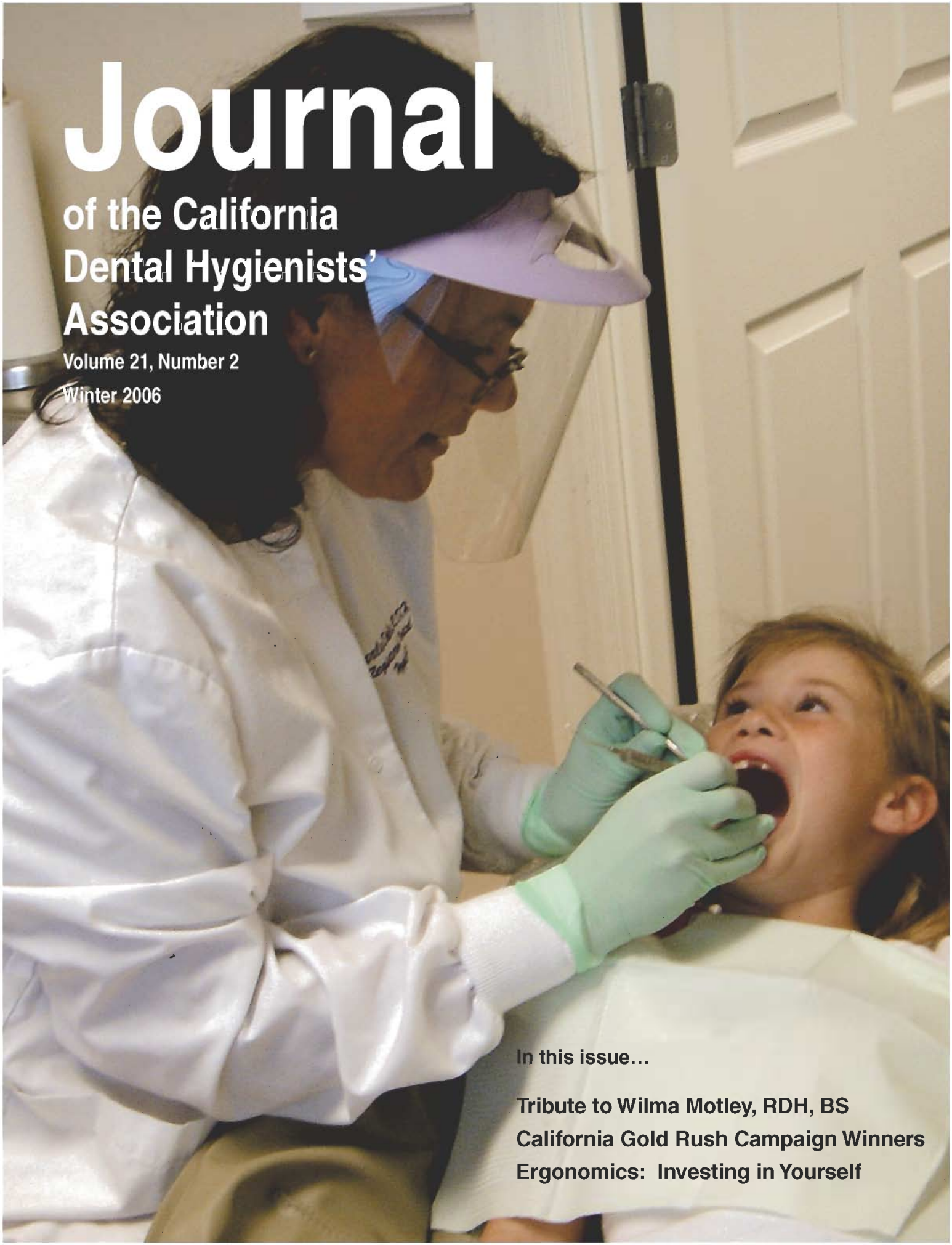

# Journal

## of the California Dental Hygienists' Association

Volume 21, Number 2
Winter 2006

In this issue...

