PIEZOSURGERY®

A REVOLUTION IN BONE SURGERY

A manifold list of advantages and benefits, which appear during and after surgery:

-- INTRAOPERATIVE ADVANTAGES

- Selective Cut  Maximum safety for surgeons and patients. Reduced risk of damaging soft tissues (dura, nerves and vessels).

- Micrometric Cut  Maximum surgical precision and intra-operative tactile sensation. Minimal bone loss through the cutting depth.


-- POSTOPERATIVE BENEFITS

- Healing  Better and faster bone healing.

- Edema  Reduced the postoperative swelling and discomfort.

-- CLINICAL EVIDENCE

-> "Piezosurgery is a safe tool for selective bone cutting for opening of the internal auditory canal with preservation of facial nerve and hearing function in acoustic neuroma surgery."  

-> "Piezoelectric device allows surgeons to achieve better results compared to a traditional surgical saw, especially in terms of intraoperative blood loss, postoperative swelling and nerve impairment. This device represents a less aggressive and safer method to perform invasive surgical procedures such as a Le Fort I osteotomy."  

-> "Piezoelectric surgery reduces the impact on soft tissues (vessels and nerves) which lie adjacent to the areas of treatment. Compared to traditional methods it enables optimal healing because it reduces the post-surgery swelling and discomfort."  

Picture taken from surgeries performed by Prof. M.I. Rossello, San Paolo Hospital, Savona, Italy
Perfect integrity of the osteomized surfaces with a cut which is clean, regular and without imperfections or pigmentation. The bone surface which was cut using the piezoelectric device showed no sign of lesions to the mineralized tissues and presented live osteocytes with no sign of cellular suffering. *Mediterranea Journal of Surg Med* 2001; 9:89-95.

**Osteotomy tissue sections, Gomori trichrome stain.**

Histomorphometric analysis performed 15 days after osteotomy with bone saw (Bs), Piezosurgery® *medical device* (Pm) and the new Piezosurgery® *plus device* (Pp) shows that the thickness (red dotted line) of the osteotomy (between the 2 blue dotted lines) is significantly higher in Bs with respect to Pm and Pp.

BV/TV % values. The area of newly deposited bone (BV) with respect to the total area (TV) of the osteotomy (expressed as %) is higher with Pm and Pp than with Bs, this difference is not statistically significant.

---

**MACRO-VIBRATIONS**

Bone bur

---

**MICRO-VIBRATIONS**

Bone saw

---

**Limited surgical control**

**Lack of precision**

---

**High surgical control**

**Precision and safety**

**Clinical and histological advantages**

---

**SCIENTIFIC STUDIES**

Osteotomy tissue sections, Gomori trichrome stain. Histomorphometric analysis performed 15 days after osteotomy with bone saw (Bs), Piezosurgery® *medical device* (Pm) and the new Piezosurgery® *plus device* (Pp) shows that the thickness (red dotted line) of the osteotomy (between the 2 blue dotted lines) is significantly higher in Bs with respect to Pm and Pp.

BV/TV % values. The area of newly deposited bone (BV) with respect to the total area (TV) of the osteotomy (expressed as %) is higher with Pm and Pp than with Bs, this difference is not statistically significant.

---

Anesi A.1, Palumbo C.1, Salvatori R.1, Cavani F.1, M. Ferretti.1, Chiarini L.1: Preliminary findings of a potenziated piezosurgical device at the rabbit skull.

1Cranio-Maxillo-Facial Surgery, University of Modena and Reggio Emilia, Modena, Italy

2Human Morphology Section – Department of Biomedical, Metabolic and Neural Sciences, University of Modena and Reggio Emilia, Modena, Italy
PIEZOSURGERY® plus
THE COMPLETE DEVICE

When it comes to bone surgery, PIEZOSURGERY® doesn’t leave much to be desired. From reconstructive to thoracic surgery – PIEZOSURGERY® offers the largest range of applications on the market.

