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PIEZOSURGERY® MEDICAL

PIEZOSURGERY®
A REVOLUTION IN BONE SURGERY

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

INTRAOPERATIVE ADVANTAGES

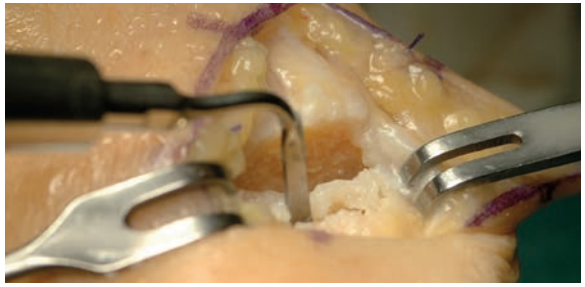
- **Selective Cut** — Maximum safety for surgeons and patients. Reduced risk of damaging soft tissues (dura, nerves and vessels).
- **Micrometric Cut** — Maximum surgical precision and intra-operative tactile sensation. Minimal bone loss through the cutting width.
- **Cavitation Effect** — Maximum intra-operative visibility. Blood-free surgical site.

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 fuction in acoustic neurma surgery." *Acta Neurochir (Wien).* 2011 *Oct;* 153(10):1941-7*; discussion* 1947. *Epub* 2011 *Jun* 27.
- "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." *J Craniomaxillofac Surg.* 2014 *Mar* 20. *pii:* S1010-5182(14)00080-8. *doi:*10.1016/*j.jcms.*2014.02.011.
- "Piezoelectric surgery reduces the impact on soft tissues (vessels and nerves) which lie adjacent to the ares of treatment. Compared to traditional methods it enables optimal healing because it reduces the postsurgery swelling and discomfort." *Minerva Stomatol.* 2012 *May;* 61(5):213-24.



Picture taken from surgeries performed by Prof. M.I. Rossello, San Paolo Hospital, Savona, Italy

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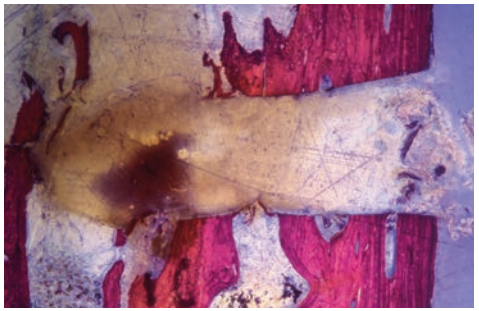
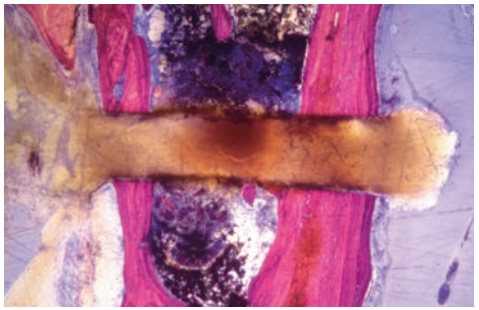
MACRO-VIBRATIONS