CALIFORNIA DENTAL HYGIENISTS' ASSOCIATION

"Advancing the art & science of dental hygiene"

*"Advancing the art & science of dental hygiene"*

## In this issue of the...

# Journal

***of the***

***California Dental Hygienists' Association***





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California Dental Hygienists' Association
505 N. Brand Blvd., #740
Glendale, CA 91203
818-500-8217 FAX 818-247-2348
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# Ergonomics: Investing in Yourself

by
Tricia Osuna, RDH, BS

**Women make up only 46% of the workforce, yet they account for 62% of the work related cases of tendonitis and 70% of the cases of Carpal Tunnel Syndrome. If we assume that approximately 98% of dental hygienists are female and 21% of dentists are female, that means that over 70% of the time the clinician rolling up to the dental chair is a woman, not a man. The average practitioner is, in fact, female.[1] It would follow, the entire office setting is important to evaluate for total health and career longevity. In brief, office ergonomics should be critical to each clinician.**

## ERGONOMICS

The word "ergonomics" is derived from the Greek word "ergon" (work) and "nomos" (natural laws) therefore "laws of work" and in February 1950 was adopted to describe the human performance-oriented engineering designs discipline.[2] Over time, this specialty of research has allowed us to evaluate numerous body mechanics and work situations that affect the human body. Through years of research, this discipline has fine-tuned their studies to incorporate anatomy, physiology, psychology, engineering, design, and management into the focus area of how together they contribute to ergonomics in our lives.

Despite years of discussion, information provided to us during our initial dental education, continuing education courses, and conversations with our colleagues, dental professionals continue to either ignore or challenge ergonomic research and suggestions to change behavior and work patterns.

A recent study published in June, 2005, states that "ergonomics and work organizational factors are likely to contribute to musculoskeletal pain."[3] While this information is not new to any dental professional, we are, nonetheless, continuing to spend clinical time in contorted, challenging, unhealthy positions and are failing to correct them. In addition to these career challenging body positions, we are often reluctant to accept new technologies and changing trends which, if accepted, would most likely alleviate some of the musculoskeletal issues from which we suffer. While we continue to practice in these unhealthy positions, we can only anticipate outcomes which will lead to ergonomic pain, loss of productivity due to decreased work hours, shorter careers due to musculoskeletal disorders (MSDs) and, ultimately, the end of a dental professional career. Musculoskeletal pain caused 27% of hygienists to decrease work hours and 8.7% to change office locations.[4]

These career ending situations and the decisions leading up to them are occurring more often, with increased injuries to dental hygienists located in the neck, shoulder, arm, wrist, fin-


gers, thumbs and back.[5] Current publications available to the dental hygiene profession offer, almost monthly, articles on instrument maintenance, sharpening and selection, body positioning, magnification, ultrasonic utilization and various additions to our practice environments which will place us in proper, healthier positions. The acceptance of new products and technologies will assist us to incorporate techniques and materials into the dental hygiene portion of our dental office and will also allow us to share this information with our co-workers, while we provide optimal therapy to our patients.

A definition, which I find most fascinating, and true, is that for "technostress: a condition resulting from the inability of an individual or organization to adapt to the introduction and operation of new technology."[6] We should often refer to ourselves as the cause of these MSDs due to hesitation in recognizing the problem, lack of desire to discuss with our employer options that are available and lack of confidence and/or knowledge of how, or what, to utilize from the myriad of new technological choices for increased health and career longevity.

The discussion here will be on various aspects of ergonomic issues that lead to MSDs, simple changes to alleviate some of the basic MSDs, and our personal responsibility to address our own physical concerns. This information should guide you not to expect employers to make us healthy, but rather to utilize the technology and advancement to enhance ourselves and our patient care. Information is supplied for many manufacturers, though not all, to assist you in the process of making change – this is the first step.

## PHYSICAL COMPLICATIONS

Although we are aware of the outcome of not positioning ourselves correctly, many of us struggle with incorrect posture on a regular basis. The situations in which we place ourselves can cause numerous MSDs. While Carpal Tunnel Syndrome is the most common perception of a physical complication, the most associated with dental hygiene practice, it is no longer the only one of which we should be aware. Total body positioning should be addressed so we do not focus only one body part as they are all contributors to MSDs. These include how we grasp our instruments, sit in the operator chair, lean over the patient, position the patient chair, personal protective equipment and physical environment.

