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Piezo technology has been a well-kept secret for many years but it is now being recognized as a more efficient and effective method of delivering ultrasonic dental care. It can become an invaluable adjunct in any office to enhance and improve the delivery of endodontic, periodontic, and oral hygiene treatments. It can become a great asset for practitioners who are delivering a wide range of treatment modalities.

Why ultrasonic? Ultrasonic units have been used for many years for making dental care more efficient for the operator and more comfortable for the patient. Ultrasonic scaling has also been shown to achieve “cavitation,” which is the creation and implosion of thousands of microscopic bubbles, a very effective method of removing biofilm, or naturally occurring colonies of oral bacteria in the mouth.

Why piezo? In the past the most popular ultrasonic units, for example the Dentsply Cavitron, utilize “magnetostrictive” technology. These devices operate by vibrating the tip in an elliptical (figure-eight) pattern. This causes the tip to slam against the side of the tooth structure in a less controlled manner while generating a great deal of heat, requiring copious amounts of water to keep the tip cool. Piezo units, like the AZ Ultrasonic by J. Morita USA, are designed to have the tip move in a linear (back and forth) motion. The operator has greater control with the piezo than with the magnetostrictive device which results in improved patient comfort. Due to the low level of heat generated by the piezo technology, minimal water is necessary and only a light water mist is required while operating this type of ultrasonic unit.

Ridge-splitting using piezo

Mandibular alveolar atrophy often limits the placements of dental implants. Dr. Souheil Hussaini of the United Arab Emirates has reported on a refinement of a technique for widening the atrophic ridge by splitting the alveolar bone longitudinally, using a piezo surgery machine. The treatment was of a patient with a severely resorbed edentulous mandible.

Three 4-mm wide by 11.5-mm long threaded Laserlok implants were placed immediately within the split and surrounded with a mixture of autogenous tissue and (tricalcium phosphate) synthetic bone. The advantages of this technique for patients include less surgical trauma and treatment time.

The ridge-splitting technique associated with immediate implant placement and bone augmentation is less invasive than traditional approaches to grafting the atrophic mandible. The type of the tapered implants used appeared to be important for reducing the stress generated inside the bone because of the incremental cutting edge, avoiding cortical plate fracture, and improving the healing results.

Also, the use of bone spreaders as a wedge to keep the spreader bone apart for the implant placement was described. In the present 2 cases, the 5-mm-wide alveolar ridge of the patient experienced a net gain of more than 7mm with 1.5mm on both sides, enabling placement of 4mm-wide implants. This technique also makes feasible to place implants into atrophic single-tooth and partially edentulous sites, as the additional control achievable by using multiple instruments to widen the ridge gently and gradually makes it easier to avoid the loss of bone around adjacent teeth. Ridge widening with this technique can be performed throughout the entire mandible; alternatively, it may be an option before conventional block graft procedure.

Some of the piezo ultrasonic units have great features such as a “self-adjusting” technology that maintains the selected power level despite contact with the tooth. There is no “bogging down” as the tip is working. Another advantage to the piezo is the wide range of usage. There are more than 50 tips available for scaling, root planing, endodontics (both intracanal and retrograde), and restorative use. Many of the scaling and periodontal tips are shaped and operate like traditional hand scalers so the operator will easily understand how to use them. The autoclavable AZ Ultrasonic handpiece is very light (50 g) and designed with ergonomics in mind. The unit also comes equipped with a “quick disconnect” attachment for easy connection to the existing water supply.

Piezo technology offers great advantages to the operators. It is important to understand the difference between piezo and magnetostrictive technology prior to purchasing this type of equipment.