for drilling, cutting and remodeling minized tissues. The cutting action produced by the unique modulated ultrasonic vibration Piezosurgery is micrometric (extreme precision) and selective (no trauma to soft tissue); additionally, combined with irrigation, the vibration produces a “cavitation effect” that helps to keep the surgical site sterile and bloodless. Over the years, as the result of Mecron’s continuous technological innovation, more than 50 insert tips have been designed and engineered to provide surgeons with the best cutting tools for each anatomical situation. Indeed, Piezosurgery allows one to perform bone surgeries with high precision, greater respect for soft tissues, greater visibility and enhanced healing.

What are the advantages of Piezosurgery in implant and bone surgery? The surgical advantages of Piezosurgery are many and truly remarkable. First, Piezosurgery delivers high precision. The ultrasonic wave employed by the device is a “microvibration,” which compared to the macrovibrations of traditional bone-cutting instruments makes this technology incredibly more precise and safe. Indeed, the cutting action does not require as much pressure and can be interrupted at any time to check the progress of the surgery. The cutting action is then resumed and refined as needed, with precision and safety for both the surgeon and the patient. Second, Piezosurgery’s cutting action is harmless to soft tissues. Thanks to the specific resonance range, the device is extremely effective on mineralized tissues but totally harmless to soft tissue, allowing for a safety level never experienced before.

This feature is obviously of crucial importance when operating in proximity of delicate soft-tissue structures, such as blood vessels, nerves, mucosa, etc. Third, thanks to its dual-wave technology, Piezosurgery delivers maximum intraoperative visibility.

When the “hammering effect” produced by the wave modulation on the insert tip hits the irrigation solution, the latter is converted in a fine spray. The sprayed molecules of the irrigation fluid hit the cutting site, cool it down and produce a temporary hemostatic effect, allowing for maximum visibility during surgery. Once terminated, the surgery bleeding resumes, hence starting all biological processes leading to osseous healing. Lastly, one of the greatest advantages of Piezosurgery is the fact it is gentler to the tissues and, in fact, reduces faster healing. Histological and biomolecular studies have shown that compared to traditional techniques, the use of Piezosurgery is not only characterized by minimal postoperative bone loss but actually promotes faster healing. In my opinion, this incredible feature makes Piezosurgery the preferable instrumentation for most bone surgical applications.

How did your father, Dr. Tomaso Vercellotti, get involved with Piezosurgery? Prompted by the limitation in precision and safety of traditional bone-cutting instruments, my father pioneered the use of piezoelectric ultrasonic frequencies for bone surgery. Upon realizing that the effectiveness of conventional ultrasonic instruments in cutting bone was extremely limited, he set off, in conjunction with Mectron Medical Technology, to develop a new technology that would allow overcoming such limitations. Their joined efforts resulted in the creation of Piezosurgery, a technology that has truly revolutionized the way we approach bone surgery. My father’s clinical and scientific efforts were truly indispensable to make Piezosurgery into a surgical revolution. First, he wanted to ensure that this new technology would truly benefit surgeons and patients alike, improving surgical predictability and reducing morbidity and complications.

To this goal, my father engaged in several research collaborations with clinicians and institutions across the world. In addition to studies on cutting efficacy of the technology and osseous healing response in animal models, several clinical studies have shown that compared to traditional techniques, the use of Piezosurgery is not only characterized by minimal postoperative bone loss but actually promotes faster healing. In my opinion, this incredible feature makes Piezosurgery the preferable instrumentation for most bone surgical applications. To date, Piezosurgery is the only piezoelectric surgical technology that has been demonstrated to be effective and successful by the clinical community through peer-reviewed publications. The number of publications on Piezosurgery increases every day, testimony of the clinicians’ understanding of the truly revolutionary nature of this technology.

The results of this research, published in more than 70 scientific articles, prove the advantages of Piezosurgery and make a compelling, evidence-based argument for its adoption in a variety of bone surgical applications.

Why did he get so passionate about this procedure? My father realized immediately the technology he had developed had remarkable characteristics and understood he had an opportunity to simplify and improve a variety of surgical procedures. Along with several international colleagues, for several years he has been developing new surgical protocols and procedures. As a result, an entirely new technology has been developed.

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