PIEZOSURGERY® plus is the complete device: it comes with nearly every surgical possibility, from maxillofacial surgery to neurosurgery.

---

**SURGICAL APPLICATIONS**

- ORAL/MAXILLOFACIAL SURGERY
- OTOLARYNGOLOGY
- PLASTIC/RECONSTRUCTIVE
- HAND SURGERY
- FOOT SURGERY
- NEUROSURGERY
- SPINE SURGERY
- ORTHOPEDICS
- THORACIC SURGERY

---

**PIEZOSURGERY® plus**

- Power joins precision
- High efficiency
- High level technology
PIEZOSURGERY® *plus*

→ FOR EVERY SURGERY

Maximum efficiency, maximum control, maximum performance - you name it: PIEZOSURGERY® *plus* is the device for everyone who wants everything – and can be used for nearly all surgeries, from reconstructive to thoracic, from maxillofacial to neurosurgery.

Thanks to innovative features like its two different channels with different handpieces, it provides you with perfect results in nearly every surgical field.

CHANNEL 1 – MEDICAL HANDPIECE

→ Superior intra-operative control and surgical sensitivity
→ Maximum flexibility in creating osteotomy lines
CHANNEL 2 – MEDICAL + HANDPIECE

- Maximum performance with highly mineralised bone
- Maximum efficiency through all the cutting depth
PIEZOSURGERY® plus can guarantee maximum performance, maximum safety for surgeons and patients and easiness of use, thanks to its high technology.
STEP 1: select the channel desired.

STEP 2: choose the insert.

STEP 3: confirm the settings by pressing OK.

STEP 4: start surgery.

piezosurgery® plus is provided with APC (Automatic Precision Control) software, which guarantees maximum safety. The software automatically recognizes deviations from normal functioning and stops the device in less than 150 ms. The error message on the screen allows for easy restoration of operating conditions. Two independent handpieces are provided, allowing for greater flexibility and performance during surgery.

Touch Screen

All functions can be managed by the touch screen. Choosing the handpiece, selecting the surgical type, switching from one handpiece to the other is just a touch on the screen.

Smart Software

piezosurgery® plus is provided with smart software. For each surgical tip, the software automatically sets the optimal working settings. Power and irrigation levels can also be adjusted manually depending on the surgical needs.
SURGICAL INSERTS

MAXIMUM QUALITY

During surgery, an ultrasonic insert oscillates up to 36,000 times per second.

That’s why we use only medical grade stainless steel in the production of mectron inserts – and why every single ultrasonic insert has to pass 12 working steps before it is ready to bear our name.

- **THERMAL TREATMENTS**
  Confer raw surgical tips the necessary hardness, corrosion resistance and elastic response to vibration.

- **SHARPENING AND SURFACE COATING**
  A proprietary CNC 5-dimensions sharpening machine cuts with an accuracy of up to 0.1 μm. Depending on the surgical indication, specific surface treatments are made, which include diamond coating with diamonds of different granulometries.

- **MARKING**
  Each surgical insert is laser marked. The code is engraved on the shaft of the surgical tips for superior safety.

- **QUALITY CONTROL**
  Surgical inserts are individually checked throughout the manufacturing process. Checks range from dimensional control of the rough insert to visual inspection of final package.
SURGICAL INSERTS

MAXIMUM VARIETY

Osteotomy, Osteoplasty, Drilling, Finishing – PIEZOSURGERY® medical inserts cover a vast variety of surgical needs. And whatever your choice is, there is one thing they all have in common: they offer the best performance you will find in the market.

⇒ OSTEOTOMY
Surgical inserts of different shapes and dimensions, short and long, curved and angled, designed to perform osteotomies with the utmost safety even in difficult to reach surgical sites.
⇒ Saw thickness from 0.35 to 0.6 mm
⇒ Osteotomy depth up 20 mm
⇒ Shank length up to 10 cm

⇒ OSTEOPLASTY
Surgical inserts short and long, curved and angled, with sharp edges, for bone modeling and bone chip harvesting.
⇒ Shank length up to 10 cm

⇒ DRILLING
Surgical inserts to drill holes with very tight tolerance, minimizing the risk of bone necrosis.
⇒ Head diameters from 0.4 to 2.0 mm

⇒ FINISHING
Surgical inserts of different shapes and dimensions, curved and angled, with heads of different shapes and with different diamond coatings, to finish the osteotomies in very delicate anatomies.

