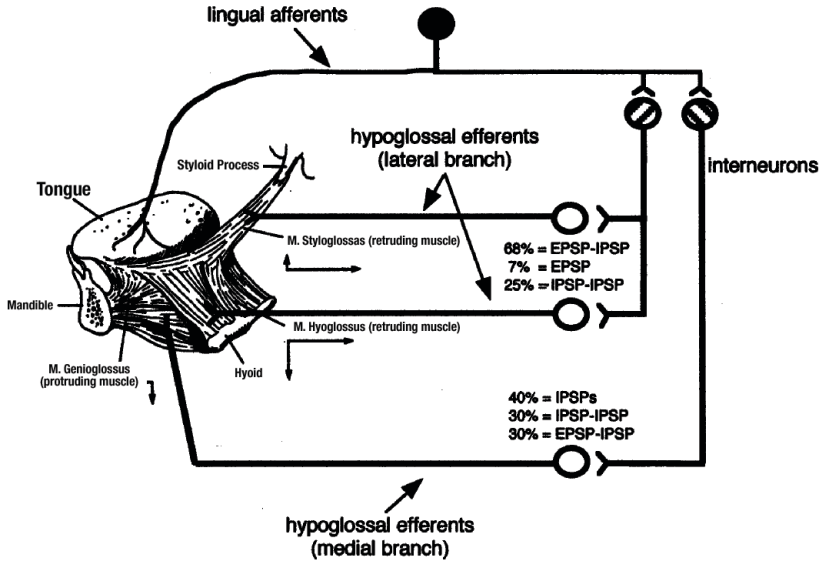


Figure 4
Effect of lingual afferents on hypoglossal responses

peractivity? In the accompanying diagram Figure 4, by permission from Miller CJ (2002) Crit.Rev.Oral Biol Med13:409, we observe findings from electrophysiological studies of the lingual (V) to hypoglossal (XII) reflex pathways in which the motor neurons of XII nerve include excitatory post synaptic synapses (EPSP) and inhibitory synapses (IPSP) to the genioglossus and styloglossus muscles.

Since the tongue will move towards the stimulus the genioglossus is mainly protrusive when the stimulus is at the tip of the tongue which in non-mouth breathers is compressed against the incisive papilla and in the mouth-breather against the posterior palate by styloglossus retrusive action. The neuromuscular occlusion will bring the tongue anteriorly while in the non-neuromuscular occlusion the scalloped tongue will be compressed against the posterior roof of the palate thus promoting tongue intrusion into the oropharyngeal space and deglutatory elevation of the larynx with closure of the glottis and hence obstructive apnea. Thus the construction of the apnea orthotic must conform to opening the airway and be fine tuned to the ideal posture for tongue. This is in part because when a patient complains of daytime sleepiness and associated musculoskeletal signs and symptoms the anticipated mandatory referral by NM dentists to sleep physicians including PSG does not follow. Musculoskeletal signs and symptoms including; morning jaw, head and neck pain, dry mouth, pharyngitis from mouth breathing and snoring as well as gastro-esophageal reflux disorder (GERD), general restlessness, inability to focus on daily tasks and frequent accidents are a result of apnea and nocturnal hypoxia.

Figure 5
Forward Head Posture (FHP)

The presence of postural anomalies, particularly the ubiquitous Forward Head Posture (Figure 5), in association with palpably tender head, neck and jaw muscles should raise a red flag that the patient is experiencing upper airway obstruction (OSA) and/or central apnea (CSA and SAS).

This should lead to assessment of the patient's dentition for signs of nocturnal bruxism and clenching of which the patient is often unaware. In addition to finding tender muscles, the NM dentist could undertake amplitude and frequency analysis of head, jaw and neck clench electromyography to differentially diagnose pre-TENS descending craniomandibular muscle fatigue from post-TENS V ascending craniocervical apneic fatigue (Figures 6 and 7).

The patient with SAS, CSA or OSA with evidence of unresolved head, neck and masticatory muscle fatigue should also be imaged to ascertain if the fatigue is associated with subluxation of the upper cervical (C1, C2) spine. Figures 8, 9 and 10 are example I-Cat images of cervical torticollis in which there is occlusal corruption with subluxation of the atlas (C1) vertebra and so called mixed obstructive/central apnea prior to TENS correction. In Figure 8, the torticollis of the neck with altered pitch, yaw and roll of the head, neck and jaws are observed defining an ascending FHP patient. Airway obstruction and associated compression of neural tracts and insufficiency of the vertebral arteries which supply the occipital visual cortex, diencephalon (hypothalamus and pituitary gland) and the respiratory center in the brainstem with deoxygenated blood leading to central apnea from neuron hypoxia. The intersection between the upper and lower joint compartments of the atlas drawn in red do not intersect due to subluxation of the atlas. Figure 9 provides a transverse section of the malaligned upper cervical complex giving the measurements of the atlas (C1) to the axis odontoid process (C2) intervals of 3.98mm on the right and 5.7mm on the left, demonstrating the subluxation of the atlas to the left prior to TENS V, VII and XI. Figure 10 shows the concentric alignment of atlas and axis following TENS orthotic placement in which the atlas odontoid intervals are 4.2mm on each side.

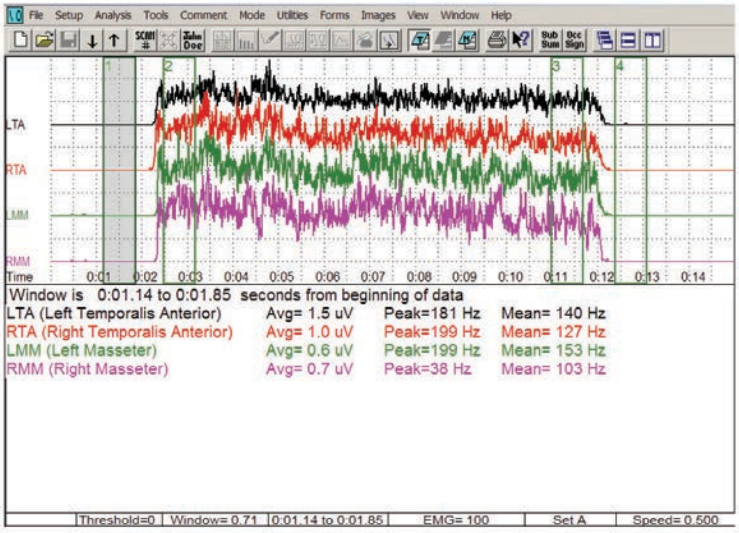


Figure 6

Untreated Apnea post-TENS Maximal Masticatory Clench EMG.

Indeed several studies have shown that oral orthotics, defined as mandibular advancement devices (MAD), have been found to improve signs and symptoms of sleep apnea (see George P (2001) JADA:132:339-347 and Osseiran HS (1995) JADA:126:461-466).

