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SATELEC

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m+ brochure

Safe and atraumatic ultrasonic piezo bone surgery

m+

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Synthesis

More safety

Selective cutting
A selective cut (distinction between hard and soft tissues): only the bone is cut; no risk of injuring soft tissues (nerves, membranes, arteries).

Controlled irrigation for great bone healing
The peristaltic pump (with integrated cassette) offers accurate control and extremely precise irrigation to avoid any heating, resulting in better bone healing and absence of postoperative effects such as edema and pain (3). According to Dr. Harder's clinical study (1): "The Piezotome® produced the smallest increase in intraosseous temperature".

More precision

Very fine
A clean, narrow and regular cut to retain maximum bone volume. Particularly robust, ACTEON® MEDICAL tips are also adapted to each anatomical context.

Visibility of the operative field
The hemostatic effect of cavitation (spray) improves the visibility of the operative field.

Tactile sense
The NEWTRON® technology guarantees preservation, efficacy and comfort. ACTEON® MEDICAL tips' gentle, regular and controlled vibrations allow continuous action even on deep cuts.

More comfort

Reliability
Piezotome® Solo m+ is a reliable, powerful and silent device.

Temperature control
No overheating of the handpiece or tips.

Efficiency of ultrasonics
Cuts are made without any effort or pressure. Only a back and forth movement is needed.

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Piezoelectricity

At present, the use of piezoelectric instruments in dentistry has become common pratice and their efficacy is demonstrated by various clinical studies.
The piezoelectric effect was discovered in 1880, by the physicists Pierre and Jacques Curie, in collaboration with Gabriel Lippmann. According to these two French researchers, the application of compressive forces on certain solid bodies would generate an electric charge. The term "Piezo" is derived from the Greek verb "piezein" which means to compress or squeeze or to press.

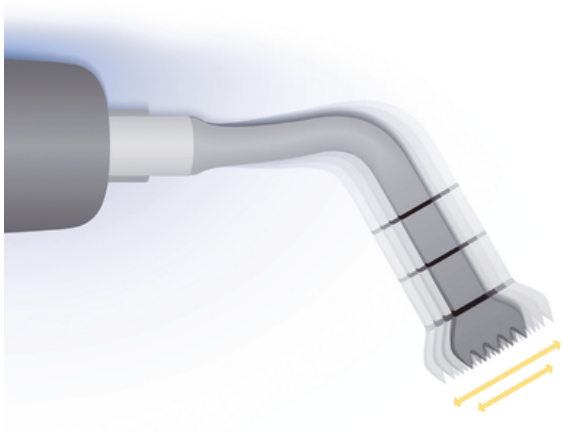
The solid bodies that possess such a property have crystalline structures such as Quartz, Tourmaline, Seignette Salt or Baryum Titanate. Today, Quartz crystals have been abandoned and piezoelectric handpieces mainly contain ceramics of crystalline structure.

Piezo effect can be explained as:

- Direct: the properties of certain solid bodies called piezoelectric (for example, Quartz or Ceramic) to electrically polarize (movement of positive and negative charges) under the effect of a mechanical force.

- Indirect: all the deformations (expansion or contraction) of certain bodies called piezoelectric under the influence of polarization, from application of electric field.

ACTEON® piezoelectric handpieces are thus subjected to an indirect effect.



Electric current generates a deformation of piezo ceramic rings. The movement of these rings leads to vibrations in the transducer's axis.
The amplifier, associated to a tip, increases the vibrational movements emitted by the piezo ceramic rings.
The tip thus vibrates along a longitudinal axis as presented in the illustration below.
The counterweight deadens the vibrations to the rear and optimizes the electromechanical output.

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newtron technology

Ultrasonic power generators are piloted by patented NEWTRON® technology electronics.
The electronic module, the handpiece and the tips are perfectly tuned providing great efficacy and clinical benefits.

Efficacy

Frequency adjustment

- Maximal performance of each tip
- Optimal and continuous efficiency whatever the load applied

Power regulation

- Constant performance even in dense bone
- Effortless cut without applying too much pressure

Comfort

For both patient and practitioner

- Secure with effortless cut
- Better tactile sense
- Reduced post-operative pain

Preservation

Soft tissue preservation

- Security: non active on soft tissue (modulated piezo signal)

Bone preservation

- Highly precise cut
- Linear piezoelectric vibrations
- Controlled and regular tip amplitude

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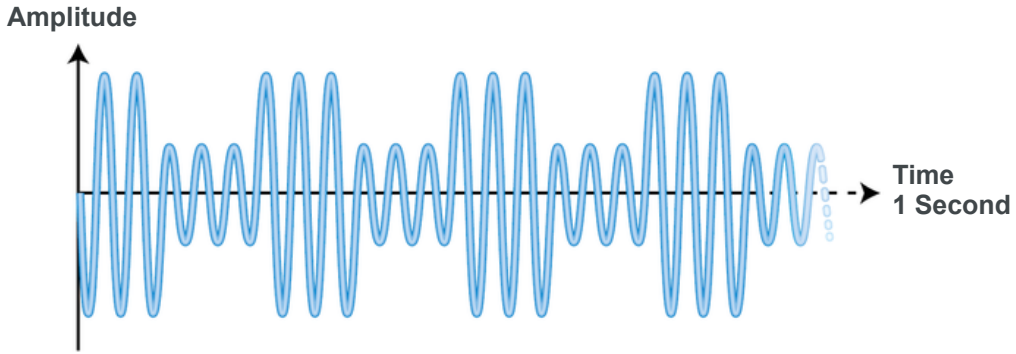
Selectivity of ultrasonic cutting effect