The first step in developing an ergonomic plan is identifying any awkward postures and MSD risk factors. The clinician's posture should be assessed by another hygiene co-worker or, if no hygiene co-worker is available, another co-worker can evaluate posture. Additionally, psychosocial factors should be considered, such as job satisfaction, endurance, work hours and career growth.[7]

The Occupational Safety and Health Administration (OSHA) has enumerated four signal risk factors for ergonomics-related injury:

1. repetitive motion for more than two hours at a time
2. awkward posture for longer than two hours at a time
3. unassisted frequent manual handling
4. unassisted forceful manual handling[8]

As dental hygienists, we are in a daily situation of fulfilling three of these requirements (numbers 1, 2 and 4) as we provide therapy for our patients. Recognition of how we position ourselves and the desire to practice as healthier professionals will also lead us to providing

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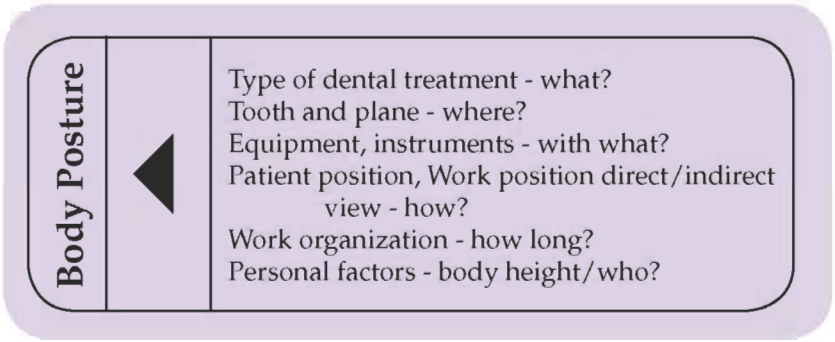
more thorough treatment for our patients. Job redesign and job rotation are two very concrete ways the hygienist can have an impact on one's own health and comfort.[9]

With this knowledge, we're now able to analyze how we position ourselves, our patients, work in the surrounding environments provided and have a better understanding of the responsibility to facilitate change for a healthier practice of dental hygiene.

Lower back pain disables over 5.4 million Americans each year and is the most frequently filed worker's compensation claim.[10] This is one of the more common ailments of dental professionals due to the clinician/patient positioning required for successful treatment. The physical office design variables also play an important role in preventing MSD. With improved chair and equipment designs, including hand instruments and ultrasonic scalers, there are now options to incorporate healthier practice situations by utilizing the new technological changes available to us. With the knowledge that repetitive or static body posture is the main cause of lower back pain, if one does not recognize the situation and make necessary changes, one may be subjected to a shorter career path or, at best, a painful one. Prolonged sitting, contorted body positions, and repetitive tasks with improper instrument grasp are all related to lower back disorders.

There are factors influencing our working posture and the chart above allows for quick easy




identification of what should be addressed and altered if the information gathered does not produce healthy outcomes.[11] By identifying and incorporating obvious risk factors, such as those listed in this chart, we can recognize, address and alter each factor to produce a healthy outcome. For an easy project to begin this process, simply answer each of the questions in the chart.

Treatment for lower back pain may vary from spinal manipulation to exercise, pain control medications to workplace adjustments or complete workplace changes.

Thoracic Outlet Syndrome is a common ailment for dental hygienists. This disorder is caused by dropping the head and hunching the shoulders, unfortunately, not at all an uncommon position for many dental hygienists. This causes a compression of the neurovascular bundle (brachial plexus, subclavian artery and subclavian vein) which are located in a space between the clavicle and the upper border of the first rib.[12] Compression in this area of these structures may cause pain, numbness as well as paresthesia located in the neck and shoulder and may radiate into the suprascapular region. The paresthesia radiates to the ulnar nerve area, as well as in the forearm, and may lead to weakness in the fingers. Treatment often involves physical therapy, combined with consultation from a neurologist, to stretch and lengthen upper quadrant muscles, and posture training exercise to reduce forward head tilt.

Carpal Tunnel Syndrome (CTS) is often associated with the practice of dental hygiene due to the cause and location of the nerve bundle affected. Hand/wrist pain is largely limited to the dominant hand; therefore, the origin of the hand/ wrist symptoms is likely caused by intrinsic hand motions, rather than awkward postures.[13] Repetitive movement with the wrist flexed or extended leads to carpal tunnel issues. The ideal motion for the wrist is not to exceed 10 degrees of flex to 35 degrees of extension. Treatment of CTS may be correction of causative movements along with night splints, physical therapy, nonsteroidal anti-inflammatory drugs and, in cases where these are unsuccessful, surgery may be necessary.

When you begin to realize the complication of posture and motion, you can readily see how dental hygienists should be more aware of work place environment and choices of technology and should facilitate necessary changes for a healthier, more successful career.

