

A Users Guide to Tip and Insert Options

Kristy Menage Bernie, RDH, BS

Progressive clinicians have long realized the benefits of powered instrumentation to the point that some are no longer relying on hand instruments. A review of the literature reports no difference between hand scaling and scaling with an ultrasonic device in terms of clinical outcome. However, with respect to time, powered instrumentation is 36.6% quicker.¹ A review of autotuned ultrasonic instrument options (most commonly used), as well as insert/tip selection, will arm clinicians with the basic information required to integrate this time-saving protocol into daily practice.

Background of Ultrasonic Instrumentation

The availability of dental ultrasonic instrumentation dates back to the late 1950s with the introduction of the first stand-alone manually tuned system. The late 1960s marked the arrival of the first autotuned system, but the widespread use of these devices was lacking until the 1970s, when new inserts that reduced aerosols via internal water flow were made available and ultrasonic instrumentation was primarily confined to supragingival deposit and stain removal.^{2,3}

Most practices use ultrasonic devices, though other sonic options exist. Ultrasonic frequency ranges from 18,000 to 50,000 vibrations per second and includes both magnetostrictive and piezoelectric technology or platforms. Both platforms include a range of tips for various purposes with magnetostrictive inserts being interchangeable within its platform—that is, magnetostrictive inserts can be used with any magnetostrictive ultrasonic unit provided it has the matching frequency (25K vs 30K). The piezo platform tips are specific to a piezo unit and/or manufacturer and cannot be interchanged.

Historically, magnetostrictive units required manual tuning of the insert. Today, most units are available with autotuning, minimizing the need for finite adjustments.⁴ Proponents of manually tuned devices appreciate the control they enjoy with their equipment vs autotuning. For these clinicians, the manual-tune option is still available exclusively in magnetostrictive systems. Nevertheless, most units used today operate on autotuned magnetostrictive and piezo technologies.

The 2 ultrasonic platforms have their own advantages and seem to be differentiated only based on clinician preference. Magnetostrictive insert tips vibrate in an elliptical motion, while piezo tips move in a linear pattern. Both offer the advantage of using water or antimicrobials (eg, chlorhexidine) during the procedure, and both require a light feathering motion with minimal pressure starting at the top of the pocket,

vs the bottom of the sulcus as with hand instrumentation.

Advantages and Disadvantages in Comparison to Hand Instrumentation

The advantages of ultrasonic instrumentation over hand instrumentation include an increased efficiency with respect to time, no need for sharpening, less chance for repetitive stress injuries, less tissue distention, and multiple active tip surfaces for deposit removal.⁵ In addition, ultrasonic instrumentation uses water for lavage and irrigation, resulting in microstreaming and cavitation. These 2 actions (microstreaming and cavitation) are important in removing endotoxins and biofilms from diseased tissue and tooth surfaces.^{5,6} Finally, in microstreaming and cavitation, the frequency of ultrasonic tips fracturing deposits is far better than sheer force removal. Ultrasonic frequency ranges from 18,000 to 50,000 vibrations per second.

The use of ultrasonic instrumentation will save time in the practice and provide clients with tangible results.

The reported disadvantages of ultrasonic instrumentation compared with hand instrumentation are that ultrasonic instrumentation is restricted by more precautions and limitations. Some users complain of reduced client comfort as a result of water spraying, aerosol production, and temporary hearing shifts. These disadvantages are easily managed today with the availability of inserts/tips that do not produce as much aerosol or water and some argue that hand instrumentation has its own distinct level of client discomfort. Additionally, there may be less tactile sensitivity and reduced visibility because of the volume of water in the field.^{5,6}

Both instrumentation options result in similar clinical outcomes, and research conducted today

establishes baseline clinical starting points via instrumentation, which generally include using a combination of both ultrasonic instrumentation and hand instrumentation. For example, the latest research conducted in the area of locally applied antibiotics/antimicrobials uses a combined approach and completes full-mouth instrumentation in a matter of days instead of weeks. Additionally, ultrasonic instrumentation represents a significant time saving over hand instrumentation, with an average instrumentation time reduction of 36.6% and approximately 1 hour saved per full-mouth periodontal case.^{1,7,8}