Safety

The generator produces a modulated frequency ranging from 28 to 36 kHz. This signal alternates between high and low amplitude, known as the PIEZOTOME® modulated mode. The bone is cut at a frequency close to its relaxation frequency, limiting the risk of injury to fragile anatomical structures [nerves, arteries]. Bone cutting is precise, cell regeneration is optimized and the healing is of high quality. The ultrasonic piezoelectric technology is suitable for any type of oral or extra-oral surgery where **precision and safety** is a must.

Piezotome® mode – Modulated signal



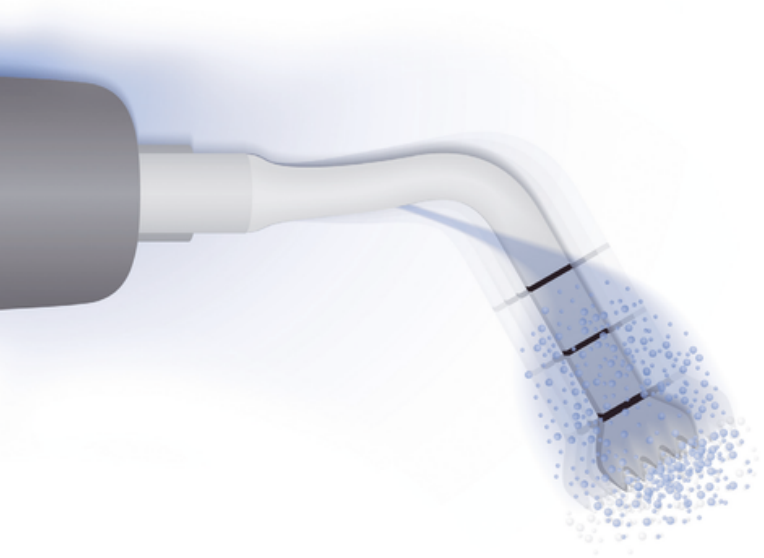
In particular, the study of Horton, Tarpley and Jacoway in 1981 (3) demonstrates the cutting precision. The robust tips, associated with limited vibration amplitude, enable very highly precise cutting.
Finally, the great maneuverability of the handpiece, combined with the range of tips adapted to each clinical application, allows for precise control during all types of treatment.

References

- Gerbault O, Daniel RK, Kosins AM. **The role of Piezoelectric Instrumentation in Rhinoplasty Surgery**. Aesthetic Surgery Journal 2015;36(1):21-34.
- A. Troedhan, MD, DMD, PhD. **Piezotome Rhinoplasty Reduces Postsurgical Morbidity and Enhances Patient Satisfaction: A Multidisciplinary Clinical Study**. Journal of Oral and Maxillofacial Surgery, Volume 74, Issue 8, 1659.e1 - 1659.e11
- Reside J, Everett E, Padilla R, Arce R, Miguez P, Brodala N, De Kok I, Nares S. **In vivo assessment of bone healing following PIEZOTOME® ultrasonic instrumentation**. Clinical Implant Dentistry Related Research 2015;17(2):384-94. Doi: 10.1111/cid.12094. Epub 2013 jun 13.

Hemostasis

Due to its irrigation subject to cavitation, the generators have a hemostatic effect on the cutting surfaces (partially owing to the production of nascent oxygen). The cavitation is characterized by the appearance of micro-bubbles when liquid comes into contact with the tip further to ultrasonic vibrations. When imploding, the cavitation bubbles have a caustic effect. This phenomenon allows achievement of optimal visibility of the operative field, limits the blood extravasation, cleans the working zones of bone debris and avoids temperature rise susceptible to tissue degradation (4).



Histology

A histological study was performed in 2001 by T. Vercellotti, A. Crovace, A. Palermo, L. Molfetta (5) in order to observe tissue healing mechanisms after having performed cutting lines with a piezoelectric device. Three orthopedic surgeries were carried out on dogs involving ulnar osteotomy, head and neck osteotomy and laminectomy. This study demonstrated an absence of necrosis signs on the cutting surfaces. Furthermore, the presence of living osteocytes exhibited the weak trauma engendered by this new technique. The macroscopic examinations showed how neat the cuts / osteotomies were. Indeed, devoid of pigmentation or visible signs of necrosis, the cutting surface is perfectly smooth.

