

mectron

→ PIEZOSURGERY® *flex*



PIEZOSURGERY®

➔ DESIGNED TO OPEN A NEW ERA IN BONE SURGERY

PIEZOSURGERY® opened a new era of bone surgery thanks to ultrasonic micro-vibrations.

➔ INTRAOPERATIVE ADVANTAGES

- **Selective Cut** Micro-vibrations generate an effective cutting action on mineralized tissue, reducing the risk of soft tissue damage.
- **Micrometric Cut** Micro-vibrations allow perfect control of the cutting action, resulting in maximum precision and minimal bone sacrifice.
- **Cavitation Effect** The cavitation effect reduces the risk of bone necrosis and helps obtaining a blood-free field.

➔ POSTOPERATIVE BENEFITS

- **Healing** Ultrasonic micro-vibrations reduce inflammatory cells on the bone and promote osteoblast production, providing for quicker healing and an improved postoperative course.

➔ CLINICAL EVIDENCE

- ➔ "In all patients, the PIEZOSURGERY® instrument allowed an easy and precise handling during osteotomy with a reduced amount of trauma to adjacent soft tissues and with no complications." *J Neurosurg. 2006 Jan; 104(1 Suppl):68-71.*
- ➔ "Schaller et al. showed in five cases of pediatric skull base surgery that with a piezoelectric device, there was no osteonecrosis, less damage to the surrounding soft tissue, and better vision of the operative site." *Childs Nerv Syst. 2007 May; 23(5): 509-513. Epub 2007 Mar 14.*
- ➔ "Analysis of the results showed that PIEZOSURGERY®: a) allows very precise cutting; b) avoids bone cutting using an osteotome; c) spares soft tissue such as brain, dura-mater, palatal mucosa, and the inferior alveolar nerve; d) increases the time of bone cutting but not the overall operative time because of the absence of soft tissue protection." *Rev Stomatol Chir Maxillofac. 2007 APR; 108 (2):101-7. Epub 2007 Mar 13.*



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

MACRO-VIBRATIONS

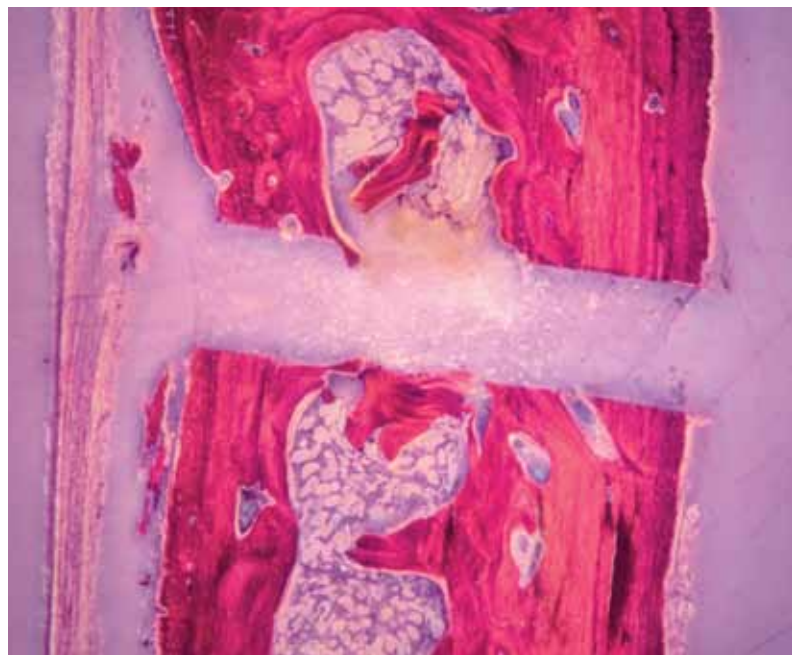


Bone bur



Bone saw

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. ”

SCIENTIFIC STUDIES

The inflammatory cells were more numerous in samples obtained from the drilled sites (Fig. 1). Neo-osteogenesis was quantified by considering the absolute number of osteoblasts per high-power field (mean of 10 fields) in osteo-genetic areas; it was consistently more active in the bone samples from the implant sites prepared using the piezo-electric bone surgery technique (Fig. 2).