Indications and Contraindications for Ultrasonic Instrumentation

Indications for ultrasonic instrumentation include just about any debridement case with the exception of those patients with a suppressed immune system; uncontrolled diabetes; chronic pulmonary disease, such as asthma, emphysema, cystic fibrosis, or pneumonia; cardiovascular disease with secondary pulmonary disease; patients who may have difficulty swallowing; and children 13 years of age or younger.⁵ Caution should be used with patients who have pacemakers (older, unshielded pacemakers can be disrupted by ultrasonic frequency), communicable diseases, demineralized tooth surfaces and/or exposed dentin, esthetic restorations, and dental implants.⁵ As with any questionable condition, authorization from the patient's physician is warranted and, with appropriate precautions, contraindications can be minimized.

When these exceptions are taken into consideration, ultrasonic instrumentation can be used for the lightest of plaque removal procedures to heavy stain and calculus removal. Subgingival removal of calculus, bacterial plaque biofilm, root surface constituents, and periodontal pathogens represent key indications for ultrasonic instrumentation. In addition, ultrasonic instrumentation can be used during surgical procedures and to remove orthodontic cement. The range of inserts/tips available today provides clinicians with the tools to increase efficiency for an array of conditions. As a general rule, thicker tips are used for heavy supragingival calculus and stain, while thinner tips are used subgingivally. Table 1 on page 15 and Table 2 on page 16 will assist clinicians with insert/tip selection and current options.

Technological Advances

Recently, advancements in ultrasonic instrumentation have gone beyond slimmer tips for subgingival use. One area of increasing concern is that of ergonomics, which is the pursuit of reducing user fatigue and repetitive injury



Kristy Menage Bernie, RDH, BS

Kristy is director and cofounder of Educational Designs, a dental hygiene consulting service that devises and implements educational-based marketing strategies. She is an active member of the American Dental Hygienists' Association and serves as immediate past president of the California

Dental Hygienists' Association. She welcomes comments at (925) 735-3238 or kmenageb@aol.com.