For the NM dentist who increasingly provides orthoses and occlusal reconstructions it is important that the occlusal orthotic be so constructed as to be effective both as a NM and sleep apnea appliance. This clearly requires clench EMG frequency analysis and polysomnography at the outset of treatment as well testing following placement of a sleep orthotic to evaluate its efficiency. While it is generally agreed that the gold standard for all types of sleep apnea is the hemoglobin oxygen saturation levels (SaO2) it should be appreciated that craniomandibular and cervical muscle fatigue can also result from general hypoxia and mus-

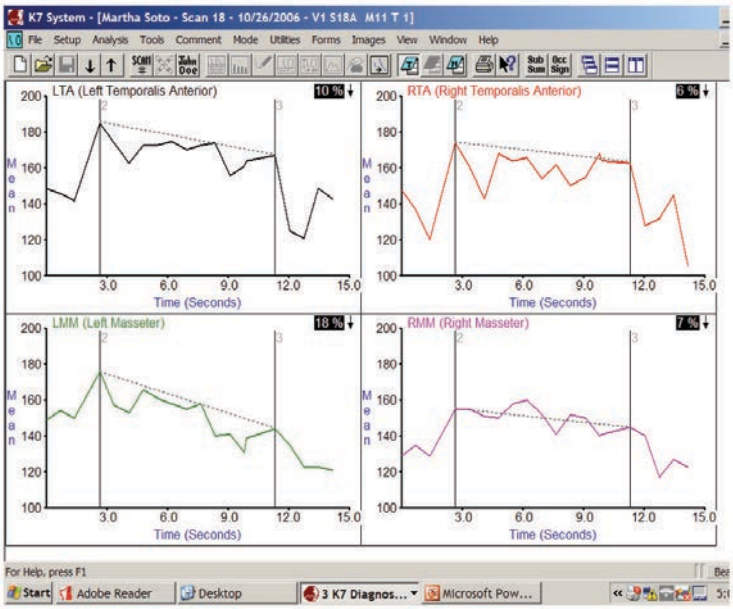


Figure 7

Frequency Spectral Analysis of Clench EMG post-TENS showing decreasing frequency indicative of ascending apneic fatigue.

Figure 8

I-Cat image of spinal torticollis with A/O subluxation in a patient with sleep apnea.

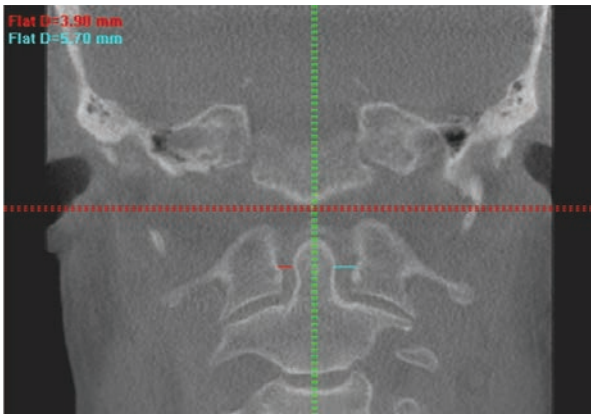


Figure 9

Transverse section of a subluxed A/O joint to left (3.98mm R; 5.7mm L).

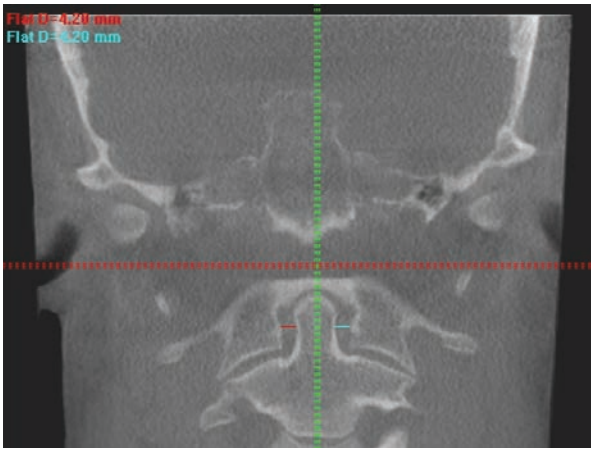


Figure 10

A/O Corrected by TENS V, VII and XI (4.2mm R 4.2mm L).

cle torquing of the jaw and neck from central apnea as described above. EMG frequency analysis should parallel PSG assessment. In brief, the development of one directly impinges upon the development of the other. Figures 11, 12, 13 and 14 are I-Cat scans of transverse and sagittal sections through the airway of natural rest and maxillo-mandibular jaw posture with Aveo TSD apnea appliance and Somnodent respectively in the same apneic subject.

Clearly the airway is most collapsed in the oropharyngeal region from worst to best: Somnodent 32.18mm/6.06mm > habitual rest 30.06mm/9.6mm > neuromuscular posture 30.9mm/9.6mm > Aveo TSD 36.0mm/11.4mm. Thus the Aveo tongue stabilizing device provides the most improved oropharyngeal airway, the Somnodent and Habitual Rest were worse than the NM bite position. Yet the subject commented that the Somnodent provided more restful sleep than the Aveo TSD. Kingshott et al (Sleep and Breathing (2002) page 69) acknowledges that while the Aveo TSD appliance significantly reduced mild snoring and microarousals only, trends for improvement were found for AHIs, and for oxygen desaturation 4% or more. A study by Padma et al. (2009) IndianJDent Res. also showed that Aveo TSD was only successful in 43% (computed from two studies) compared to 57% with mandibular repositioning appliances excluding NM repositioning. It is evident that improved airway diameter at the oropharnx alone is not sufficient to account for improvement in chronic obstructive sleep apnea. Furthermore measurements of the interspace between the odontoid and atlas demonstrates that while atlas subluxation is resolved in the neuromuscular mandibular posture it is not resolved in the Somnodent, habitual rest or Aveo mandibular posture. Thus as indicated above in obstructive apnea there are other factors such as central apnea due to vertebral artery insufficiency and compression of the nerve tracts to and from the respiratory center in the brainstem that must be addressed. Since it has been shown that the neuromuscular position does improve A/O subluxation (see Thomas and Dickerson, Visions January 2009) it is hypothesized that an apneic orthotic in the stabilized and corrected neuromuscular position should resolve obstructive sleep apnea by preventing the tongue from intruding into the airway as well as associated central effects arising from upper cervical misalignment without producing collapse of the neuromuscular occlusion which has been shown to occur for existing sleep orthotics.

The latter does presuppose that hypertrophic adenoids and ton-

sils in association with constrictor muscles of the pharynx are exacerbated by the decreased cross-sectional area of airway due to noncompliance of an enlarged, stiff neck. Alcohol consumption should be controlled to avoid anesthesia and vasodilatory congestion of the airway from loss of the naso-vagal reflex with consequential oxygen desaturation. Another requirement is to control oxygen desaturation. Retrusion of the mandible is known to decrease the cross sectional area of the upper airway and requires correction. These episodes of airway collapse designated as obstructive sleep apnea hypopnea syndrome, OSAHS, are associated with recurring oxyhemoglobin desaturation and arousals from sleep resulting in excessive daytime sleepiness of which an estimated 80% of cases go undiagnosed in the USA.

Some evidence indicates that central breathing instability also contributes to the development of OSAHS such as absence of ventilatory motor output from an unstable respiratory control center. Reduction in pharyngeal dilator action is associated with periodic breathing and hypercapnia. Severe OSAHS is a significant risk factor for myocardial infarction, hypertension and CVA (stroke).

With respect to the latter it is also recognized that OSAHS contributes to the metabolic syndrome which includes increased fasting glucose levels, increased blood pressure and lipid abnormalities and obesity. With respect to the latter multiple studies have shown that in OSAHS patients CPAP therapy (continuous positive airway pressure device) partially reverses the metabolic anormality by decreasing insulin resistance, lipid peroxidation and hypertension through increasing vasodilator responses.