## MAGNIFICATION

One of the newest technological advances aiding in ergonomic issues is magnification lenses or loupes. Magnification loupes and lenses are routinely accepted in numerous other health care disciplines but are now


frequently discussed and integrated into daily use in dental hygiene daily practice.

Magnification, and its use in dental hygiene, is now being openly supported and encouraged. Numerous dental hygiene programs nationwide are mandating the use of magnification. Although the clinical integration time frame varies, nonetheless, it is an accepted new standard for clinical practice. Dentists have been utilizing magnification for many years, as have physicians. It only seems logical for dental hygienists to utilize this awesome technology and participate in the team communication on the same level as the dentist in their practice. When oral health providers wear loupes, and see a very similar field, they communicate, treatment plan, diagnose or assess on the same level. This time-saving assessment technology is incredible, however the ergonomic benefits may outweigh any communication or clinical improvement discussion. Dental hygienists have been more cautious in their acceptance and integration of magnification into their daily routine based on various opinions and beliefs.

Magnification integration requires a commitment of time for the clinician to select the specific product that will provide them the most comfort, highest quality of optical loupes, and the correct measurements for the individual. Some of the major downfalls in loupe utilization are incorrect measurements to achieve visual acuity and the clinician attempting to compensate for this. Clinicians must first determine the optimal working position that supports their musculoskeletal health and then select magnification that will support that position.[14] When measured and adjusted correctly for each individual body type and structure, magnification will help place the clinician in a more correct body position. The results of a study by Branson, Bray et al. support statements in the literature that report improved posture with the use of magnification lenses.[15]

Table1: Magnification

| Company Name | Website | Telephone |
|---|---|---|
| Designs for Vision | www.designsforvision.com | 800-727-6407 |
| Orascoptic | www.orascoptic.com | 800-369-3698 |
| PeriOptix | www.perioptix.com | 888-360-0033 |
| Q Optics | www.qualityaspirators.com | 800-858-2121 |
| Royal Dental Group | www.royaldentalgroup.com | 425.743.0988 |
| SheerVision | www.sheervision.com | 877-678-4274 |
| SurgiTel | www.surgitel.com | 800-959-0153 |
| Carl Zeiss,Inc | www.zeiss.com | 800-442-4020 |

Dental hygienists with a willingness to lengthen their careers should consider this as a personal investment and not shy away or ignore the use of something that will aid in their physical well being while waiting for their employer to purchase loupes for them. An investment in your health is well worth it.

An adjustment period also has to be incorporated and, therefore, efficient use of time to integrate this, or any technology, should be addressed. Once the adjustment period has been fulfilled, the clinician will be able to provide patient therapy more consistently and maintain personal musculoskeletal health.





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Table 2: Hand Instruments

| Company Name | Website | Telephone |
|---|---|---|
| ADMT Dental Instruments | www.admtechnology.com | 888-445-2368 |
| American Eagle Instruments | www.am-eagle.com | 800-551-5172 |
| A-Titan Instruments | www.atitan.com | 877-284-8261 |
| Brasseler USA | www.brasselerusa.com | 800-841-4522 |
| Dentsply Professional | www.professional.dentsply.com | 800-989-8826 |
| G. Hartzell and Son | www.ghartzellandson.com | 800-950-2206 |
| Hu-Friedy Mfg. Co Inc. | www.hu-friedy.com | 800-483-7433 |
| Miltex Inc. | www.miltex.com | 866-854-8300 |
| Nordent Manufacturing Inc. | www.nordent.com | 800-966-7336 |
| PDT Inc | www.pdtdental.com | 800-240-9895 |
| Premier Dental Products Co | www.premusa.com | 888-670-6100 |
| Suter Dental Mfg Co Inc | www.suterdental.com | 800-368-8376 |

Research is readily available to select the type and manufacturer that works best for each clinician. Magnification loupes are available in Through-the-Lens (TTL) or Flip-Up styles. A chart of some manufacturers offering magnification lenses is presented here for further research (Table 1).

