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PIEZOSURGERY® MEDICAL
PIEZOSURGERY®

→ A TRUE REVOLUTION IN BONE SURGERY

Thanks to the use of ultrasonic frequencies, PIEZOSURGERY® has opened a new age in bone surgery.

- **Selective cut**
  The ultrasonic frequencies guarantee an effective cutting action on bones while reducing the risk of damaging the soft tissues.

- **Micrometric cut**
  The micro-vibrations of the surgical tips allow superior control of the cutting action resulting in very fine osteotomies with minimal bone loss.

- **Cavitation effect**
  Combined with the ultrasonic frequencies, reduces the risk of bone necrosis and maintains a blood free surgical site.

### INTRA-OPERATIVE ADVANTAGES
- Reduced risk of damaging soft tissues
- Optimal intra-operative control
- Minimal bone loss
- Maximum flexibility in creating osteotomy lines
- Reduced risk of bone necrosis
- Blood-free surgical site

### HISTOLOGICAL BENEFITS
- "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." Mediterranean Journal of Surg Med 2001; 9:89-95.
- "Piezoelectric bone surgery appears to be more efficient in the first phases of bone healing; it induced an earlier increase in BMP’s, controlled the inflammatory process better and stimulated bone remodeling as early as 56 days post-treatment." J Periodontol. 2007 Apr; 78(4):716-22.
- "The piezoelectric bone surgery provided an earlier increase in proteins, favoring bone production. Drilling promoted later new bone synthesis, as demonstrated by the increase in proteins only at 56 days from the bone surgery." J Periodontol. 2007 Apr; 78(4):716-22.

Picture taken from surgeries performed by Dr. R. Adani, University Hospital, Verona, Italy
Results: Piezoelectric osteotomy permitted a micrometric, selective cut and a clear surgical site by the cavitation effect created by irrigation/cooling and oscillating tip. No excessive bleeding was encountered. The evaluation of the PIEZOSURGERY® specimen proved 8 weeks as well as 12 weeks after surgery an ingrowth of vital bone-forming tissue in the osteotomy gap. The remodelling in the compact bone was undisturbed and the osteotomy gap was filled with new bone. Additional radiological findings supported these findings. The bone fragments were completely healed, the bone marrow cavity restored as well as the external callus formation was subsided undergoing piezoelectric surgery. In general bone healing was faster than known from conventional methods.

Conclusion: PIEZOSURGERY® definitely enhances handling of delicate structures in the oral and maxillofacial region. Concerning osteotomies of thin and fragile bones, application of ultrasound is assessed to be superior to other mechanical instruments, because of easy handling, efficient bone ablation and minimal accidental harm to adjacent soft tissue structures. 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. J Oral Maxillofac Surg. 2007 Sep; (1Suppl) 65(9):39.e7-39.e8.

CLINICAL BENEFITS

→ “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.
When safety and precision matter, PIEZOSURGERY® Medical scores clear advantages over all others bone cutting instruments.

“...In some delicate situations, the rotational spin of burs and the thickness of saws may even preclude a precise osteotomy from being performed at the intended ideal lines. The precision of osteotomies performed with drills or saws is limited by the manual pressure required to guide the instrument while avoiding damage to both soft and hard tissues. In contrast, 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. J Neurosurg. 2006 Jan; 104(1 Suppl):68-71.”
PIEZOSURGERY® MEDICAL

A WIDE RANGE OF SURGICAL TIPS

PIEZOSURGERY® Medical is provided with a wide range of surgical tips. All of them have been designed in close collaboration with experienced surgeons, developed using state of the art technologies, manufactured using high quality medical grade material, following a complex manufacturing process and individually checked before release.
Surgical tips of different shapes and dimensions, 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 to 20 mm

OSTEOTOMY TIPS

Surgical tips curved and angled, with sharp edges, for bone modelling and bone chip harvesting.

OSTEOPLASTY TIPS

Surgical tips to drill holes with very tight tolerance, minimizing the risk of bone necrosis.

- Head diameters from 0.4 to 2.0 mm

DRILLING TIPS

Surgical tips 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.

FINISHING TIPS
Setting up PIEZOSURGERY® Medical requires only a few steps:

- Connect to the power supply and switch on the device
- Connect the handpieces
- Connect the irrigation kit
- Connect the foot switch
- Select the handpiece
- Connect the surgical tip and select on the touch screen
- Prime the irrigation tubing
- Press start

All reusable parts of PIEZOSURGERY® Medical are designed to be cleaned and sterilized easily. The handpieces are provided with silicon protector to avoid damage to the connecting pins.
PIEZOSURGERY® MEDICAL

HIGH PERFORMANCE, MAXIMUM SAFETY AND EASINESS OF USE

PIEZOSURGERY® Medical is designed for high performance, with maximum safety and easiness of use.

Thanks to the USB port, the software upgrade is fast and easy. To install a new release of the software and utilize newly developed inserts requires only a few minutes.

PIEZOSURGERY® Medical 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.

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.

PIEZOSURGERY® Medical is provided with smart software. For each surgical tip, the software automatically sets the optimal operating parameters. Power and irrigation levels can also be adjusted manually depending on the surgical needs.
PIEZOSURGERY® MEDICAL
IDEAL FOR A WIDE RANGE OF SURGICAL PROCEDURES

- MAXILLO-FACIAL SURGERY
- HAND SURGERY
- FOOT SURGERY
- ENT SURGERY
- NEUROSURGERY
- SPINE SURGERY

- CRANIO-FACIAL SURGERY
- Bilateral Sagittal Split Osteotomy
- Chin Osteotomy
- Le Fort I, II, III
- Maxillectomy
- Segmental Osteotomy
- Sinus Lift
- Calvarian Bone Graft Harvest
- Free Fibula Flap
- Optic Nerve Decompression
- Craniofaciostenosis
- Mastoidectomy
- Timpanoplasty
- Facial Nerve Decompression
- Dacriocistorhinostomy
- Lateral rhinotomy

- MINUTE ORTHOPAEDIC SURGERY
- Foot:
  - Correction of Hallux Valgus Deformity
  - Hammer Toe
  - Claw Toe
- Hand:
  - Interphalangeal Joint Arthrodesis
  - Carpo-metacarpal joint fusion
  - Bone grafting
  - Corrective Osteotomy
  - Osteophyte Excision

Pictures taken from surgeries performed by: Dr. S. Stea and Dr. P. Biondi, Maria Cecilia Hospital, Ravenna, Italy (on the left); Prof. M.I. Rossello and Dr. E. Pamelin, San Paolo Hospital, Savona, Italy (on the right)
PIEZOSURGERY® is the original piezoelectric bone cutting technique and is the only one validated by more than 12 years of scientific research and clinical studies.
TECHNICAL CHARACTERISTICS

- Dimensions (L x W x H) 410 x 380 x 310 mm
- Weight 11.7 kg
- Working frequency automatic scanning – from 24 KHz. to 36 KHz
- Power supply requirements 100 - 240 Vac
- Frequency 50/60 Hz
- Max. current absorption 200 VA
- Fuses Type 5 x 20 mm T 2AL, 250 V
- Mean power levels applied to the handpiece adjustable to 4 different power outputs
  - CORTICAL
  - CANCELLOUS MEDIUM
  - CANCELLOUS LOW
  - DELICATE ANATOMY
- Delivery rate of the peristaltic pump adjustable to 7 different power levels (vibration)
  - 5 delivery rates – from 7 to 65 ml/min approx.
- Warranty device 2 years; handpiece and handpiece cord 1 year