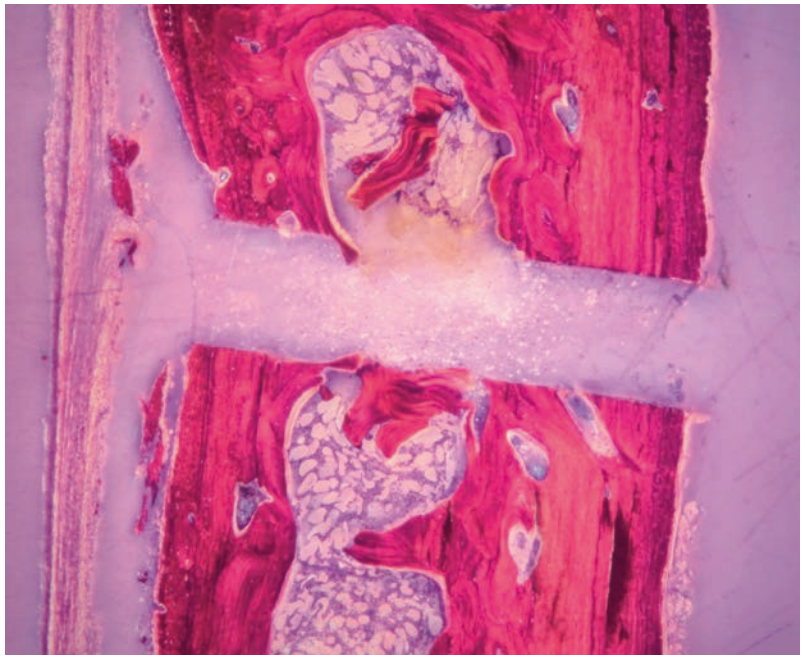
Bone bur



Bone saw

- Limited surgical control
- Lack of precision

MICRO-VIBRATIONS



PIEZOSURGERY®

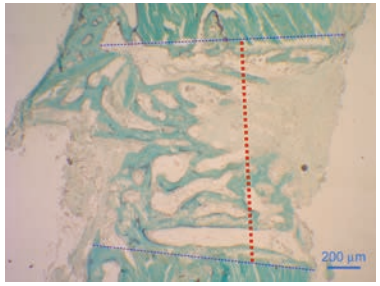
"Perfect integrity of the osteomized surfaces with a cut which is clean, regular and without imperfections or pigmentation. The bone surface which was cut using the piezoelectric device showed no sign of lesions to the mineralized tissues and presented live osteocytes with no sign of cellular suering. *Mediterranea Journal of Surg Med 2001; 9:89-95.*"

- High surgical control
- Precision and safety
- Clinical and histological advantages

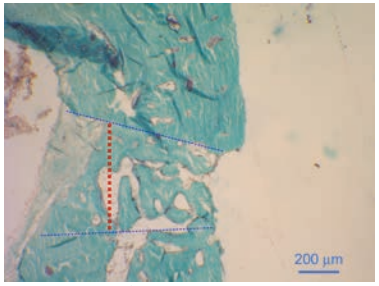
SCIENTIFIC STUDIES

Osteotomy tissue sections, Gomori trichrome stain.
Histomorphometric analysis performed 15 days after osteotomy with bone bur (Bb), 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 Bb with respect to Pm and Pp.

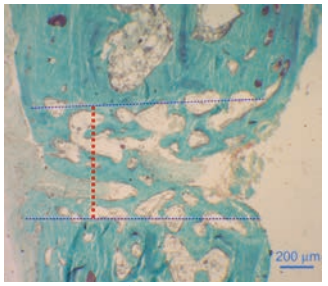
BV/TV % values. The area of newly deposited bone (BV) with respect to the total area (TV) of the osteotomy (expressed as %) is higher with Pm and Pp than with Bb, this difference is not statistically significant.



Bone bur



PIEZOSURGERY® *medical*



PIEZOSURGERY® *plus*

Anesi A.[1], Palumbo C.[2], Salvatori R.[1], Cavani F.[2], M. Ferretti[2], Chiarini L.[1] *Preliminary findings of a potenziated piezosurgical device at the rabbit skull.*
[1]Cranio-Maxillo-Facial Surgery, University of Modena and Reggio Emilia, Modena, Italy
[2]Human Morphology Section – Department of Biomedical, Metabolic and Neural Sciences, University of Modena and Reggio Emilia, Modena, Italy

PIEZOSURGERY® MEDICAL
THE WIDEST RANGE

When it comes to bone surgery, PIEZOSURGERY® doesn't leave much to be desired.
From reconstructive to thoracic surgery – PIEZOSURGERY® *plus* and PIEZOSURGERY® *flex* offer 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.