## HAND INSTRUMENTS

If you choose to go back, way back, to the very beginning of your dental hygiene education, you will remember that one of the first projects you were taught leading to your clinical future was the grasp of the instrument. Many articles have stated that grasp points out of alignment can severely hamper the effectiveness of instrumentation and also contribute to injury and impairment.[16] Positioning of fingers, in conjunction with body and hand positioning, will lead toward better control, pressure and ability to remove deposits. Techniques have been developed that have allowed for a reduction in quick repetitive movements and more stability for control. Slow deliberate strokes, with force applied in the correct manner using a modified pen grasp, allow for relaxation between strokes and, therefore, stability and less tension on the forearm muscles leading to various MSDs. Your thumb on the dominant hand must be able to apply the primary force to the instrument blade. A modified pen grasp allows for the instrument to rest against the bony side of your middle finger and also against your index finger somewhere between the knuckle and the second joint of the index finger.[17] Varying fulcrums, adjusting your position around the patient in the operatory, utilizing more of the variety of instruments offered are all important in preventing MSDs.


Today's instrument market offers an amazing variety of choices from diameter, texture, weight, to blade selection and coatings. You can now select from mini-blade to micro mini-blade and diamond coated (Table 2). Any clinician choosing to vary their instruments to include more options will find themselves in a less static body position, wrists more often in neutral, torso in the proper alignment and less force being used to successfully remove deposits.

As there are no regulations in the dental industry for instrument weight or shape of handles, there are numerous choices available for clinicians that offer varying benefits. The table below shows some of the weight, in grams, as well as the size of the instrument handles. In addition to these two choices, there is also texture to consider. Due to increased ergonomic issues amongst dental professionals, manufacturers have begun to produce larger diameter handles to aid in reducing the pinching grip that was leading to MSDs. When one uses smoother handles, they tend to 'pinch' more than when utilizing a more textured or knurled handle. These more grooved or textured handles allow for less 'pinch,' for lack of a better way to explain, to hold onto them, and therefore reduce the static hand/finger

Flexi Change
Dentsply Professional

Suter Dental

Table 3: Hand Instruments Diameter & Weight

| Company Name | Diameter | Weight |
|---|---|---|
| ADMT Dental Instruments | 9.5 – 12 mm | 14 g |
| A-Titan Instruments | 4.76 – 9.5 mm | 14 – 20 g |
| Brasseler USA | 6.35 – 11.12 mm | 16 – 26 g |
| Dentsply Professional | 8.4 – 11.2 mm | 24 g |
| G. Hartzell and Son | 9.5 mm | 14.5 g |
| Hu-Friedy Mfg. Co Inc. | 6.35 -9.9 mm | 18.4 – 20.8 g |
| Miltex Inc. | 10.33 mm | 22.4 g |
| Nordent Manufacturing Inc. | 6.4 – 16 mm | 11.9 – 26 g |
| PDT Inc | 10 mm | 13 g |
| Premier Dental Products Co | 4.76 – 12.7 mm | 16 – 23 g |
| Suter Dental Mfg Co Inc | 6.35 - 22.2 mm | 10 - 23 g |

position and tension in the forearm. The combination of larger diameter, cross cut or knurled handle is in the best interest of the clinicians' ergonomic health.

Murphy's acronym ***PAARR*** can be used to force oneself into the correct positions that allow for a healthy practice situation day in and day out.

***P***lace the curette subgingivally, using only light pressure
***A***ngle the instrument to the appropriate angle
***A***dapt the toe third of the cutting edge to the tooth
***R***emove by tightening the fulcrum on a hard tissue surface while pressing the adapted cutting edge, activate the working stroke and, as soon as the stroke is completed …
***R***elax the grasp.[18]

The clinician must first want to make the change for a healthier future and then follow through. No one can do it for you, the tools have been created and provided and each individual must implement them into their particular practice setting.

## ULTRASONICS

Over time, the use of power driven instruments has increased dramatically. Research has led to published results of numerous benefits to clinicians and patients by their use, including lavage, debridement and less fatigue. A recent survey published in *Hygienetown* indicates many hygienists are now incorporating this tool into their armamentarium to provide dental hygiene therapy. While many years ago there was really one commonly used type of scaler, the sonic, we have added magnetostrictive and piezoelectric. These two types of power driven scalers offer the clinician a break from hand instrumentation force and grasp as well as increased patient benefits.

It appears traditional that dental hygienists become proficient with the use of one type of ultrasonic scaler predominately and not routinely trained on the use of different brands/types while in school. This selection often occurs after graduation while employed in a practice which already has one or the other in the operatory (Table 4).