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Ultrasonic Piezo clinical benefits

Ultrasonic piezo bone surgery was initially used by CMF surgeons and then extended to many other specialties, due to its great clinical benefits in oral and extra-oral surgeries:

Intraoperative

Safety:

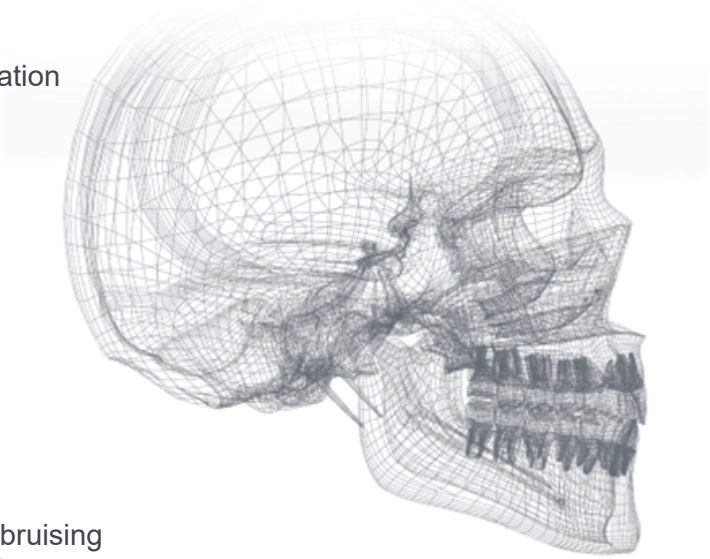
- Selective cut: soft tissue are preserved (nerve, arteries, dura mater)
- Avoid bone overheating (cavitation effect)

Precision:

- Thin & precise osteotomies
- Maximize bone volume

Comfort:

- No handpiece vibration
- Low pressure



Postoperative

Smoothness:

- Reduced pain
- Less swelling and bruising
- More natural results

Healing:

- Favors bone regeneration
- Fast recovery
- Stable and long-term results

PIEZOTOME® Solo m+, compact and efficient, brings together all of the powerful, reliable and safe components of the M+ range for maximum performance and safety.

Clinical indications

Active on hard tissue while preserving soft tissue.
Small bones osteotomies, osteoplasties, drilling, smoothing where safety and precision are essential.

Concentrated ultrasonics for bone surgery in an easy and powerful device

piezotome solo m+

Power mode from d1 (most powerful) to d4

d1
d2
d3
d4

DELIVERED WITH
- 1x bracket
- 5x 3m single use irrigation lines with perforators
- 1x handpiece holder
- 1x IPX6 M+ multifunction footswitch
- 1x M+ wrench
- 1x 3m mains cord

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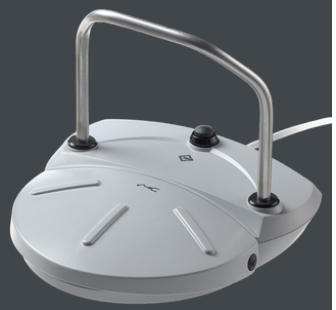
Connected accessories

PIEZOTOME® M+ LED handpiece
- Boosted handpiece: 6 ceramic rings
- Cold LED light for high visibility and low heat generation
- 3m long cord adapted to the operating room environment



Footswitch (operating room certified IPX6 rating - guarantees against water intake)
- Making it possible to control the principal actions that respond to the sterile environment:
  - Power mode
  - Ultrasound ON/OFF

Peristaltic pump for controlled irrigation
- Quick set-up
- Robust
- Precise and constant flow rate (avoids bone overheating)
- Silent running

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Open Ultrasonic Rhinoplasy

A smooth and less traumatic procedure offering precise bone reshaping and controllable long term results.

Precise bone treatment

- The ultrasonic rhinoplasty protocol allows default corrections (nose too hard, too wide or bumpy) with no unwanted fractures even on brittle, thin or unstable bones.

Direct vision

- Surgery performed under direct vision for enhanced precision.

Fast recovery

- Faster social-life re-integration: less ecchymosis and edema with more natural results.

Essential Kit
F87681

Dr Olivier GERBAULT, France

"Rhinoplasty has dramatically changed with ultrasonic rhinoplasty: from a partially blind approach where bones were rasped and broken with the risk of unwanted fracture, it has become a completely visually controlled operation where bones are reshaped and mobilized without altering their stability. This accurate control on shape, position and smoothness of bones is achievable thanks to the use of piezoelectric instruments through a wide sub periosteal exposure of the whole bony vault, and is safe as they don't damage soft tissues and preserve bone supports. Ultrasonic rhinoplasty is an easy procedure. The dorsum and keystone smoothness is achieved by using very thin saws and rasps. Bones can be drilled to suture cartilages to bones, change their orientation or to improve their stability. Finally, long piezoelectric tips enable to straighten the septum or to harvest long pieces of septum without risking to destabilize it. Piezoelectric surgery is part of the current evolutions of 21st century surgery: aesthetic and functional rhinoplasty are profoundly impacted by this disruptive technology."