COMPLETE

- Power joins precision
- High efficiency
- High level technology

CE 0476

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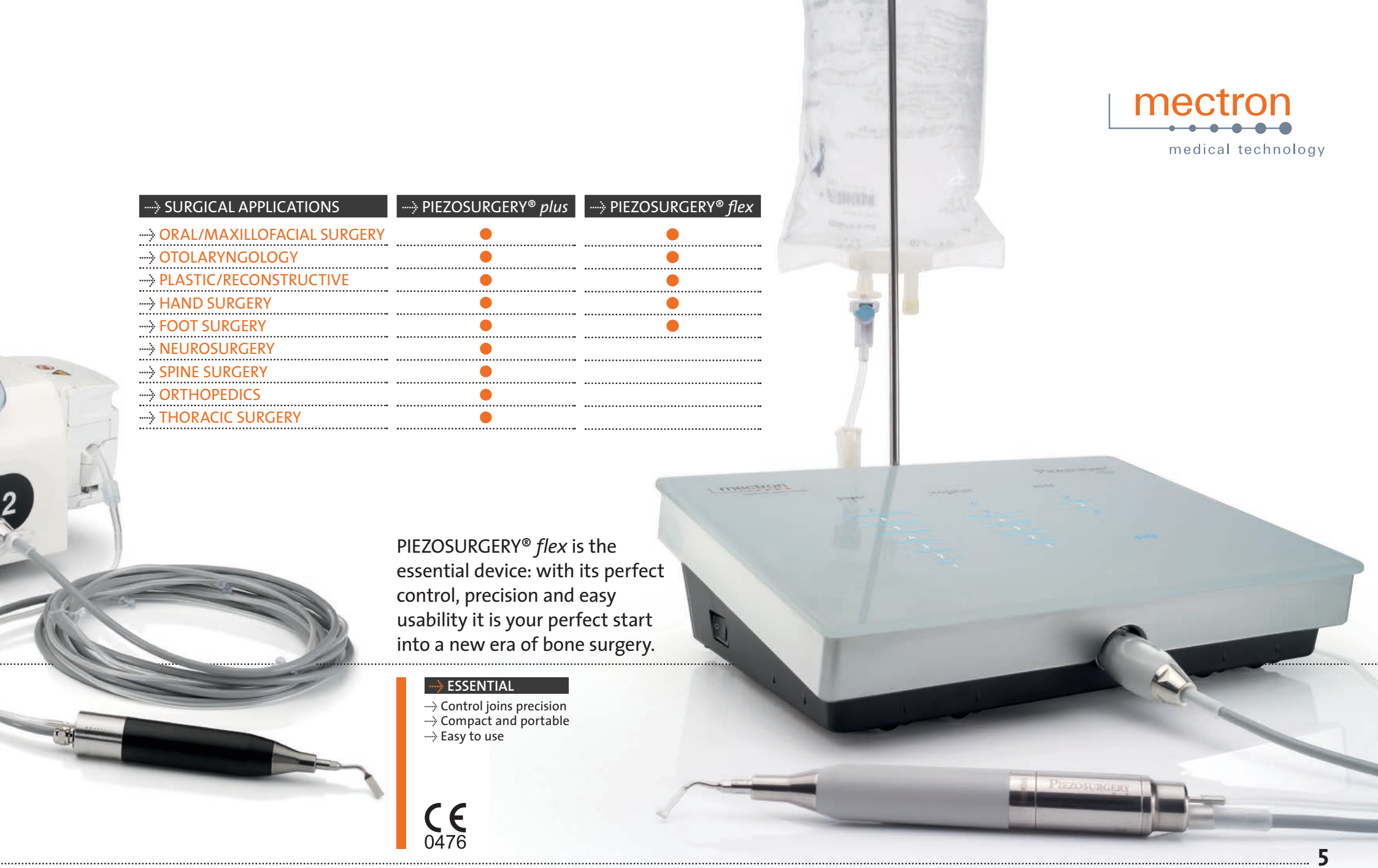
SURGICAL APPLICATIONS	PIEZOSURGERY® *plus*	PIEZOSURGERY® *flex*
ORAL/MAXILLOFACIAL SURGERY	●	●
OTOLARYNGOLOGY	●	●
PLASTIC/RECONSTRUCTIVE	●	●
HAND SURGERY	●	●
FOOT SURGERY	●	●
NEUROSURGERY	●	
SPINE SURGERY	●	
ORTHOPEDICS	●	
THORACIC SURGERY	●	