In fact oxygen desaturation at night is known to contribute to insulin resistance, oxidative stress biomarkers and increased levels of proinflammatory cytokines including C reactive protein, interleukin 6 and 18 and metalloproteinase 9. It is known that the latter are also increased in C1, C2 subluxation by so called stressed effects on HPA depression from vertebral artery compromise not only to the brainstem and oc-

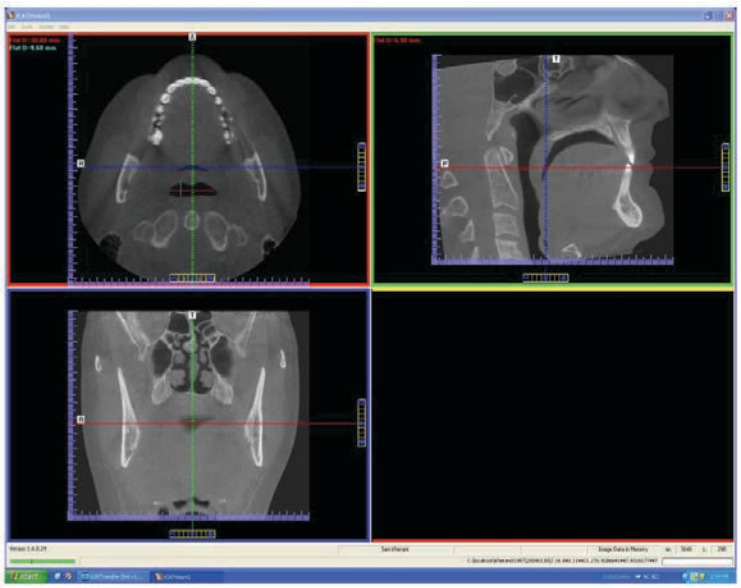


Figure 11

Airway at mandibular resting position with transverse width of 30.06mm and sagittal width of 9.6mm. Atlas mildly displaced right.

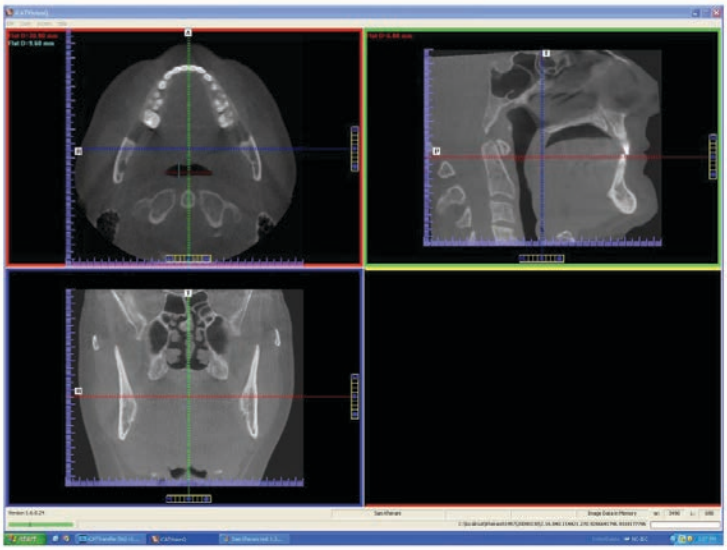


Figure 12

Airway with neuromuscular orthotic in place with transverse width of 30.9mm and sagittal width of 9.6mm. Atlas is almost centered.

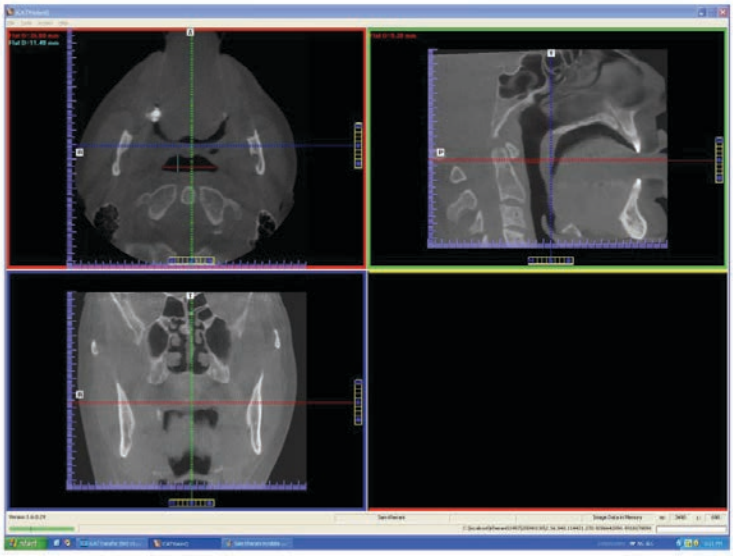


Figure 13

Airway with Aveo TSD in place with transverse width of 36.0mm and sagittal width of 11.4mm. Atlas markedly displaced right.

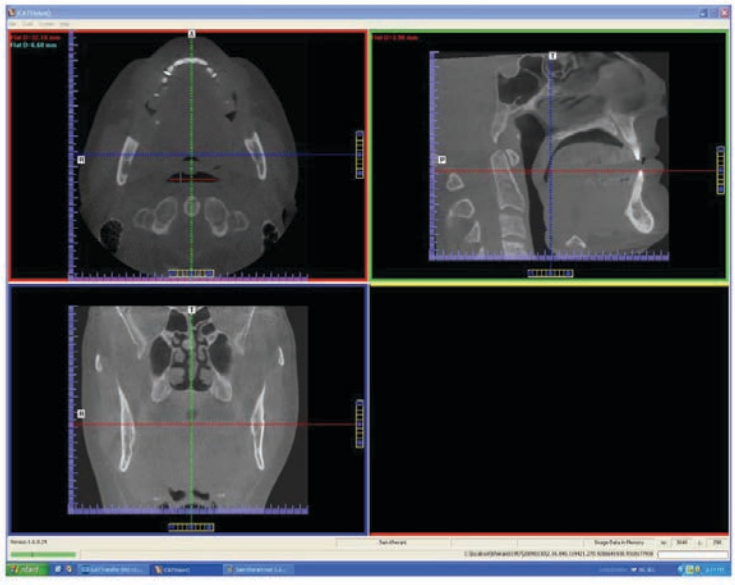


Figure 14

Airway with Somnodent orthotic with transverse width of 30.9mm and sagittal width of 6.6mm. Atlas is not centered.

cipital cortex (migraine aura) but also to the diencephalon which houses the hypothalamus and prevents the release of pituitary endocrine releasing factors. Nitric oxide production is thus decreased in OSAHS and is directly correlated with the degree of oxygen desaturation.

With particular regard to obstructive apnea there are a variety of nerve endings that have been identified in and under the epithelial tissues of the upper airway that are capable of evoking afferent feedback to the central nervous system. These reflex effects include sneezing, coughing, apnea, swallowing, laryngeal opening and closure with associated negative pressure reflex effects from a wave of peristaltic contraction and constriction of the airway from tongue intrusion into the upper airway (see Figure 1). These upper airway reflexes are modulated by sleep phenomena, local and general anesthesia, and chemical ventilator drive. In Figures 15, 16 and 17 we see the results of overnight polysomnography (PSG) studies required to differentiate between obstructive and central apnea.