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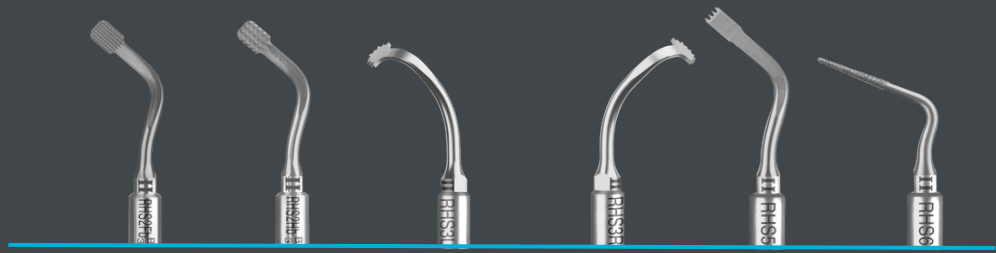
rhinoplasty Gerbault essential

Developed in collaboration with Dr. Gerbault, these tips are designed specifically for the nose anatomy; they do not alter the skin nor the blood vessels allowing for a quicker post-surgical recovery.



RHS2Fb	RHS2Hb	RHS3L	RHS3R	RHS5	RHS6
F87687	F87686	F87677	F87678	F87679	F87680

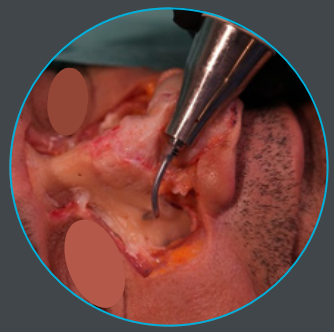
RHS2Hb & Fb - Hard & Fine rasps

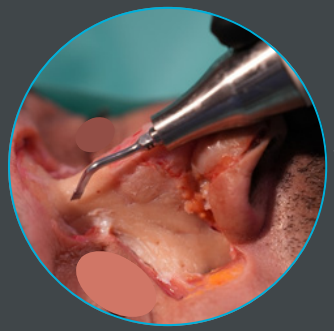
- Fine reshaping of the nasal pyramid
- Removal of the bony hump
- Smoothing of bone irregularities
- Smoothing of bone and hard cartilaginous graft

RHS3L & R - Rounded saw

Left & Right angled saws

- Lateral and transversal osteotomies





RHS5 - Thin saw

Straight thin saw

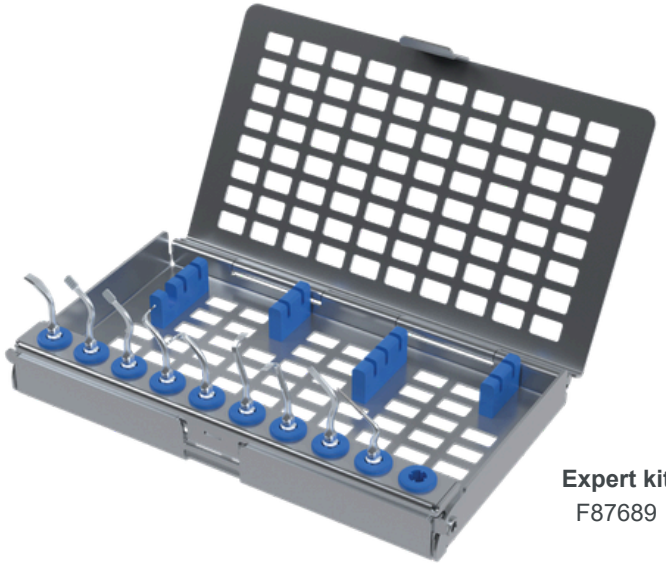
- Median oblique osteotomy
- Rib graft

Dissections done by Dr Olivier GERBAULT and Dr Peter PALHAZI

Open Ultrasonic Rhinoplasy

The Expert kit provides unprecedent bone access. Each tip has been designed specifically to respect the anatomy and answer to the different steps of bone treatment in rhinoplasty, from bone rasping to osteotomies with a completely unobstructed and clear view. Thus, any bone convexity or asymmetry can be assessed and treated.

ACTEON MEDICAL miniaturized rhinoplasty instruments paired with M+ piezoelectric ultrasonic devices allow the reshaping and mobilization of bones without sacrificing bone stability as soft tissue is preserved.



Expert kit
F87689

Dr. Amanda FANOUS, Canada

"I truly believe that ultrasonic technology has revolutionized the world of rhinoplasty. For the first time in history, rhinoplasty surgeons are now armed with a tool that allows them to not only precisely perform all osteotomies, but to also sculpt the actual bony surfaces (osteoplasty).
Furthermore, given that the piezotome does not breach the inner periosteum, the work has the added advantage of being done under direct visualization for extra precision without fear of bony collapse. The applications are wide: deviated bony pyramids, wide bony vaults, brittle bones in older patients, etc…
I could not imagine my practice today without it."