*Parkell Turbo Sensor Ultrasonic*

Ultrasonic manufacturers are now addressing handle weight, length, diameter and function. You will now see rotation of the cord so there is less drag on the handle, eliminating or reducing the need to tighten the grasp on the ultrasonic handpiece. Manufacturers creating only inserts have also taken a look at making changes that would incorporate advanced instruments tips as well as LED lights to assist in proper technique, debris removal and tip adaptation (Table 5).

## CLINICIAN OWNERSHIP

The clinician should consider purchasing the professional equipment used daily to deliver patient care and ensuring your health and professional longevity. Magnification is clearly in this category, as the optical system is designed for the individual - you wouldn't dream of sharing them with a colleague.

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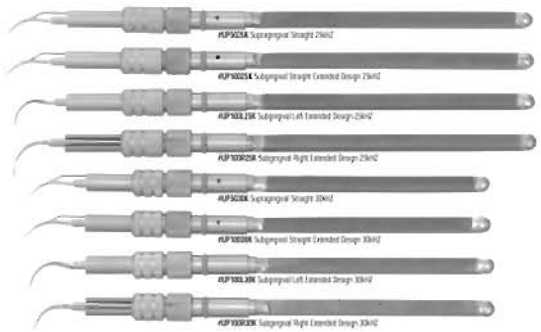
## Table 4: ultrasonic unit or insert manufacturers

| Company | Website | Telephone |
|---|---|---|
| Brasseler | www.brasselerusa.com | 800-841-4522 |
| Coltene Whaledent | www.coltenewhaledent.com | 800-221-3046 |
| DBI America | www.dbidental.com | 800- 884-3507 |
| Dentsply Professional | www.professional.dentsply.com | 800-989-8826 |
| Discus Dental | www.discusdental.com | 800- 422-9448 |
| G. Hartzell and Son | www.ghartzelladnson.com | 800-950-2206 |
| Hu-Friedy | www.hu-friedy.com | 800-483-7433 |
| Odontoson | www.odonto-wave.com | 800-368-5776 |
| Parkell | www.parkell.com | 800-243-7446 |
| Premier Dental Products | www.premusa.com | 888-670-6100 |
| Pro Dentec | www. prodentec.com | 870-698-2300 |
| Satelec | www.satelec.com | |
| Vista Dental | www.vista-dental.com | 877-418-4782 |

## Table 5: Ultrasonic unit/insert type

| Company | Unit or Insert or both | Product Name |
|---|---|---|
| Brasseler | Piezo electric unit and inserts | Varios 750 Lux Multi-Function Piezoelectric Ultrasonic System |
| Brasseler | Piezo electric unit and inserts | Varios 350 Lux Compact Multi-Function Piezoelectric Ultrasonic System |
| Coltene/Whaledent | Magnetostrictive unit and inserts | BioSonic scaler |
| DBI America | Piezo electric unit and inserts | The Swift |
| Dentsply Professional | Magnetostrictive unit and inserts | Cavitron SPS, Cavitron SPS Select |
| Dentsply Professional | Magnetostrictive Swivel Handpiece | Steri-Mate handpiece with Swivel |
| Discus Dental | Magnetostrictive Insert | Protégé |
| Discus Dental | Magnetostrictive lighted insert | Protégé LED |
| G. Hartzell and Son | Magnetostrictive Ultrasonic Implant Tips | Ultrasonic Implant Tips |
| G. Hartzell and Son | Magnetostrictive Ultrasonic Tips | Ultrasonic Tips |
| Hu-Friedy | Magentostrictive Inserts | Ultrasonic Inserts Swivel |
| Odontoson | Magnetostrictive unit and inserts | Odontoson-M |
| Parkell | Magnetostrictive unit and inserts | TurboSENSOR |
| Parkell | Piezo electric unit and inserts | TurboPIEZO |
| Pro-Dentec | Piezo electric unit and inserts | Pro-Select$^3$ Periodontal Therapy System |
| Satelec | Piezo electric unit and inserts | P5 Newtron, P Max, Prophy Max |
| Vista | Piezo electric unit and inserts | Piezo Advantage |


***Bellissima Inserts (Dentsply Professional)***



In the same manner, hand instruments and power scalers should be seriously considered for personal ownership. Reasons for purchasing your own include:

- You select the equipment for the features you want
- You know your equipment is properly maintained, reducing the risk of broken, damaged or non-functioning equipment
- You achieve greater proficiency and comfort with the equipment since you don't have to adjust to different equipment daily
- You have taken ownership of your professional health

Ownership ensures you have equipment with which you are comfortable, but you also know its working condition. One of the more frustrating experiences is arriving at work only to find the power scaler unit is broken and you are not able to use it for that day or week while it is being repaired. Or you pick up hand instruments, to find they have been ruined by poor sharpening or careless handling in the sterilization process. Protecting your equipment protects your working environment.