⇒ INSERTS DEVELOPMENT
→ 1. research and collaboration with renowned surgeons
→ 2. use of a dedicated software simulating the final product to develop the insert’s movement with the greatest precision
→ 3. thorough clinical tests to validate prototypes
MECTRON EXPERIENCE

Since its introduction 15 years ago, PIEZOSURGERY® has proven its efficiency again and again – scientifically and clinically validated by countless publications.

Visit www.mectron.com. On our homepage you will not only find all literature references and further information on our devices, but also a complete list of congresses and courses we take part in.

PRODUCTS
The Products section offers further information and technical details on Mectron’s PIEZOSURGERY® equipment and surgical inserts provided.

VIDEO
Clinical videos by the most renowned surgeons in all fields (maxillofacial surgery, microsurgery, hand and foot surgery) are available on our website.

EVENTS
The Events section lists all courses and workshops where you can discover and experience Mectron’s PIEZOSURGERY® technology. Information is available on courses and seminars as well as congresses featuring Mectron’s own exhibition stand.
Piezosurgery seems suitable to perform precise thin osteotomies while limiting damage to the bone itself and to the underlying delicate structures even in the case of unintentional contact. These advantages make the piezoelectric bone scalpel a particularly attractive instrument in neurosurgery.


Piezosurgery proved to be a useful and safe technique for selective bone cutting and removal of osteophytes with preservation of neuronal and soft tissue in ACDF. In particular, the angled inserts were effective in cutting bone spurs behind the adjacent vertebra which cannot be reached with conventional rotating burs.


Piezosurgery allowed easy, safe and precise bone cutting with no injury to neurovascular tissue, such as dura, transverse or sigmoid sinus, brain, and cranial nerves. No complications were noted during the procedure. Due to the absence of rotating power near neurovascular structures the drilling process was easy and comfortable for the surgeon.


Piezosurgery proved to be a useful and safe technique for selective bone cutting and removal of osteophytes with preservation of neuronal and soft tissue in ACDF. Absence of microvibrations makes the instrument more manageable and easy to use and allows greater intraoperative control with higher safety in cutting in difficult anatomical regions.

## PRODUCTS

### ACCESSORIES

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIESOSURGERY® MEDICAL HANDPIECE</td>
<td>03120127</td>
</tr>
<tr>
<td>PIESOSURGERY® MEDICAL + HANDPIECE</td>
<td>03120219</td>
</tr>
<tr>
<td>PIESOSURGERY® MEDICAL TORQUE WRENCH</td>
<td>02900080</td>
</tr>
<tr>
<td>PIESOSURGERY® MEDICAL + TORQUE WRENCH</td>
<td>02900116</td>
</tr>
<tr>
<td>PIESOSURGERY® MEDICAL L TORQUE WRENCH*</td>
<td>02900115</td>
</tr>
<tr>
<td>IRRIGATION KIT SINGLE USE (BOX OF 10 UNITS)</td>
<td>03230008</td>
</tr>
<tr>
<td>CART PIESOSURGERY® MEDICAL</td>
<td>03540009</td>
</tr>
</tbody>
</table>

### CONTAINERS FOR CLEANING AND STERILIZATION PROCEDURES

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRAY FOR PIESOSURGERY® ACCESSORIES</td>
<td>04610005</td>
</tr>
<tr>
<td>COVER FOR THE TRAY</td>
<td>02080015</td>
</tr>
<tr>
<td>CONTAINER FOR STERILIZATION</td>
<td>02080016</td>
</tr>
<tr>
<td>COVER FOR THE CONTAINER FOR STERILIZATION</td>
<td>02080017</td>
</tr>
<tr>
<td>PAPER FILTER OUTER LENGTH (BOX OF 100 UNITS)</td>
<td>00420008</td>
</tr>
<tr>
<td>ADAPTOR FOR PIESOSURGERY® MEDICAL HANDPIECES</td>
<td>04610008</td>
</tr>
<tr>
<td>FILTER FOR ADAPTOR</td>
<td>04590006</td>
</tr>
</tbody>
</table>