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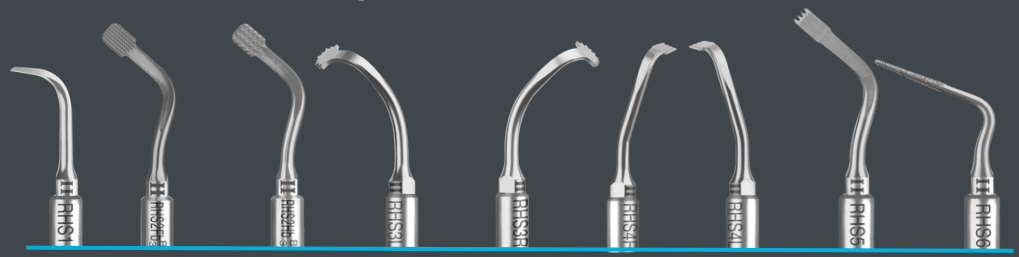
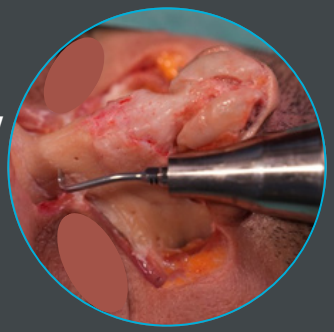
rhinoplasty
Gerbault expert



RHS1	RHS2Fb	RHS2Hb	RHS3L	RHS3R	RHS4R	RHS4L	RHS5	RHS6
F87688	F87687	F87686	F87677	F87678	F87682	F87683	F87679	F87680

RHS1 - Scrapper
Curved tip to remove important bone excess:
- Ostectomy on dense bone and in case of thick skin
- Nasal pyramid remodeling
- Ostectomy of the dorsal hump and lateral convexity

RHS4L & R - Angulated saw
Left & Right angled saws
- Transverse osteotomies
- Partial costal bone grafting



RHS6 - Diamond-coated drill
Diamond-coated tip dedicated to nasal bone drilling or nasal spine drilling
- Bone suture
- Septal suture to bone

Dissections done by Dr Olivier GERBAULT and Dr Peter PALHAZI

Closed & Preservation Ultrasonic Rhinoplasy

Dr Peter PALHAZI, Hungary

"Rhinoplasty doesn't exist without piezo. If you once start using it and you realize its potential, then you're going to see that it's a different level of dealing with the bones, it's just not comparable with something like a chisel rhinoplasty."

DISCOVER OUR 3D VIDEO PROTOCOLS

Dr Olivier GERBAULT, France

"Preservation techniques of the dorsum have become very popular in recent years, especially for correcting minor humps that are not too asymmetrical and have a favorable shape.
The principle is to avoid opening the upper lateral cartilages and to maintain the osteocartilaginous junction continuity at its central part. Long ultrasonic rhinoplasty instruments play a crucial role in these techniques to precisely control the mandatory septum resection required to lower the cartilaginous or osteocartilaginous vault.
They also allow for gentle and controlled harvesting of nasal septum tissue or correction of any type of septal deviation while preserving septal stability."

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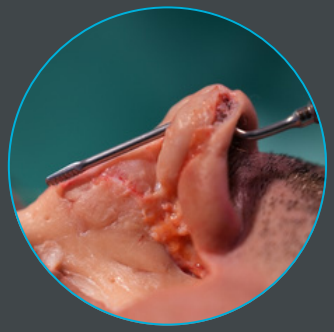
rhinoplasty Gerbault

RHL2	RHL4L	RHL4R	RHL5	RHL6
F87694	F87692	F87691	F87684	F87693



RHL2 - Long rasp

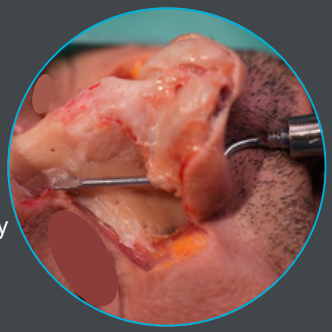
Long hard rasp

- Fine reshaping of the nasal pyramid
- Removal of the bony hump
- Smoothing of bone irregularities
- Fast rasping to create bone abbrasion and better adhesion with the skin

RHL5 - Long saw

Long thin saw

- Closed lateral osteotomy
- Median oblique osteotomy
- High osteotomy of the PPE
- Dorsal resection of the bony and cartilaginous septum



RHL4L & R - Long angulated saw

Left & Right angled saws

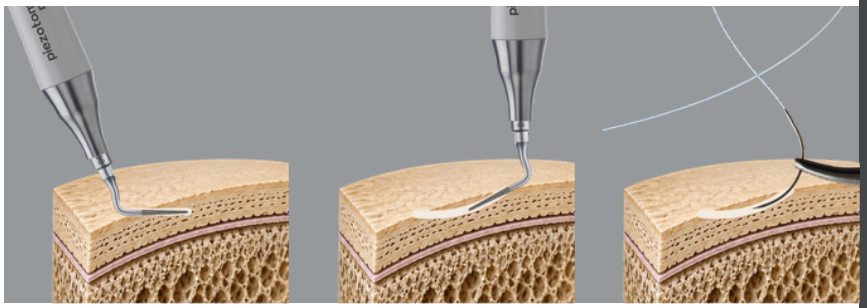
- Closed transverse osteotomies
- Longitudinal osteotomy of the PPE

Dissections done by Dr Olivier GERBAULT and Dr Peter PALHAZI

Ultrasonic Facial Plastic surgery

ACTEON MEDICAL offers a range of high-quality tips designed to support precision, safety, and consistency. Developed with a strong focus on clinical performance and surgeon experience, these tips are intended to meet the specific requirements of delicate facial procedures.