In Figure 18 we are able to see the significance of the vertebral basilar arterial system to dysfunction of the respiratory and masticatory center control as well as other cranial nerve dysfunctions seen in musculoskeletal signs and symptoms. At the caudal or lower end of the medulla shown in Figure 18 the right and left vertebral arteries travel ventrally and superior to the first cervical nerves which rest on the posterior arch of the atlas vertebra to fuse or anastomose with its partner to form the basilar artery. This artery supplies both the respiratory and masticatory centers and in subluxation of the atlas the torqued arteries provide insufficient flow to maintain the functions of the centers leading to central apnea and central fatigue of the masticatory center resulting in ascending craniomandibular fatigue diagnosed by spectral analysis of the electromyogram of the trigeminal nerve. Insufficiency of the vertebral arteries probably accounts in part for mixed apnea and musculoskeletal disorder particularly of the craniomandibular and cervical musculature.

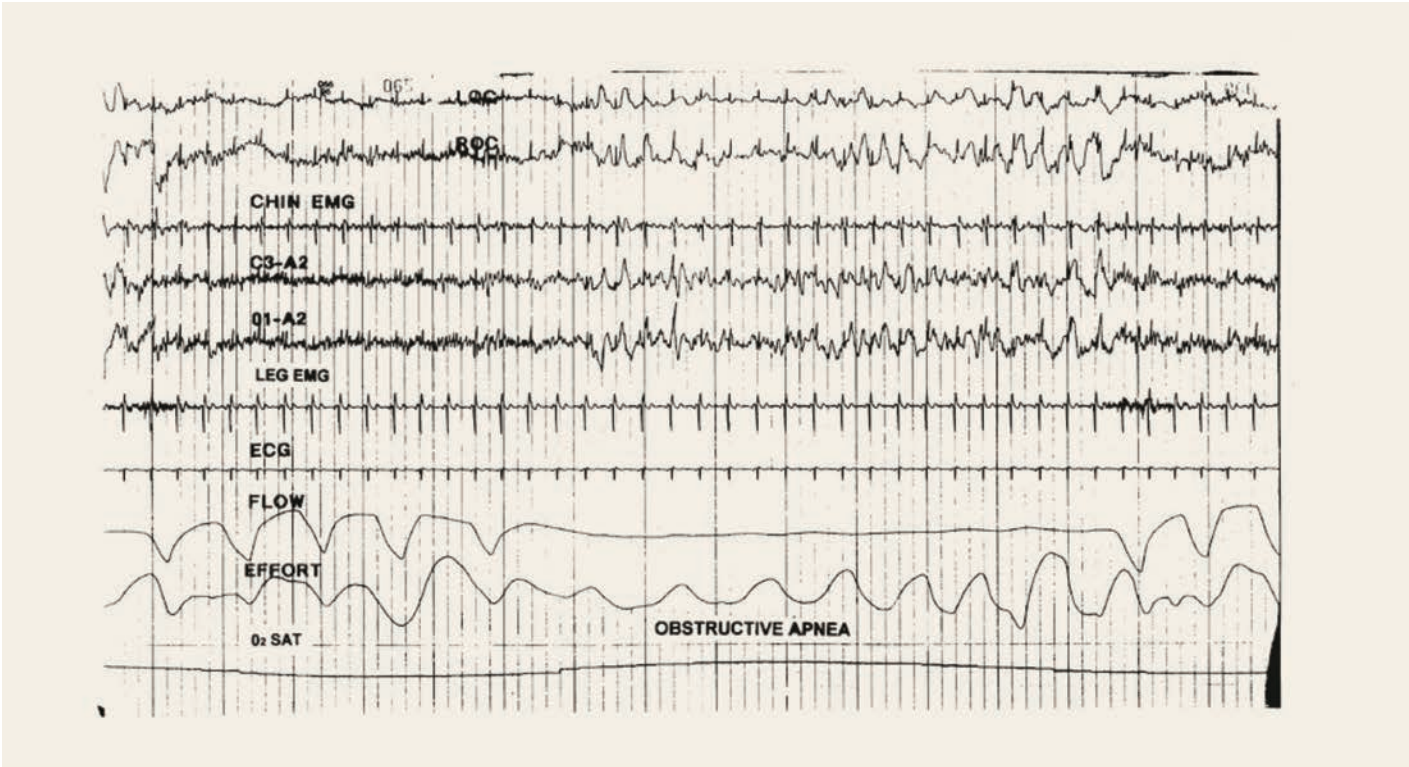


Figure 15
PSG from Obstructive Apnea.

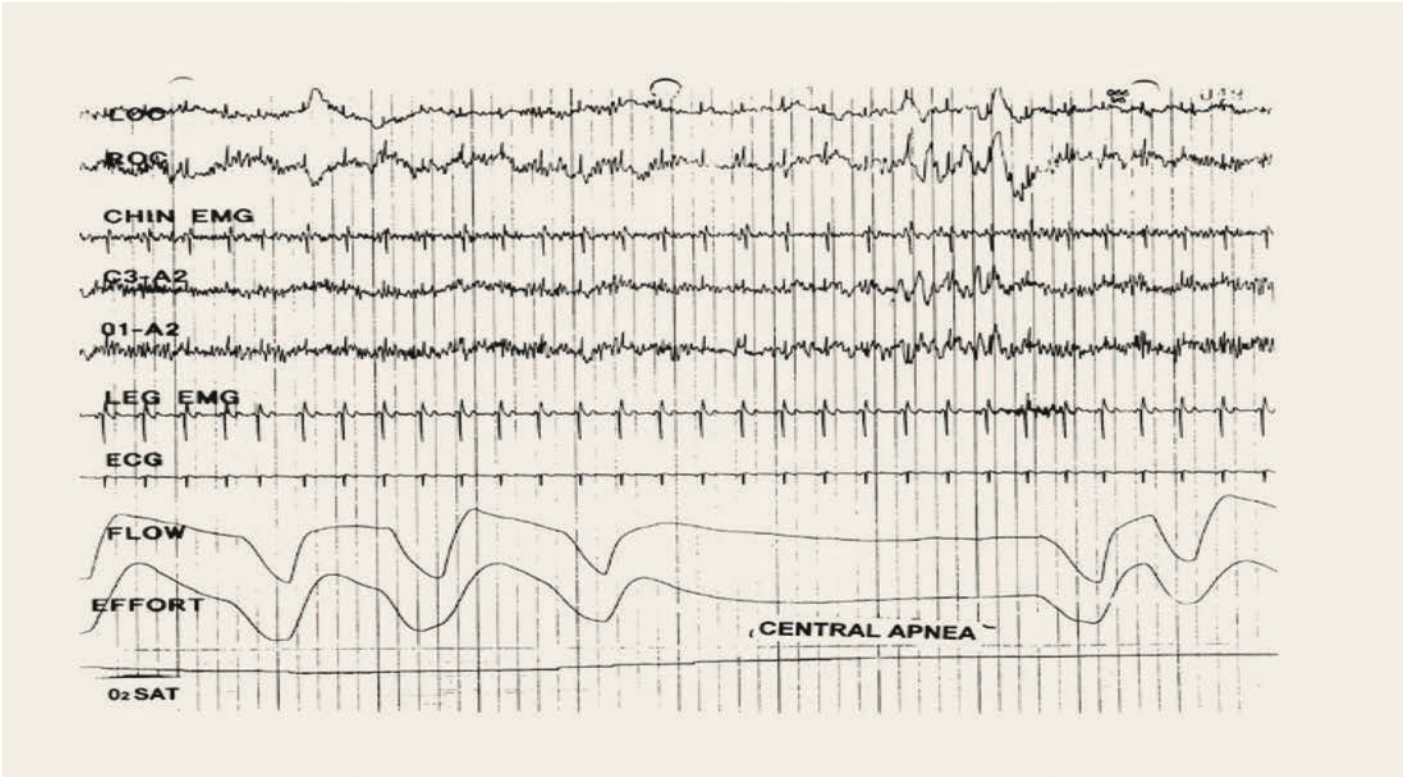


Figure 16
Central Apnea.