Table 1—Magnetostrictive Ultrasonic Insert and Equipment Options

Manufacturer	Unit and Insert Options	Other Equipment	Supragingival Options	Subgingival Options	Additional Information
DENTSPLY Professional, York, Pa (800) 989-8826 www.professional.dentsply.com	Unit Options 30K Cavitron® SPS Ultrasonic Scaler 25K Cavitron® Select 25KCavitron® BOBCAT Ultrasonic Scaler 30K Cavitron® JET with SPS Technology Insert Options Inserts come in 25K or 30K, except where noted	Cavitron® SteriMate® Handpiece with Swivel DualSelect™ Dispenser System	External Water Classic “P” Insert Series: 25K only, metal grip Flow-Through Water Thru Flow® (TFI®) Series: plastic grip Internal Focused Water Focused Spray® (FSI®) Inserts: plastic grip, in Bellissima™ comfort grip	External Water Slimline Insert Series: straight/right/left metal grip Internal Focused Water Focused Spray® (FSI®) Slimline® (SLI®): straight/right/left inserts, plastic grip, also available with Bellissima comfort grip	Continuing education programs available to interested groups and schools on ultrasonic use; additional seminar topics available.
Discus Dental, Inc., Culver City, Calif (800) 422-9448, www.discusdental.com	Unit Options 30K or 25K Protégé™ Scaler: auto and manual tune options in one unit, cordless foot pedal, comes with ergonomic ProGrip™ rotating handpiece Insert Options All insert options come in 25K or 30K, and all Protégé inserts feature a patent-pending coated tip designed to extend the life of the insert	ProGrip™ 360° rotating handpiece comes with Protégé units and is also available for retrofitting on other magnetostrictive units	External Water “P”-Series Inserts: metal grip Flow-Through Water StandardFlow™ Inserts (SFI™): plastic grip, available with soft grip and LED light for enhanced visibility Internal Focused Water PrecisionFlow™ Inserts (PFI™): plastic grip, available with soft grip and LED light for enhanced visibility	External Water “P”-Series ThinTip Inserts straight/right/left inserts, metal grip, straight tips include built-in wear indicator Flow-Through Water StandardFlow™ ThinTip Inserts: straight/right/left inserts, plastic grip, straight tips include built-in wear indicator, available with soft grip and LED light Internal Focused Water PrecisionFlow™ ThinTip Inserts: straight/right/left inserts, plastic grip, straight tips include built-in wear indicator, available with soft grip and LED light	Continuing education programs available to interested groups and schools on ultrasonic use; additional seminar topics available.
Hu-Friedy, Chicago, Ill (800) 483-7433 www.hufriedy.com	Insert Options All insert options come in 25K or 30K		External Water Original Propy Designs™: Metal or plastic grip Flow-Through Water Streamline Designs™: plastic grip Satin Swivel™ Inserts: plastic grip that swivels during use, available in limited styles (#10/#1000) Internal Focused Water Satin Swivel™ Direct Flow™ Inserts: plastic grip that swivels during use, available in limited styles (#10/#1000)	External Water After Five™: straight/right/left inserts, metal grip After Five PLUS™: straight/right/left inserts, plastic grip Furcation PLUS™: subgingival/furcation debridement, straight/right/left, plastic grip, 0.8-mm ball-end design Furcation™: same as Furcation PLUS, except metal grips Flow-Through Water Satin Swivel™ Inserts: available in limited styles (#100 Universal), plastic grip that swivels during use Internal Focused Water Satin Swivel™ Direct Flow™ Inserts: available in limited styles (#100 Universal), plastic grip that swivels during use	Continuing education programs available to interested groups on instrumentation (hand and powered).
Parkell, Inc. Farmingdale, NY (800) 243-7446 www.parkell.com	Unit Options Basic Model Clean Machine™; Manual or Auto 30K TurboSensor™ Ultrasonic Scaler; Dual-Handpiece Turbo 25-30 Scaler Insert Options Inserts come in 25K or 30K	Periosonic® Multi-Fluid Irrigator	External Water Universal: metal grip	External Water Straight Perio: metal grip Flow-Through Water Burnett Power-Tip™ Subgingival scaling: metal grip Super-thin Curved Perio: right/left inserts, metal grip	
Premier Dental Products Plymouth Meeting, Pa (888) 670-6100 www.premusa.com	Insert Options All inserts come in 25K or 30K		Flow-Through Water Big Easy™: comfort grip	External Water External Flow “P” Style Insert: universal/straight/right/left inserts, metal grip	Continuing education programs offered to groups on topics other than use of ultrasonics.

NOTE: In general, thicker tips are designed for supragingival deposit removal, while thinner tips are best suited for light, fine, or subgingival use. Thinner tips also work best with low to medium power settings on most equipment. Insert tip maintenance is essential. When a tip loses 1mm in length, efficiency is reduced by 25%. Use wear indicator (on tip or on provided card) often to ensure peak performance, and when worn past 1mm, replace. Cleaning of inserts should not include placement in ultrasonic cleaning devices. Simply rinsing, drying, and bagging the inserts will suffice. Refer to specific manufacturer instructions for care and use for additional information.