ACTEON MEDICAL tips feature a versatile design and can also be used to create bone tunnels that serve as anchor points in facelift procedures. Their optimized geometry enables precise, reproducible bone perforation while respecting surrounding anatomical structures.
By facilitating accurate tunnel formation with minimal effort, these tips help ensure secure anchoring for soft tissue suspension. Designed for reliable performance and ease of handling, they contribute to procedural efficiency and enhance surgical confidence in facial rejuvenation techniques.



Dr Mehmet CÖMERT, Turkey

"I could clearly say this is a very easy tool to use when performing bone surgery along with facial rejuvenation because it doesn't increase the heat so it's safe for the skin flaps and it is easy to use low energy device, which would cause no complication and harm.
I would really like to use this, especially in the delicate areas like lower eyelid and infraorbital rim so it could be very safe to use peri orbital area.
When we go inside the eyelet once again, work around very important structures, and this would safely allow me to create tunnels on the orbital rim to suspend the midface during my lower eyelid ectropion reconstructions.
The drill tip is a very versatile tool. Very easy to use safe. Safe device to create Bone tunnels where needed."

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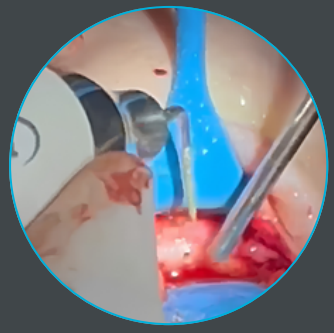
RHS2Fb	RHS2Hb	SL1	SL2	CE3	DB1
F87687	F87686	F87618	F87619	F87653	F87610

DB1 - Forehead bone tunnel
Endoscopy face lift

DB1 - Eyelid bone tunnel
Lower Eyelid Retraction Repair



RHS2Hb - Chin shaping
Facial Rejuvination

Courtesy of Dr Mehmet CÖMERT, Istanbul - Turkey

Ultrasonic Cranio - Maxillo - Facial surgery

Piezoelectric surgery is a new bone cutting technique increasing safety especially in anatomically difficult to reach areas.
Micrometric vibrations ensure very thin and precise osteotomies with stable and long term results for a broad range of clinical applications:

Cranio

- Frontal sinus osteotomy
- Craniosynostosis
- Parietal graft

Maxillo

- LeFort I osteotomy
- Bilateral Sagittal Split Osteotomy (B.S.S.O)
- Genioplasty

Facial

- LeFort II & III osteotomy
- Zygomatic bone osteotomy
- Reconstruction

CMF Kit
F57803

Dr Clement WIRTH, France

"Ultrasonic surgery of the facial skeletal complex is the revolution of the early 21st century. By providing unparalleled precision, it has pushed back the boundaries of orthognathic surgery, improved splitting techniques, and even enabled the creation of new osteotomy modalities. Piezotomy has progressed so significantly over the past 20 years that it now provides surgeons with a precise, minimally invasive, refined, and ultra-high-performance tool. Its respect for vital structures has made its use indispensable in maxillofacial surgery. The future of this technology is promising and paves the way for new, spectacular innovations."

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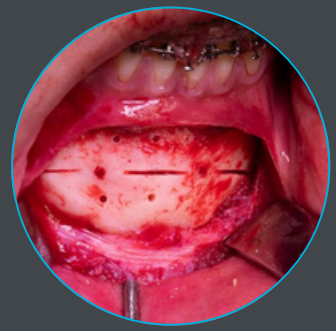
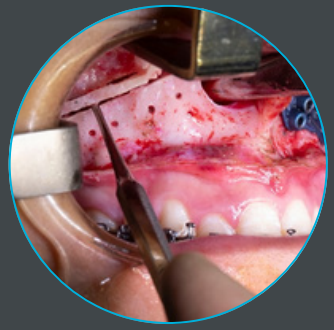
cmf
essential

BS1L	BS2R XL	BS2L XL	BS1RD	SL1	BS4
F87612	F87606	F87605	F87608	F87618	F87615

Bilateral Sagittal Split Osteotomy (B.S.S.O)

Genioplasty





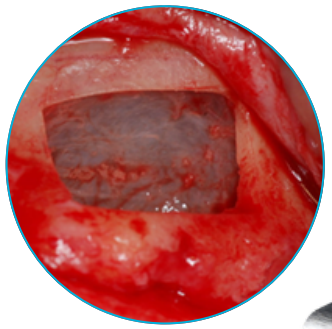
LeFort I osteotomy

Courtesy of Dr Jahrad HAQ, London - UK

Ultrasonic Cranio - Maxillo - Facial surgery

The sinus cavity naturally tends to increase its volume with time. Furthermore, the extraction of a tooth situated in the maxillary sinus area entails a loss of bone height (called pneumatisation of the sinus) and a loss of alveolar bone. The placement of an implant in a bone deficit zone can then lead to a membrane perforation.