REDUCED INFLAMMATORY CELLS

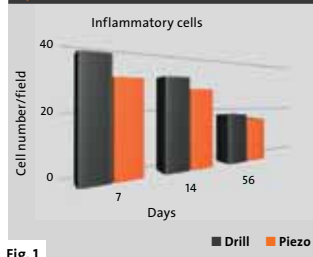


Fig. 1

MORE ACTIVE BONE REGENERATION

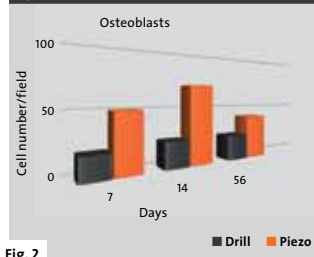


Fig. 2

Post-operative time	Pain severity	Group A n (%)	Group B n (%)	P value
1 day	Slight	52 (74)	26 (37)	< 0.05
	Moderate	12 (17)	37 (53)	< 0.05
	Severe	6 (9)	7 (10)	< 0.05
	Total	70 (100)	70 (100)	< 0.05
3 days	Slight	68 (97)	44 (63)	< 0.05
	Moderate	2 (3)	23 (33)	< 0.05
	Severe	0 (0)	3 (4)	< 0.05
	Total	70 (100)	70 (100)	< 0.05
10 days	Slight	70	68 (97)	< 0.05
	Moderate	0 (0)	2 (3)	< 0.05
	Severe	0 (0)	0 (0)	< 0.05
	Total	70 (100)	70 (100)	< 0.05

Group A: Mectron PIEZOSURGERY® devices; Group B: microdrill

In the group A, the lower post-operative pain highlights the absence of a thermal effect on the surface cut and shows a better healing process.

Preti G., Martinasso G., Peirone B., Navone R., Manzella C., Muzio G., Russo C., Canuto R.A., Schierano G. Cytokines and Growth Factors involved in the Osseointegration of Oral Titanium Implants positioned using Piezo-electric Bone Surgery versus a Drill Technique: a Pilot Study in Minipigs. J Periodontol. 2007 Apr; 78(4):716-22

Crippa B., Salzano F.A., Mora R., Dellepiane M., Salami A., Guastini L. Comparison of postoperative pain: piezoelectric device versus microdrill. Eur Arch Otorhinolaryngol. 2011 Feb 16. [Epub ahead of print]



PIEZOSURGERY® *flex*

→ DESIGNED TO BE FLEXIBLE

PIEZOSURGERY® *flex* is an efficient, versatile and user-friendly device offering safety and precision in all situations.

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PIEZOSURGERY® *flex*



→ THE RIGHT MIX OF POWER AND PRECISION

- Quick and effective cutting action
- Soft tissue protection
- Improved intra-operative control and surgical sensitivity
- Maximum flexibility in designing osteotomic lines

→ HIGH-QUALITY SURGICAL INSERTS

- Thinner, more precise osteotomies
- Minimal bone sacrifice along the whole depth of cut

Picture taken from surgeries performed by Dr. S. Stea and Dr. P. Biondi, Maria Cecilia Hospital, Lugo-Cotignola, Italy



→ TECHNOLOGY AND
PERFORMANCE

Thanks to its perfect mix of power and precision and the high-quality surgical inserts, PIEZOSURGERY® *flex* offers the best surgical outcome and makes interventions possible which are extremely challenging with traditional tools.

PIEZOSURGERY® *flex*

→ DESIGNED TO BE EFFECTIVE

Mectron's PIEZOSURGERY® technology guarantees cutting effectiveness.

- MODE SETTING
offer the best surgical performance for each insert.
- FEEDBACK SYSTEM
automatically monitors and adjusts the tuning of the vibration frequency for each insert.



→ SETTINGS TABLE

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

A small inset image showing a settings table for the Piezosurgery flex system. The table lists various parameters and their recommended settings for different surgical inserts. The table is organized into columns for 'Mode', 'Power', and 'Irrigation'.



**EASY TO HANDLE
IN THE OR**

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

SURGICAL INSERTS

→ DESIGNED TO BE HIGH-QUALITY

Surgical inserts are made of medical grade stainless steel and undergo a 12-step production process guaranteeing its quality.

Inserts vibrate at 36,000 micro-vibrations/ sec. and can stand the huge mechanical solicitations they are exposed to during surgeries.



→ HEAT TREATMENT

Provides the raw insert with the required hardness, resistance to corrosion and elastic response to vibrations.

→ GRINDING AND SURFACE COATING

The automatic 5-axis CNC grinder cuts with a precision up to $0.1\text{ }\mu\text{m}$. Based on indications for use, specific treatments are performed on the insert surface, including diamond coating with diamonds in different grain sizes.

→ MARKING

Each insert is laser-marked. The code is engraved in the insert's stem for higher security.