PIEZOSURGERY® *flex* is the essential device: with its perfect control, precision and easy usability it is your perfect start into a new era of bone surgery.

ESSENTIAL

- Control joins precision
- Compact and portable
- Easy to use

CE 0476

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.

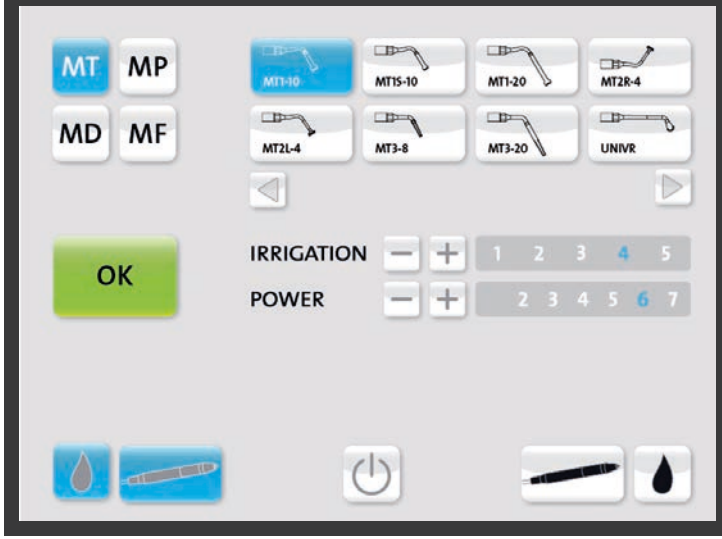
HANDPIECE FOR STANDARD CHANNEL (1)

- Superior intra-operative control and surgical sensitivity
- Maximum flexibility in creating osteotomy lines

HANDPIECE FOR PLUS CHANNEL (2)

- Maximum performance with highly mineralised bone
- Maximum efficiency through all the cutting depth

HOW PIEZOSURGERY® *plus* LETS YOU FOCUS 100% ON SURGERY



- STEP 1: select the channel desired.
- STEP 2: choose the insert.
- STEP 3: confirm the settings by pressing OK.
- STEP 4: start surgery.

APC ON BOARD

MAXIMUM SAFETY

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

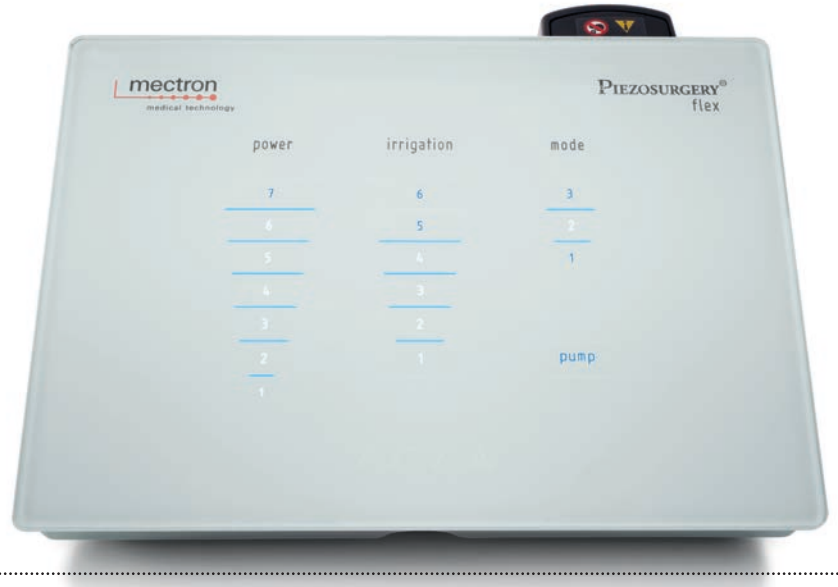
All functions can be managed by the touch screen. Choosing the handpiece, selecting the surgical type, switching from one handpiece to the other is just a touch on the screen.