The sinus membrane acts as an immune barrier responsible for the maintenance of the healthy sinus. It is thus necessary to perform a sinus lift by an elevation of the membrane, then by an integration of biomaterials.
A flap is then performed and then opened on the antero-lateral wall of the upper maxilla. Different techniques of window cutting can be employed. However, considering the risks of membrane perforation when moving bone window inward into the sinus (Tatum's technique), it is recommended to remove and separate the whole perimeter of bone window fragment.



For unmatched visibility.
The Sinus Lift tips offer the practitioner a straightforward and safe answer to the lateral sinus lift operation. Thanks to the ultrasonic frequency modulation, the risk of membrane damage is limited.
The diamond-coated tips for window cutting and the three spatula tips for sinus lift SL1 and SL2 are cooled by the sterile spray (thus avoiding tissue damage from exposure to high temperatures). The use of a manual instrument is recommended to control the membrane detachment. Moreover, the cavitation effect enables excellent visibility of the operating field. These tips guarantee a fine, clean and effortless cut.

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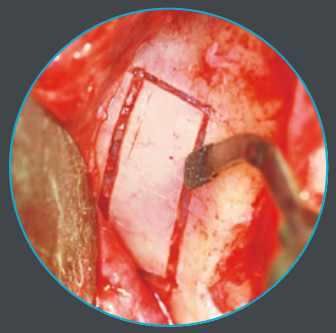
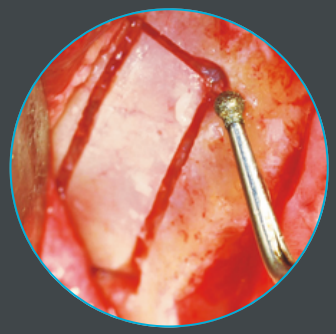
sinus lift

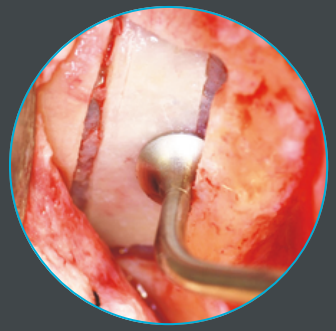
SL1	SL2	SL3	SL4	SL5
F87618	F87619	F87620	F87621	F87622



SL1 - Bone incision
Diamond-coated tip for vestibular bone window cut and for attenuation of sharp angles.

SL2 - Bone incision
Diamond-coated ball tip for smoothing the vestibular bone window and precise osteoplasty.





SL3 - Membran elevation
Plateau tip, non-cutting, for sinus membrane elevation on the window's edges.

SL4 & 5 - sinus membrane elevation and disengagement
Non-cutting spatulas, used for sinus membrane elevation inside the sinus and for disengagement of anatomical structures.

Tips settings

Tip	Recommended mode	Irrigation ml/min

Osteotomy

BS1S	D1	60
BS1RD	D1	80
BS1L	D1	60
BS1 XXL	D1	80
BS2L	D1	60
BS2R	D1	60
BS2L XL	D1	60
BS2R XL	D1	60
BS5	D3	60
SL1	D1	60
NINJA	D1	60 - 80
LC1 XL	D1	60 - 80

Tip	Recommended mode	Irrigation ml/min

Osteotomy

CS1	D2 - D3	80 - 100
RHS3L	D1	60
RHS3R	D1	60
RHS4L	D1	60
RHS4R	D1	60
RHL4L	D1	60
RHL4R	D1	60
RHS5	D1	60
RHL5	D1	60
RHL6	D1	60

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Tips settings

Tip	Recommended mode	Irrigation ml/min

Bone Remodeling / Drilling

CE3	D1	60 - 80
DB1	D1	80
DB2	D1	80 - 100
RHS6	D1	80
SL2	D1	60

Membrane Detachment

SL3	D4	50
SL4	D4	30
SL5	D4	30

Tip	Recommended mode	Irrigation ml/min

Osteoplasty

BS4	D1	60
BS6	D1	60
BS6 XXL	D1	80
RHS1	D1	60
RHS2Hb	D1	60
RHS2Fb	D1	60
RHL2	D1	60

The best for you...

Security

Cutting selectivity, no soft tissue lesions

- "Piezotome® surgery is superior in atraumaticity and soft-tissue safety (...) no lesions of the mandible nerve were detected with Piezotome® surgery"(6) / "0 lesion with Piezotome® vs 16% of hypesthesia with rotary instruments"
- LeFort I osteotomy "...total absence of soft tissue injuries, both in the posterior pedicle and in the vascular elements and palatal tissues"(7)
- "ACTEON® produced the least increase of intraosseous temperature" versus competitors units(8)

GREAT INTRAOPERATIVE CONTROL

Optimal visibility (cavitation), limits blood (hemostasis), removes bone debris and avoids high temperatures

- Throughout the procedure a clear and stable view was achieved, with a low level of bleeding and adequate irrigation of the cutting area"(7)

FAST PROCEDURE

"... in 5 cases in which we used this technique, the duration of the osteotomy was 8 to 15 minutes, a trivial period in the entire surgery"(9)

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... and for your patients.