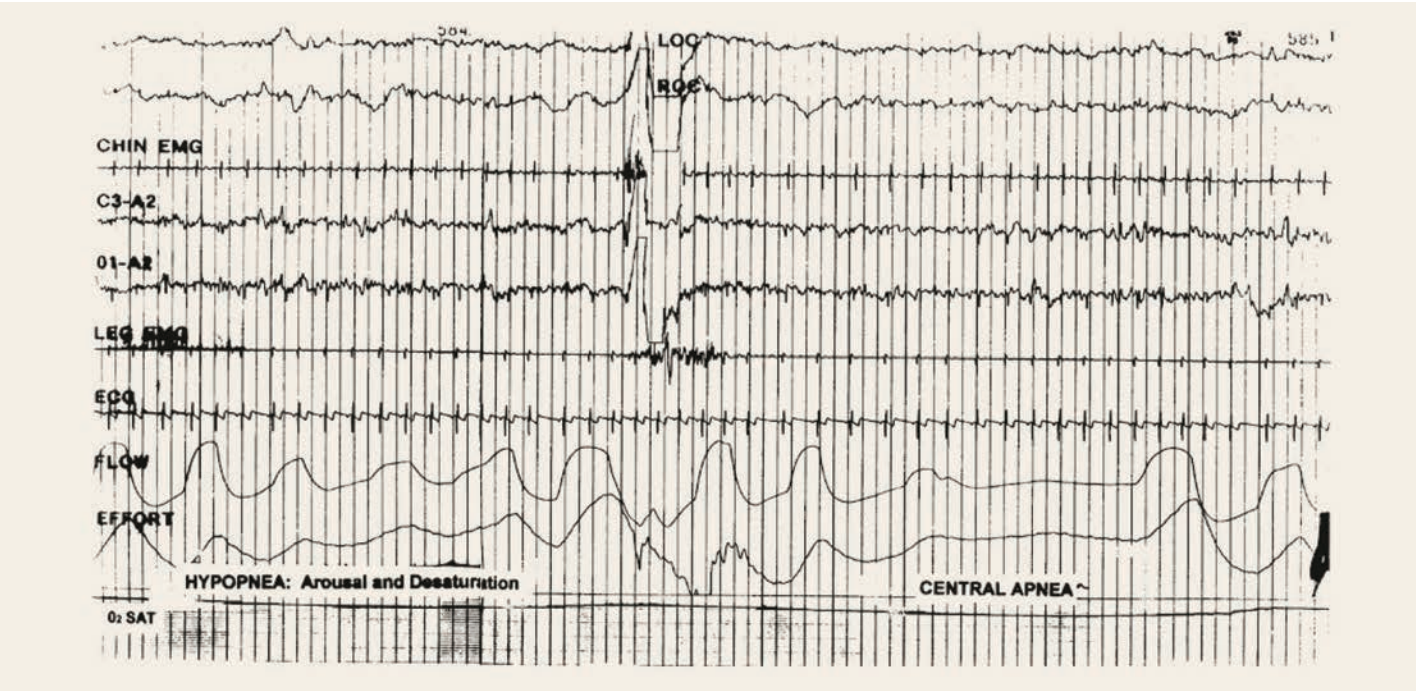


Figure 17
Mixed obstructive central apnea.

In summary it is evident that obstructive sleep apnea, snoring and nocturnal oral parafuntion are due in part to central fatigue and that this should be considered in the construction of sleep orthotics aimed at relieving obstructive sleep apnea. It is suggested that the sleep appliance be free of orostomatognathic interferences that could result in tongue intrusion into the airway as well as ensuring correction of upper cervical misalignment. In particular the neuromuscular correction of the occlusion should be considered in relation to construction of the sleep appliance since evidence shows that occlusal problems result from using sleep appliances. It is proposed that a study be undertaken to produce effective sleep appliances incorporating neuromuscular principles. At present there is no such appliance.

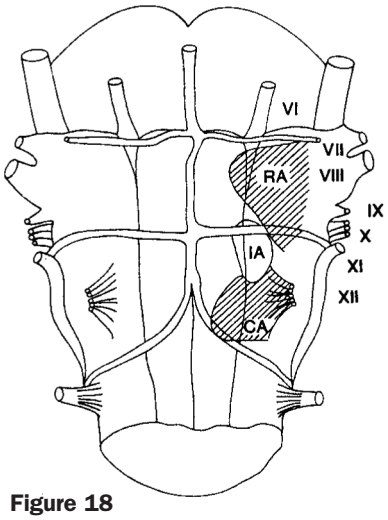
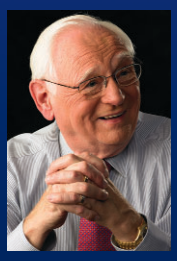


Figure 18
Respiratory Center on medulla.



Norman Thomas graduated as a Doctor of Dental Surgery with honors and double Gold Medals in 1957. Dr. Thomas was awarded a Nuffield Fellowship (Oxford) to complete an honors degree in medical sciences in 1960. Between 1960 and 1974, he pursued residency and research programs at the Bristol Royal Infirmary, The Royal College of Surgeons of England, the Medical College of Virginia, and the University of Alberta, where he is now Professor Emeritus.

From 1970 to 2002, Dr. Thomas served on the Medical Research Council of Canada, the National Institute of Health, USA, and the Canadian Dental Association, gaining a Certificate of Merit from the latter and several Fellowships in medical sciences and dentistry. He is a Life Member of the Alberta Dental Association and retired from dental practice in 2002. In 1998, he was appointed Chancellor of the International College of Head and Neck Orthopedics and, in that capacity, has lectured in the U.S., Europe, Australia, and Asia. He was awarded a Ph.D. degree in Oral Medicine for research on the process and mechanism of tooth eruption.

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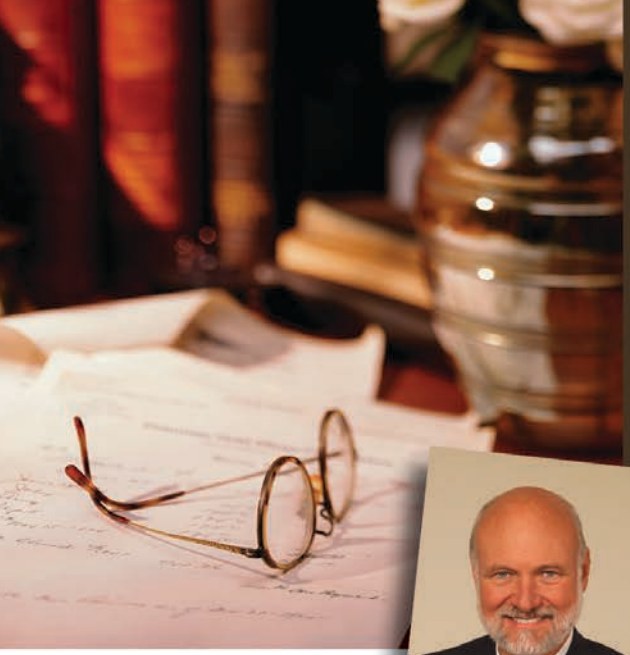

THE WEATHERS' REPORT

Arthur "Kit" Weathers, Jr., DDS

"Does Your Dental Practice Need CPR?"