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.

PIEZOSURGERY® *flex*
THE PERFECT START

It is compact. It is easy to use. It is affordable. However, it comes with all the performance, the perfect control and the outstanding cutting efficiency of mectron PIEZOSURGERY® technology. Which makes PIEZOSURGERY® *flex* nothing less than the perfect start into state of- the-art bone surgery.



MODE SETTING
Offer the best surgical performance for each insert.

SETTINGS TABLE
The recommended parameters (mode, power and irrigation) always provide the best efficiency for each insert.

FEEDBACK SYSTEM
Automatically monitors and adjusts the tuning of the vibration frequency for each insert.

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COMPACT & PORTABLE

A comfortable suitcase to move PIEZOSURGERY® *flex* as needed.

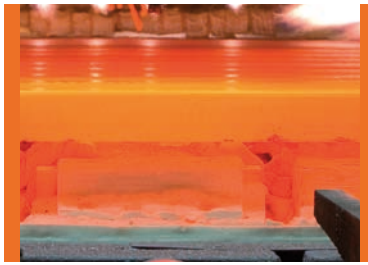
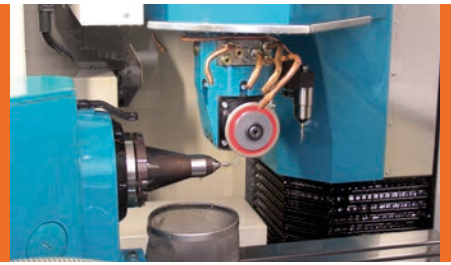
EASY TO HANDLE IN THE OR

- touch screen display
- external irrigation system
- 3 m handpiece cord
- 5 m power cord

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.

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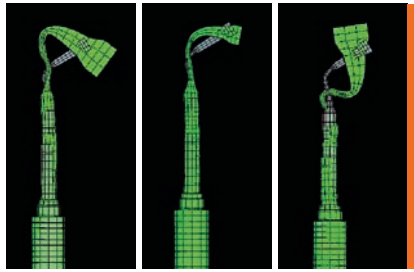
SURGICAL INSERTS
MAXIMUM VARIETY

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.