BETTER HEALING PROCESS AND BONE REGENERATION

- "Piezoelectric instrumentation favors preservation of bone"(8)
- Better bone turnover and densification "Bone instrumented by piezoelectric surgery appears less detrimental to bone healing than high-speed rotating device"(10)

SMOOTHNESS

Less traumatic

- Decreased postsurgical morbidity "...significant reduction or almost absence of postsurgical ecchymosis/edema and significant reduction of pain"(11)
- "Increased patient satisfaction significantly"(11)
- More natural results

SAFE AND STABLE RESULTS

- Stable and long term results "...osteotomies can be performed with stability, because the underlying periosteum and mucosa are not damaged..." & "...allow the surgeon to easily stabilize unstable bones by drilling holes"(12)

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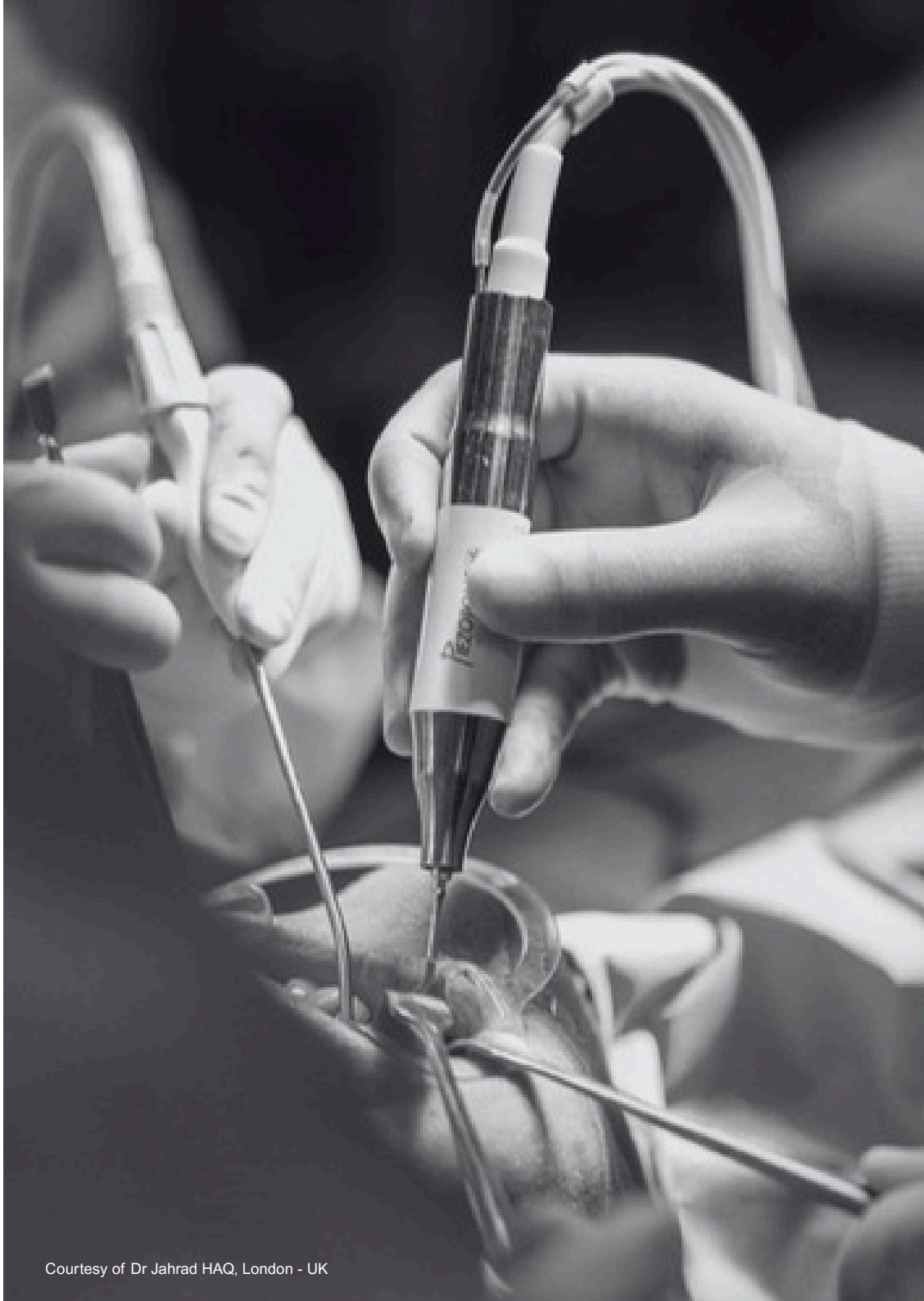

Courtesy of Dr Jahrad HAQ, London - UK