Table 2—Piezoelectric Scaler Options

Manufacturer	Unit Options	Other Equipment	Tip Options
Electro Medical Systems SA (EMS), Dallas, Tex (800) 367-0367 www.ems-dent.com	Piezon® Master 600, Piezon 600, Piezon® Master 400, miniPiezon®	Two-bottle irrigation, reservoirs for up to 40 minutes of treatment, and option for a second handpiece on the Piezon 600. One irrigation bottle, compact design for the Master 400 and Mini versions	Instrument A used for general supragingival deposit on all surfaces of all teeth. Instrument B used for gross supragingival deposit and orthodontic cement removal. Instrument C used for removal of heavy deposits on anterior teeth. Instrument PS used on subgingival surfaces (all teeth including sulcus and interproximal spaces), used on subgingival surfaces and for maintenance and supragingival deposit removal. Instrument PL3 used for periodontal maintenance (all surfaces). Instruments PL1 (curved left) and PL2 (curved right) are used for periodontal debridement, especially in the maintenance phase. Shaped for lingual and buccal surfaces as per quadrant and improved access to furcations. Instruments PL4 (left-curved) and PL2 (right-curved) have tiny ball-ends and are used for the debridement of furcations and even concavities. Shaped for lingual and buccal as per quadrant. Piezon® Implant cleaning tip is coated for safe use around dental implants. Perio Diamonds has 2 grain tip options for periodontal debridement.
Professional Dental Technologies, Inc, Batesville, Ark (870) 698-2300 www.prodentec.com	Pro-Select Piezo3®-Ultrasonic Scaler	Autoclavable handpiece with 4 autoclavable medicament bottles	
Satelec Inc U.S.A./Groupe Acteon, Mount Laurel, NJ (800) 289-6367 www.satelecusa.com	Suprasson® P5 Booster, Suprasson® P Max, Suprasson® P Max Lux, Suprasson® Prophy Max (Ultrasonic)	P5 Booster has quick connect, and the P Max and P Max Lux units have medicament reservoirs; P5 Booster, small and compact; P Max Lux also has a fiber optic light in the handpiece	#1 Universal Scaler Tip: supragingival all surfaces. 10Z Scaler Tip: supra- and subgingival debridement. 10X Scaler Tip: shallow pockets. BDR perio kit: biofilm disruption and removal tips (TK1—straight; TK1S—short; TK1L—long; TK21L—left, TK21R—right). Bladed tips: H3/universal use, H4L/left, H4R/right; bladed like a curette for general periodontal debridement. Diamond-coated tips: H1/universal tip, H2L/left, H2R/right; good for tight spaces and furcations. Carbon composite tips: PerioSoft™ line that can be used on dental implants and esthetic restorations. (PH1/universal tip, PH2L/left, PH2R/right).

(eg, carpal tunnel disorder). Manufacturers have responded by offering swiveling tips and rotating handpieces, which reduce the bearing load of cords and maximize ease of use. Additionally, the introduction of smaller, lighter units has increased portability, thereby facilitating frequent use. Advances in the area of clinical visibility are on the horizon, such as one manufacturer planning to offer inserts with embedded LED lights.

A wide array of tip innovations have been designed to maximize value and make equipment maintenance easy. For example, coated tips are designed to maintain an instrument's peak performance for a longer period of time. The patent-pending coating also allows for retipping, thereby delivering added value to the office. Tips with built-in wear indicators will help

clinicians assess when their insert needs to be replaced before its efficiency drops off. Relatively new to the marketplace are diamond-coated tips for finite smoothing in the piezo category, and for surgical use in the magnetostrictive category. And finally, all manufacturers are offering uniquely styled grips that are thicker and softer for greater ergonomic benefit and stippled for better grip.

Conclusion

New technologies, esthetic treatment options, and assessment tools enhance education and treatment planning, and have left clinicians in an enviable quandary. As time becomes even more of a precious commodity, it is more important than ever for clinicians to become more effective and more efficient so they do not expand the average

dental hygiene appointment. The use of ultrasonic instrumentation will save time in the practice and provide clients with tangible results. A reduction in instrumentation time will provide a greater opportunity for the implementation of vital new services like tongue plaque removal and tooth shade registration without compromising basic patient care. This category of instrumentation will continue to grow with new innovations that will maximize results while giving clinicians the features they need to integrate ultrasonic instrumentation into daily practice. **COH**

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