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

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 0.8 to 1.8 mm

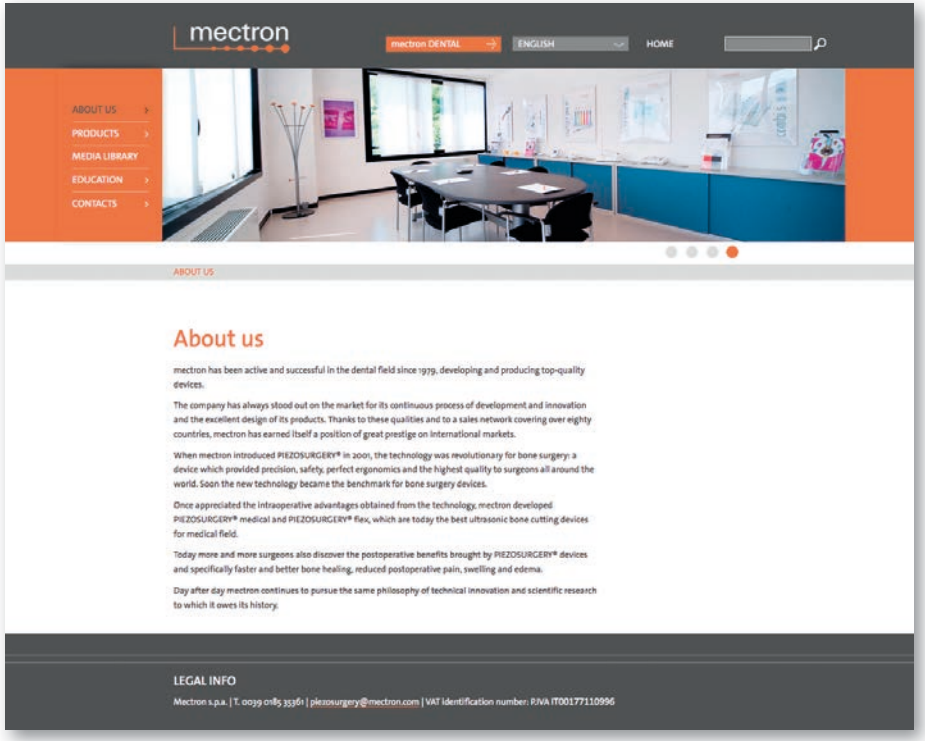
FINISHING

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.

MECTRON EXPERIENCE

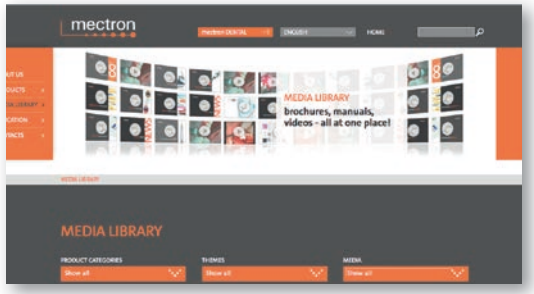
Since its introduction 15 years ago, PIEZOSURGERY® has proven its efficieny again and again – scientifically and clinically validated by countless publications.

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 renown surgeons in all fields (maxillofacial surgery, micro-surgery, hand and foot surgery) are available on our website.

EVENTS

The Events sections 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.

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PIEZOSURGERY® – SCIENTIFICALLY AND CLINICALLY VALIDATED

BONE HEALING

The minimal postoperative pain appears remarkable; in the same direction, the first impression about the rapidity of recovery appears noteworthy: it results in a reduced necessity of postoperative medications, due to a lesser production of granulation tissue and, consequently, to the possibility to better foresee the stabilized result with important anatomical and functional implications.

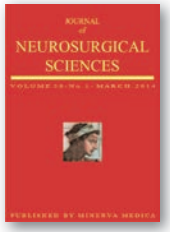
Pirodda A., Raimondi M.C., Ferri G.G. **Piezosurgery in otology: a promising device but not always the treatment of choice.** Eur Arch Otorhinolaryngol. 2012 Mar; 269(3):1059. doi: 10.1007/s00405-011-1841-2. Epub 2011 Nov 22.

SAFETY

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.

Grauvogel J., Scheiwe C., Kaminsky J. **Use of Piezosurgery for removal of retrovertebral body osteophytes in anterior cervical discectomy.** Spine J. 2014 Apr;14(4):628-36. doi: 10.1016/j.spinee.2013.06.085. Epub 2013 Dec 4.

BENEFITS



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

Grauvogel J., Grauvogel T.D., Kaminsky J. **Piezosurgical lateral suboccipital craniectomy and opening of the internal auditory canal in the rat.** J Neurosurg Sci. 2014 Mar;58(1):17-22.

PRECISION

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 bonescalpel a particularly attractive instrument in neurosurgery.

Iacoangeli M., Rienzo A.D., Nocchi N., Balercia P., Lupi E., Regnicolo L., Somma L.G., Alvaro L., Scerrati M. **Piezosurgery as a Further Technical Adjunct in Minimally Invasive Supraorbital Keyhole Approach and Lateral Orbitotomy.** J Neurol Surg A Cent Eur Neurosurg. 2015 Mar;76(2):112-8.