Recharge your Endodontics with EndoNomics™

Are there holes in your schedule? Would you like to improve your practice economics? Would you like to reduce the stress of unplanned referrals and eliminate the mystery surrounding traditional endodontic therapy?

Done correctly, endo can be one of the most rewarding procedures in the dental office. Unfortunately, many dentists avoid endodontics because of fear of the unknown and unsolved mysteries carried over from dental school. In this article, I will show you how to apply the concept of EndoNomics™ to help stimulate your dental practice.

I actually coined the word EndoNomics™ about 15 years ago to describe the systems being taught at my "Root Camps." I based the word, EndoNomics™ loosely on two Greek

roots, endon, which means "within" and nomos, which can be roughly translated as "rules or laws." EndoNomics™, therefore refers to the "rules and laws" of economics "within" the dental practice.

Notice, I said "within the dental practice" because these concepts can apply to every phase of dentistry. Eliminating the stress of unplanned referrals, improving your cash flow, raising certain fees and focusing more on continuing education will benefit the practice across the board.

Breathe new life into your practice with what I like to call, "Comprehensive Practice Revitalization" or EndoNomic™ CPR.

Three Parts of CPR

The three basic parts of medical CPR are easily remembered as "ABC": A for airway, B for breathing, and C for circulation. We can use the same acronym to help us remember the basics of "Comprehensive Practice Revitalization."

• A is for airway. The "airway" of the practice often becomes blocked or obstructed by old habits and outdated procedures. In a medical CPR course, participants learn how to open the airway and position the patient so the airway is ready for rescue breathing. EndoNomic™ CPR starts by identifying mental blockages and physical obstructions that are shut-

ting off the airway to the practice. To clear the airway, you must first identify the obstructions and then reposition the practice.

• B is for breathing. Rescue breathing is initiated when a patient is not breathing. Someone performing rescue breathing essentially breathes for the victim by forcing air into the lungs. This procedure includes breathing into the patient's mouth at correct intervals and checking for signs of life. You can also breathe new life into your dental practice, and a great way top do this is by incorporating the systems of EndoNomics[tm] into your practice.

• C is for circulation. The most important phase of medical CPR is chest compressions to restore circulation. The same holds true for EndoNomic[tm] CPR in the dental practice. You must begin initial treatment immediately, and when the 'patient' is stabilized, do a complete diagnostic work up so you can restore optimal health to your practice. If you had all the answers, you would have already diagnosed and treated your problems.

I first thought of the concept of EndoNomic[tm] CPR for the dental practice when an attendee at my Endo Root Camp told me that the reason he had a renewed interest in Endodontics was because of a desire to fill holes in his schedule. I heard this many times, so I thought it would be a good idea to take a closer look at revitalizing the practice of endo and dentistry in general.

There are many tools we can use to administer EndoNomic[tm] CPR to an ailing dental practice, so let us examine the process.

Analyze your cash flow

Number one on your list should be to carefully analyze your cash flow and apply tourniquets to areas where you are hemorrhaging money. You want to get the bleeding under control, but the biggest mistake you can make is to spend all of your time cauterizing small bleeders while you miss opportunities to dramatically improve the overall health of your practice.

Avoid practice expenses that do not directly increase revenues. A new music system might sound really great, but it will have minimal (if any) bearing on your revenues. Invest in things that directly lead to an increase in revenues such as marketing and continuing education.

Raise your fees

One of the fastest ways to increase revenue is to selectively raise fees that are historically too low and not likely to be noticed by the patient. A great example is your anterior root canal fee.

A general practitioner is held to the same standard of care as the Endodontist, but for some reason, most GPs charge 30 to 50 percent less than the Endodontist for the same exact treatment. The average GP charges around $500 for an anterior root canal while the average Endodontist charges $750 or more.

Measure your finances

Monitoring practice expenses and income is vital to healthy dental practice management. Make certain you are not over-financing your business and balance commitments with profits. Financial systems should be monitored daily, monthly and yearly to avoid costly overruns. In today's economy, monitoring cash flow is more important than ever. The first and most important step to take is to…

Create a system to alert you when any of your critical numbers are off.

It is imperative that you have adequate warning in areas such as cash flow, daily and monthly production goals, performance goals for team members, profit and loss statements, marketing results, and referral ratios. Monitoring will put you in a position to act on information rather than react to problems.

Determine the average six-month cash value of every patient that walks through your door. Many doctors assume they know the one-year and

lifetime value of a patient, but they do not really know the six-month cash value of their patients. This can cause a false sense of security and overspending on marketing and operations. You can find this information by auditing patients from six months ago, and observing how much cash has been received.

Find Your Niche

If you want to truly differentiate yourself in your marketplace, start niche marketing your practice. Begin by creating a more targeted marketing message, which will attract patients searching for solutions to the problems mentioned in your ad.

Here are a few services that are perfect to start niche marketing: Endo, Implants, Conscious Sedation, TMJ Disorders, Migraine Headaches, Sleep Apnea, Neuromuscular Ortho, Invisalign and Teeth Whitening. Your message to potential patients should talk briefly about the problem, and spend most of the time building up the idea that you are the best person to end their frustration.

Obviously, you cannot solve everyone's problems, so highlight the core procedures that you are most qualified to treat in an efficient and profitable manner. Fortunately, this will usually be the services you enjoy the most.

P.S. If you need additional training in your areas of primary interest, search out a good source of quality continuing education – more about that later in this article.

Which "sale" is the most important?

Most retail business owners will tell you that repeat business is more profitable and easier to obtain than trying to convince first time buyers to buy from you. Why? Because existing customers have demonstrated they trust you. The same reasoning applies to the dental practice.

Internal marketing is the key to a healthy practice. Take the time to say thank you to your patients, and make certain they know you are accepting new patients. Send handwritten thank you notes each time a patient sends you a referral. Make sure your entire team understands the importance of internal marketing, and train them to ask for referrals.

Treat your patients like VIPs (Very Important Patients) and provide everyone with excellent customer service. If you do not know what excellent service looks like, stay at a Ritz-Carlton hotel and experience what it feels like to receive five-star service.

Your goal should be to create a memorable experience for every patient who walks through the front door, and make certain they are talking about you when they walk out. You goal is to aim for a "WOW" response. When people have a pleasant experience, it triggers an emotional bond, and they will spend more, tell their friends and, unless you foul it up, become patients for life.

You might consider rewarding your referring patients with complementary dental products or services. A gift certificate for a nice dinner conveys your appreciation and encourages them to refer other new patients.

Other internal marketing ideas might include displaying testimonial letters, posting signs that indicate referrals are welcome, sending out a quality practice brochure, or posting your patient's names in a "birthday club" in the local newspaper. Get your team together and brainstorm additional ideas to add to this list.

Measure the effectiveness of your patient retention system. Pull up all the new patients you saw seven months ago and see how many of them have come back. If patients are coming back on or before their six-month re-care appointment, you and your team are doing a good job of creating a good new patient experience. If your patients are not coming back, your practice definitely needs CPR.

Where is your profit coming from Apply the 80/20 Rule

The 80/20 rule (aka the Pareto Principle) says that 80% of all your profits come from 20% of your patients and 20% of your activities will provide 80% of your positive results.

Would you like to increase your bottom-line profits TODAY? Just ask

yourself, "What 20% of activities am I doing that is providing the highest return?" Then, have your entire team ask themselves the same question, and start eliminating items that are not profitable.