### SPARE PARTS

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>POWER-SUPPLY CABLE</td>
<td>00050020</td>
</tr>
<tr>
<td>PIESOSURGERY® MEDICAL FOOTSWITCH</td>
<td>04620004</td>
</tr>
<tr>
<td>PERISTALTIC PUMP</td>
<td>03210006</td>
</tr>
<tr>
<td>DRIP STANDS FOR SALINE BAG</td>
<td>03150002</td>
</tr>
<tr>
<td>CONNECTOR PROTECTION PIESOSURGERY® MEDICAL</td>
<td>03150086</td>
</tr>
</tbody>
</table>

*torque wrench to tighten the inserts: MTS-10 L (03600009), MPS L (03610008), MP6 L (03610009)*
### SURGICAL INSERTS

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSTEOTOMY</td>
<td>MT1-10</td>
<td>03600001</td>
</tr>
<tr>
<td></td>
<td>MT15-10</td>
<td>03600007</td>
</tr>
<tr>
<td></td>
<td>MT1-20</td>
<td>03600002</td>
</tr>
<tr>
<td></td>
<td>MT2R-4</td>
<td>03600003</td>
</tr>
<tr>
<td></td>
<td>MT2L-4</td>
<td>03600004</td>
</tr>
<tr>
<td></td>
<td>MT3-8</td>
<td>03600005</td>
</tr>
<tr>
<td></td>
<td>MT3-20</td>
<td>03600006</td>
</tr>
<tr>
<td></td>
<td>UNIVR</td>
<td>03600008</td>
</tr>
<tr>
<td></td>
<td>MT4-10 +</td>
<td>03600010</td>
</tr>
<tr>
<td></td>
<td>MT5-10 L</td>
<td>03600009</td>
</tr>
<tr>
<td>OSTEOPLASTY</td>
<td>MP1</td>
<td>03610001</td>
</tr>
<tr>
<td></td>
<td>MP2</td>
<td>03610002</td>
</tr>
<tr>
<td></td>
<td>MP3-a30</td>
<td>03610003</td>
</tr>
<tr>
<td></td>
<td>MP4 +</td>
<td>03610007</td>
</tr>
<tr>
<td></td>
<td>MP5 L</td>
<td>03610008</td>
</tr>
<tr>
<td></td>
<td>MP6 L</td>
<td>03610009</td>
</tr>
<tr>
<td>DRILLING</td>
<td>MD2-08</td>
<td>03620010</td>
</tr>
<tr>
<td></td>
<td>MD2-10</td>
<td>03620004</td>
</tr>
<tr>
<td></td>
<td>MD3-12</td>
<td>03620005</td>
</tr>
<tr>
<td></td>
<td>MD3-14</td>
<td>03620006</td>
</tr>
<tr>
<td></td>
<td>MD3-16</td>
<td>03620007</td>
</tr>
<tr>
<td></td>
<td>MD3-18</td>
<td>03620008</td>
</tr>
<tr>
<td>FINISHING</td>
<td>MF1</td>
<td>03630001</td>
</tr>
<tr>
<td></td>
<td>MF2</td>
<td>03630002</td>
</tr>
<tr>
<td></td>
<td>MF3</td>
<td>03630003</td>
</tr>
<tr>
<td></td>
<td>MF4</td>
<td>03630004</td>
</tr>
<tr>
<td></td>
<td>MF5</td>
<td>03630005</td>
</tr>
<tr>
<td></td>
<td>MF6</td>
<td>03630006</td>
</tr>
</tbody>
</table>