Ownership not only allows for a healthier clinician, it also shows empowerment and professionalism. The employer now realizes the dental hygiene clinician is confident enough to purchase what they need without question and will work with the equipment necessary to provide consistent, ethical treatment to their patients. This speaks volumes to the entire dental team! If you put that message aside, one can also understand the value of knowing that, every day your are in practice, you know for sure that you can perform to the best of your ability, without compromise of broken instruments, inserts or unit, by misuse or abuse by other clinicians.

## CONCLUSION

In addition to what we use for dental hygiene therapy to mechanically remove deposits, we also need to investigate healthier support systems. These include gloves that are right and left handed, not ambidextrous, which fit us comfortably and properly without forcing or straining both hands. Sharpening systems, illumination, handpieces, prophy angles, patient chair, clinician chair, instrument delivery systems, anesthetic syringes along with personal protective equipment that work for each of us individually should be addressed. Gowns, safety glasses and any other general products should be looked at as we have here with instruments, magnification and posture. Dental hygienists exercise a unique option when there are problems in the office as they may simply reduce their hours in that particular office and work in another setting. Hence, they are less compelled than most workers to institute actions leading to change.[19]

One important factor is the importance of health in our personal lives. If we do not reduce personal stress from our work and personal surroundings, it will carry over and appear as MSDs in some form or fashion. Exercise, a healthy diet, stress reduction/relaxation techniques, adequate rest, efficient time management along with the recognition of what must be changed are all imperative changes to address. Behavior concerns with office staff as well as employers may come into play with stress. However, if we begin to take ownership for our part of this and facilitate identified changes to improve our situation for ourselves, we are heading in the right direction for a longer, healthier career in dental hygiene. There is no one that can make these changes for us, we must empower ourselves to do this and commit to following through.

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There are strong, personal and professional empowerment rewards when one takes charge of their future and makes the investment in products and technology. By selecting purchase options and slowly integrating your personal choices into your armamentaria, you control more of your environment and lessen the causes and risks of MSDs to which you are exposed. This investment will not only enhance careers but also promote the use of advanced technological research for better health and career longevity.

## About the Author

Tricia Osuna, RDH, BS, received a Bachelor of Science degree in Dental Hygiene from the School of Dentistry, University of Southern California, in 1978. In addition to private practice clinical practice in the Los Angeles area, Tricia was a clinical instructor at the UCLA School of Dentistry in the Department of Advanced General Dentistry.

She served for four years as the Dental Hygienist Representative on the USC Dental Alumni Association Board of Directors.

In March of 2002 Governor Gray Davis of California appointed Tricia to a four year term as the Dental Hygiene Board Member on the Dental Board of California.

Professionally, Tricia has been an ADHA member for 28 years, serving as an elected delegate to the Annual Sessions of the Southern California Dental Hygienists Association, California Dental Hygienists' Association and American Dental Hygienists' Association. She has served as President of the South Bay Dental Hygienists' Society along with numerous positions in both Los Angeles and South Bay Dental Hygienists' Societies. Tricia is also a member of the American Academy of Dental Hygiene.

In 1992 she was elected President of the California Dental Hygienists' Association. Recognized for her many efforts and contributions to the Dental Hygiene profession, Tricia has received several awards including the CDHA's President's Recognition Award, the ADHA Bausch and Lomb "Distinctions in Dental Hygiene" Award and, most recently, the American Dental Hygienists' Association Distinguished Service Award.

Tricia has authored several articles on topics such as: Empowering Dental Hygienists, Magnification, Xerostomia, Digital Radiography and The use of Safety Syringes, as well as the chapter in the book, *Demystifying Smiles*, on fluoride utilization.

Tricia owns her own company, Professional Insights, Inc., which provides consulting services, continuing education courses, student presentations and market research evaluations on dental and dental hygiene products to companies worldwide. She was the Corporate Relations Consultant for the California Dental Hygienists' Association for seven years. Tricia enjoys presenting seminars and research clinics on a variety of topics. She has lectured throughout the United States as well as internationally. Her fun, humorous approach has received rave reviews!

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