Most dental practices put the same amount of time and referral-generating energy into ALL patients equally. While this sounds fair, the reality is if you want to increase your bottom-line, especially when times are tough, you have to figure out how to attract the 20% high-value patients.

For example, if you notice 20% of your best patients are spending more money and referring more patients than all the others put together, then spend more time nurturing those patients.

Take continuing education courses

The most valuable investment you can make is an investment in yourself. Now is the best time for you to take that C.E. course you have been putting off. If you have noticed a slowdown in your practice, I will bet you can trace it back to a continuing education slowdown.

The critical part of any CPR procedure is timing. Research shows that you must begin medical CPR within four to six minutes after cessation of breathing to prevent brain damage or death. Obviously you do not have to start EndoNomic[tm] CPR that quickly, but time is still of the essence. If you start EndoNomic[tm] CPR in a timely manner, you should be able to bring your practice back to a happy and healthy state. If you wait too long, however, your practice might go into cardiac arrest. I sincerely hope that the suggestions in this article will help you breathe new life into your practice.

I will leave you with one last tip: If you have not already done so, please visit www.EndoRootCamp.com and register for my free "Root Tips of the Week."

Is your glass half full or half empty?

It depends on whether you are drinking or pouring…
If you are adding to the glass, it is half full and getting fuller.
If you do nothing, the water will evaporate…

For more than thirty years, Dr. Arthur "Kit" Weathers has lectured worldwide on technologies, products and processes designed to simplify the practice of endodontics by the general dentist. The developer of a range of dental products, Dr. Weathers pioneered the EndoMagic! Nickel-titanium file system for general dentists seeking to improve both the quality of care and the economics of the endodontic services they offer. As the clinical technique developer of the X-tip Intraosseous Anesthesia System, he has assisted practitioners in need of patient-friendly anesthetic application methods.

Dr. Weathers is the author of numerous articles on innovations in endodontic treatment products and processes as well as intraosseous anesthesia delivery systems. His most recent four part series of articles entitled, "Endodontics, From Access to Success," appeared in Dentistry Today. Dr. Weathers has also introduced the well-reviewed C.E.Magic "edutainment" interactive learning system, entitled "Antibiotics in Dentistry" to the field of dental continuing education.

Dr. Weathers serves as the Director of Endodontics at the Las Vegas Institute for Advanced Dental Studies (LVI). Lecturing extensively to dental organizations, Dr. Weathers integrates an academically grounded approach to his subject with humor, magic, and mnemonics to enable his audience to recall his well-accepted techniques. As the founder of the Practical Endodontics "Root Camp," Dr. Weathers offers numerous two-day, hands-on training sessions at the Las Vegas Institute and his facility in Griffin, GA.

Dr. Kit Weathers is the creator and featured speaker at the LVI Endo Root Camp®

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The answers to these questions and concerns are not easy. We feel secure by following set patterns in our personal and professional lives. Our minds are conditioned to certain ways and we find it comforting to do exactly what we know we have to do. We like keeping within our comfort zone. As long as we can get by with what we have, we prefer not to change. Sometimes we have to actually deteriorate before we are willing to change.

Of course we all know why! We have all heard it before! We would rather sit in the pain of darkness and not change because of that horrible, dreaded word - FEAR. Fear of failure, fear of rejection, and fear that we lack competence to make the change. Everybody is afraid of something. Courage is not the absence of fear; courage is choosing the greater fear. Ask yourself if the fear of a missed opportunity is greater than the fear of a failure. Is the fear of disappointing yourself greater than the fear of disapproval from another? Is the fear of who I am greater than the fear of what I do? The true question is; what do you need to fear more than you presently fear? That is what will drive change.

How is this applied to drive change on a professional level? How do we get our teams to make change? Let's examine seven strategies for organizational change.

1. If you want and need the people in an organization to buy into what you are doing, do not decide what to change and how to change it without giving them an opportunity to provide input. Those involved in an organization should be "stakeholders," not passive observers to what is going on. There are two kinds of change; self-chosen and organization. Which change is easier? Self-chosen. Why? Because we have control over it. We do indeed have a need to be in control of our decisions. If that is the case then your team needs to be a part of the decision making around any change.

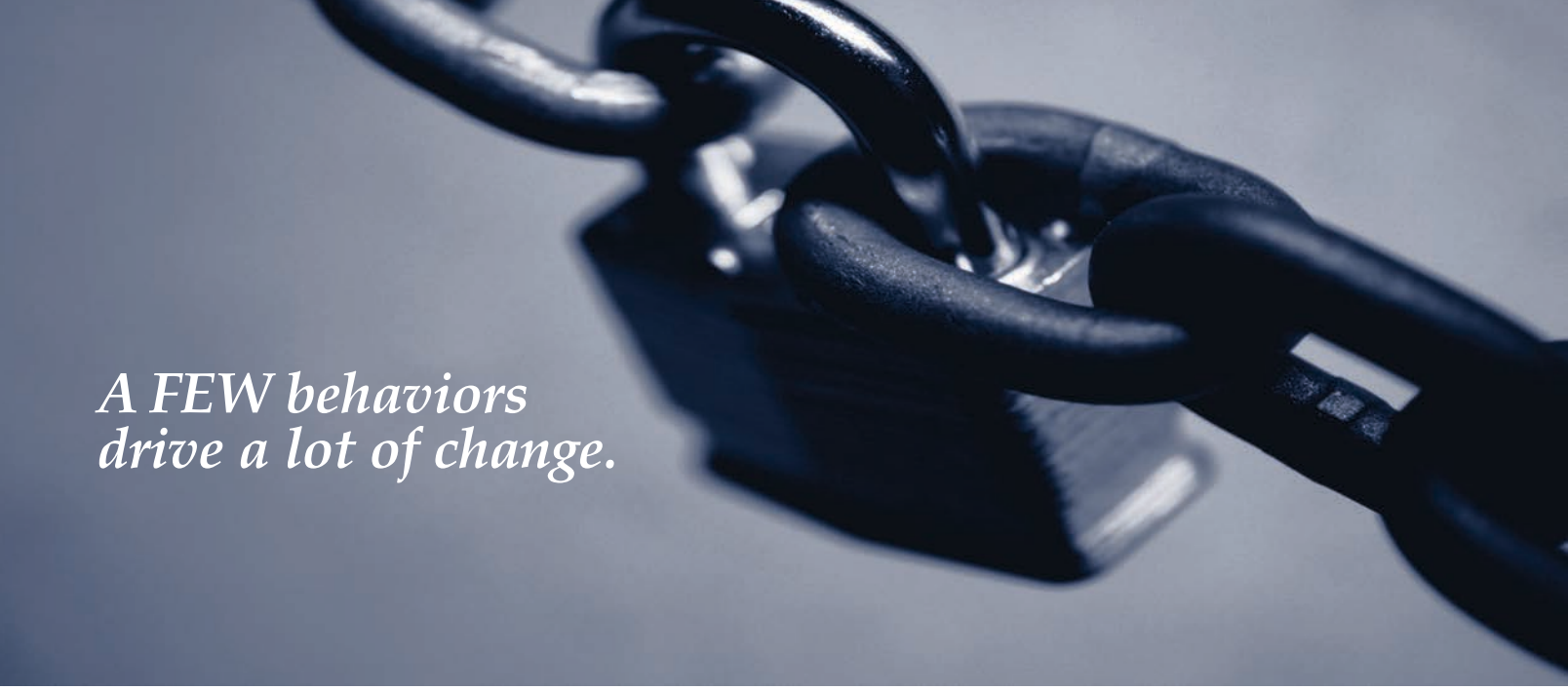
2. Resistance is not an indication that something is wrong with what you are trying to change. It is an indication that something is happening. It is a good sign! If you treat everything that you see as resistance, you can be wrong. It may be a lack of understanding about what you are doing as opposed to not liking what you are doing. The remedies for each are quite different. Ask yourself; is this a "willingness issue" or a "training issue?" It may be your fault that there is resistance.