EASE

Piezoelectric osteotomy reduced surgical time, blood loss, and inferior alveolar nerve injury in bimaxillary osteotomy. Absence of macro-vibrations makes the instrument more manageable and easy to use and allows greater intraoperative control with higher safety in cutting in difficult anatomical regions.

Bertossi D., Lucchese A., Albanese M., Turra M., Faccioni F., Nocini P., Rodriguez Y Baena R. **Piezosurgery versus conventional osteotomy in orthognathic surgery: a paradigm shift in treatment.** J Craniofac Surg. 2013 Sep;24(5):1763-6. doi: 10.1097/SCS.0b013e31828f1aa8.

PRODUCTS

		PS *plus* 05170003	PS *flex* 05170002
ACCESSORIES			
HANDPIECE FOR PLUS CHANNEL	03120219	●	
TORQUE WRENCH FOR PLUS CHANNEL	02900116	●	
TORQUE WRENCH FOR EXTENSION OF LONG INSERTS*	02900115	●	
HANDPIECE FOR STANDARD CHANNEL	03120127	●	●
TORQUE WRENCH FOR STANDARD CHANNEL	02900080	●	●
IRRIGATION KIT SINGLE USE (BOX OF 10 UNITS)	03230008	●	●
TROLLEY-CASE	04440018	●	
CART	03540009	●	●
CONTAINERS FOR STERILIZATION OF HANDPIECE AND TORQUE WRENCH			
CONTAINER FOR STERILIZATION	02080016	●	●
COVER OF THE STERILIZATION CONTAINER	02080017	●	●
PAPER FILTER FOR CONTAINER (BOX OF 100 UNITS)	00420008	●	●
TRAY FOR STERILIZATION	04610005	●	●
COVER OF THE TRAY	02080015	●	●
THERMODISINFECTION ADAPTOR FOR HANDPIECE	04610008	●	●
FILTER FOR THERMODISINFECTION ADAPTOR	04590006	●	●
SPARE PARTS			
POWER-SUPPLY CABLE	00050020	●	●
FOOTSWITCH FOR PS *plus*	04620004	●	
FOOTSWITCH FOR PS *flex*	04620003		●
PERISTALTIC PUMP	03210006	●	
DRIP STANDS FOR SALINE BAG	01380002	●	●
PROTECTION FOR HANDPIECE'S CONNECTOR	03150086	●	●

* MT5-10 L (03600009), MT8-20 L (03600013), MP5 L (03610008), MP6 L (03610009)

SURGICAL INSERTS			PS *plus* 05170003		PS *flex* 05170002
			STD HANDPIECE 03120127	PLUS HANDPIECE 03120219	STD HANDPIECE 03120127
OSTEOTOMY	MT1-10	03600001	●		●
	MT1S-10	03600007	●		●
	MT1-20	03600002	●		●
	MT2R-4	03600003	●		●
	MT2L-4	03600004	●		●
	MT3-8	03600005	●		●
	MT3-20	03600006	●		●
	UNIVR	03600008	●		●
	MT6S-10	03600011	●		●
	MT7-3	03600012	●		●
	MT9-13	03600016	●		●
	MT4-10 +	03600010		●	
	MT5-10 L	03600009		●	
	MT8-20 L	03600013		●	
	MT4-20 +	03600014		●	
	MT10-20 +	03600015		●	
OSTEOPLASTY	MP1	03610001	●		●
	MP2	03610002	●		●
	MP3-a30	03610003	●		●
	MP4 +	03610007		●	
	MP5 L	03610008		●	
	MP6 L	03610009		●	
DRILLING	MD2-08	03620010	●		●
	MD2-10	03620004	●		●
	MD3-12	03620005	●		●
	MD3-14	03620006	●		●
	MD3-16	03620007	●		●
	MD3-18	03620008	●		●
FINISHING	MF1	03630001	●		●
	MF2	03630002	●		●
	MF3	03630003	●		●
	MF4	03630004	●		●
	MF5	03630005	●		●
	MF6	03630006	●		●

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