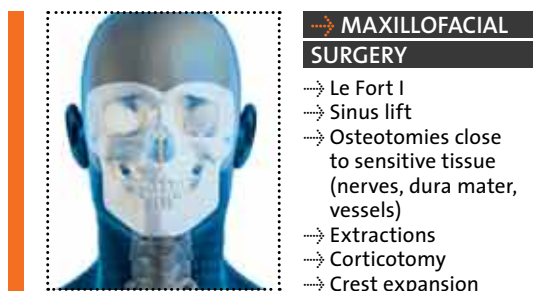
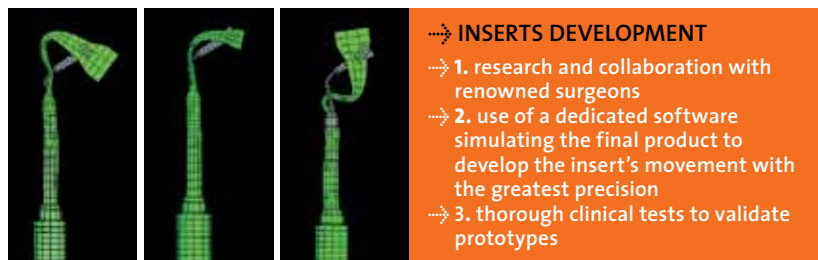
→ QUALITY CONTROL

Each insert undergoes quality controls during the production process. Checks range from a dimensional control on the semi-finished product to the control of sterilised inserts before packaging.

SURGICAL INSERTS

DESIGNED FOR ALL NEEDS

Our vast choice of inserts responds to any surgical need, offering the best performance during all interventions as well as excellent intra-operative and post-operative outcomes.



→ DISCOVER THE MECTRON EXPERIENCE

PIEZOSURGERY® is Mectron's original piezoelectric surgical technique, the only one validated by 15 years of scientific publications and research.

All literature references, further information on the product and a complete list of Congresses and Courses Mectron will take part in are available on our website: www.mectron.com.



→ PRODUCTS

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

→ VIDEOS

Clinical videos by the most renown surgeons in all fields (maxillofacial surgery, microsurgery, 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.

→ PIEZOSURGERY® – SCIENTIFICALLY AND CLINICALLY VALIDATED

→ BONE HEALING



As bone healing is not disturbed by the PIEZOSURGERY®, but even seems to be improved, this method will have a major influence on new minimally invasive bone surgery techniques with special regard to biomechanics.

Stübinger S, Goethe JW. Bone Healing After PIEZOSURGERY® and its influence on Clinical Applications. *Journal of Oral and Maxillofacial Surgery* 2007, Sep;65(9):39.e7-39.e8.

→ SAFETY



Ultrasound osteotomy is a new technical procedure that is advantageous for bone cutting in multiple situations, with minimal to no damage in adjacent soft tissues such as brain, palatal mucosa and the inferior alveolar nerve.

Béziat J.L., Béra J.C., Lavandier B., Gleizal A. Ultrasonic osteotomy as a new technique in cranio-maxillofacial surgery. *Int J Oral Maxillofac Surg.* 2007 Jun; 36(6):493-500. Epub 2007 Mar 26.

→ BENEFITS



The microvibration allow a selective cut of only mineralized structures without damaging soft tissues. The micrometric vibrations ensure precise cutting action without causing bone necrosis by heating. At the same time the physical phenomenon of cavitations maintains a blood-free site.

Battiston B., Tos P., Conforti G., Vercellotti T. PIEZOSURGERY in Hand Surgery. *Riv Chir Mano* 2006; 43(3):268-270.

→ PRECISION



In all patients, piezoelectric surgery allowed for effective, precise, safe, easy, and rapid intraoperative management. In particular, the instrument's precision allowed surgeons to make exact, clean and smooth cuts without any injury to adjacent soft tissue.

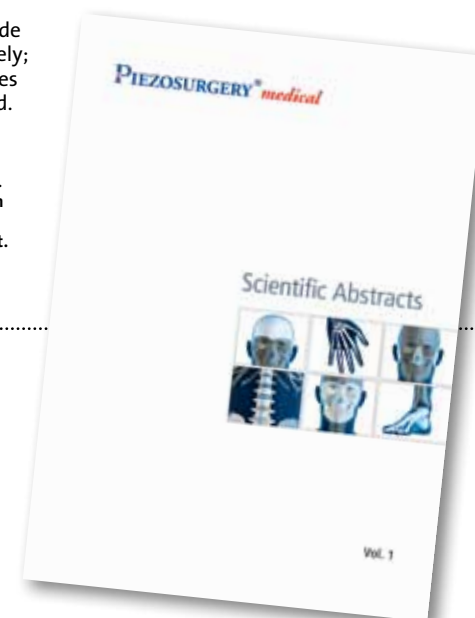
Dellepiane M., Mora R., Salzano F.A., Salami A. Clinical evaluation of piezoelectric ear surgery. *Ear Nose Throat J.* 2008 Apr; 87(4):212-3,216.

→ EASE



The handling of the piezoelectric device is virtually effortless, requiring very little manual pressure to guide the osteotomies precisely; even curved osteotomies can be easily performed.

Kramer F.J., Ludwig H.C., Materna T., Gruber R., Merten H.A., Schliephake H. Piezoelectric osteotomies in craniofacial procedures: a series of 15 pediatric patient. *J Neurosurg.* 2006 Jan; 104 (1 Suppl.): 68-71.



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