3. Culture eats change for breakfast! If your change will impact "how we do things around here," the odds are that the culture change will be harder than the original change. People feel connected to other people who are identified with the old way. We are a social species. We become connected to those who taught us and with those with whom we are familiar – even at times to our own detriment. While discussing the change, make statements that honor the work and contributions of those who brought such success to the practice in the past because at some level your team will feel asked to betray their former mentors whether those people remain in the practice or not.

4. The most important word in the language of change is TRUST. Without it, you will only get what looks like change on the surface while underneath, things remain the same. When you do not have time to make lengthy explanations about why you are doing what you are doing, only TRUST will carry the day. Making a change requires a kind of leap of faith. A decision to move in the direction of the unknown. I can only do that with trust.

5. The perceived level of commitment of the person at the top of the organization will have more to do with the success or failure than anything else. Test to find out what that perception is. The commitment may be there but poorly communicated, so make sure it is there and well communicated. Make sure that perception is not a fear that you might have a hidden agenda around the change.

6. Pain drives change! In most practices, nothing changes until the



pain of doing it the way we currently are gets high enough so that it can no longer be tolerated.

7. Keep your focus on the rewards. Motivate and praise accomplishments as well. Celebrate the victories along the way.

My good friend and mentor Dr. Mark Duncan recently shared a book with me; *Influencer* by Kerry Patterson, Joseph Grenny, David Maxfield, Ron McMillan, and Al Switzler. This is a book about change however it is not an easy read like *Who Moved My Cheese*. The authors all agree that in order to make change we have to focus on behaviors. A FEW behaviors drive a lot of change. Therefore if we discover a few VITAL behaviors then change becomes easier.

Did you ever feel overwhelmed after attending a course at LVI? Your Team has information to share with you and you have information to share with them and you both have to take it all back to other team members. How is that possible when you return home to a full schedule after being gone for nearly a week! Change a FEW VITAL behaviors.

The authors give example after example of businesses that ONLY focused on a few vital behaviors and saw drastic changes. Airline companies in the U.S. have lost over $10 billion and shed tens of thousands of jobs. However, Southwest Airlines had its 14th straight year of profits and double-digit growth. Their three behaviors: Turn planes around faster, treat customers better and have a higher percentage of bags and passengers arrive at the same time.

YMCA – 3,000 Americans drown each year, many in public pools. After observing hundreds of teenage lifeguards it was determined that most of their time was spent greeting members, testing chemicals, and adjusting swimming lanes. Just one behavior change was implemented; the 10/10 scan. Every 10 minutes while performing their other duties, lifeguards would scan the pool for 10 seconds. The result; drowning rates dropped by two thirds.

After wearing my thinking hat for many hours and having lots of discussions and thinking back on my experiences of working with hundreds of dental practices, I was determined to identify a few VITAL behaviors that keep dental practices from experiencing change and what the solutions would be.

THE TOP THREE:

1. Lack of Team to Team, Team to Doctor, and Doctor to Team communication. We focus so much of our attention on Team to Patient and Doctor to Patient communication. How do we get them to say "YES"? Yet very little time is spent on communicating with each other.

2. Lack of internal training. We certainly cannot fault you for not taking CE and training courses. We see many of you at LVI each month. However, how good are we at training within our own offices? Does the right hand always know what the left hand is doing and saying? Is everyone on the same page or even in the same book?

3. Too busy. Well of course, we just do not have time to do the above!

WHAT ARE THE SOLUTIONS TO CHANGING THESE BEHAVIORS?

1. Productive team meetings. Several issues back, I wrote an article on the "M" word and how to make meetings productive. If you cannot find that article there is a DVD on Team meetings available in the LVI store. What is the focus of those meetings? Team to Team, Team to Doctor, Doctor to Team communication and yes, cross training.

2. Monitoring the practice. As per *Influencer*- test your results. Do not merely measure the presence or absence of behaviors. Check to see if the results are what you desire. It is March Madness – we are at the final four – how many people do you think would stay in the stands if there was no scoreboard? How long do you think those players would continue to run up and down the court with no scoreboard? I love the little five years and under soccer games. They inform everyone that they do not keep score at these games. HA! Every parent walking to their cars after the game knows EXACTLY what the score was! We like to know if we are winning or losing. It is a proven fact that businesses that monitor, improve. When the measurements are discussed and used to problem-solve, the business improves at an accelerated rate.

And as my additional good friend and mentor Dr. Sam Kherani would say "at the end of the day be mindful of…" – and the one thing that I would want you to be mindful of is WHY you want to make a change. I want to leave you with one of my favorite stories about change.

The King called together his three sons. "It is time for you to make your mark." he told them. "Beyond our borders are unknown worlds of dragons, maidens and black-hearted knights. Go out and conquer." And so his sons ate the feast of the departing, and set out across the world.

After three years, the first son returned and the whole court came out to greet him. "What have you conquered?" asked the King.

"I have slain dragons, rescued maidens and vanquished black knights." spoke the son. "I have conquered lands such that our territories are now doubled in size."

"Boldly done!" said the King. "Those new lands shall be your kingdom to rule and protect."

After three more years, the second son returned, and the whole family came out to greet him.

"What have you conquered?" asked the King.

"I have parlayed with dragons, negotiated with black knights and made the maidens fair swoon." replied the son. "I have conquered the minds and hearts of ten kingdoms, and we now have fond allies all across the lands."

"Brightly done!" cried the King.

"You shall be my most noble lord, ambassador in my stead to all of the lands."

After three more years, the third son did not return. After three further years, he still did not return. After three years again, a ragged stranger walked alone up the steps to the royal court. The old King was the only person to recognize the stranger. He came down from his throne, embraced his third son deeply, and then asked, "What have you conquered?" The son smiled a long smile.

"I have slept with dragons and caroused with knights. I have danced with maidens and sung with the children. I have laughed with old men on the quay and cried with old women left alone. I have howled at the moon and lain in the sun. I have scaled high mountains and seen distant lands of mystery and promise. I have plumbed the depths and met magicians of the mind."

"I lost some fear and gained some wonder. I lost some of myself and found some of other people. I tore down the walls of ignorance and found many more. And I have found my way home. I have no need to conquer or fight or persuade. Today is now enough for a lifetime."

A deep silence fell over the court as the King thought long and fully about what his son had said. "Wisely done!" he said. "For you have conquered yourself, and the world and the worlds beyond shall be your playground."

Remember, change starts from within.

Sherry Blair, CDA
Dynamic Team Program Director

As Director of the Dynamic Team Program at the Las Vegas Institute, Sherry shares her more than 33 years of experience managing each and every system within the dental practice. Sherry has combined her acquired knowledge and personal experience to create an inspired, effective and motivated curriculum that refines the systems surrounding the patient's total experience in a dental practice. Sherry's extensive exposure to most forms of practice management and dental systems, as well as her strong focus on patient satisfaction, make her uniquely qualified to enhance the effects of any dental practice.

Sherry Blair is featured in LVI's Dynamic Team Concepts Series - a set of courses for dental team members designed to complement the CORE curriculum for doctors.

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