



**Piezo-assisted External
Dacryocystorhinostomy
Versus
Conventional External
Dacryocystorhinostomy**

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Financial disclosures

None



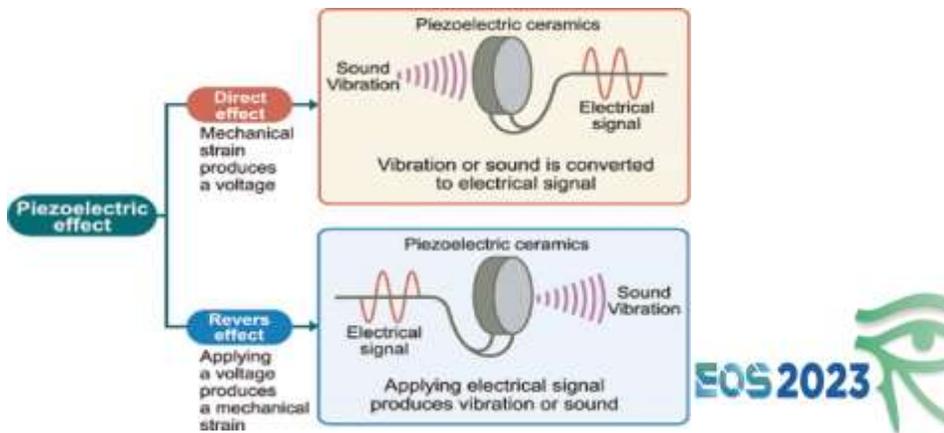
Introduction



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- External dacryocystorhinostomy (DCR) is one of the most common Oculoplastic surgeries performed for managing epiphora due to nasolacrimal duct obstruction.
 - Many modified techniques of ex DCR has been described for a better surgical outcome.
 - In this study, we highlighted one of these modifications, which is the use of **piezoelectric technology** in external DCR.



- The term “**piezo**” originates from the Greek word *piezein*, and means “**pressure**”.
- Piezoelectricity means electricity generated from pressure.



- Piezoelectric devices typically consist of a handpiece with different tips , a control unit and a foot switch



Piezoelectric Effect:

Crystals deform when an electric current is passed across them.



Production of ultrasonic waves.



Waves are amplified & transferred to a vibration tip.



When tip is applied with slight pressure on bone tissue.



A Mechanical Cutting Effect Occurs On Mineralised Tissue.



- Piezo surgery is a new option for osteotomy using an ultrasound device.
- This device produces low-frequency microvibrations (25–35 kHz) that selectively cut mineralized tissues while sparing soft tissues which require frequencies of greater than 50 kHz.
- This allows for precise and selective cutting, hence is considered to be safer than the mechanical rongeurs.



Aim of the work

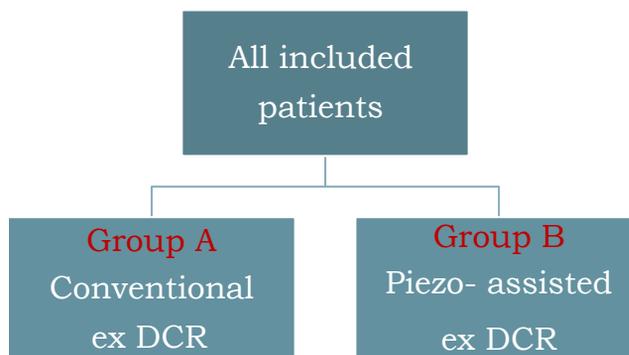
Comparative study between Piezo assisted external Dacryocystorhinostomy and conventional external Dacryocystorhinostomy as regard surgical time, efficacy, safety and cost.



Patients and Methods



Forty (40) eyes of (38) patients suffering from lacrimal drainage insufficiency divided into 2 groups:



Inclusion Criteria

- Acquired nasolacrimal duct obstruction.
- Lacrimal mucocele.
- Acquired lacrimal fistula



Exclusion Criteria

- Congenital nasolacrimal duct obstruction.
- Recurrent cases after DCR surgery.
- Punctal and canalicular causes of epiphora.
- Lacrimal tumor.



SURGICAL TECHNIQUE



A standard external DCR in both groups till the osteotomy

For group A, osteotomy was done using *Kerrison rongeurs*

For group B, osteotomy was done using *piezosurgery handpiece tip* to incise the bone of the anterior lacrimal crest and sac fossa.



Marking the osteotomy edges

Piezosurgery handpiece tips (SG4 for VarioSurg3 device and OT2 for Mectron device) were used



- The suitable program for cutting bone was set (SURG mode for VarioSurg3® device and cortical mode for Mectron® device).
- The tip was held perpendicular to the bone surface associated with irrigation (by Normal saline 0.9 %).





One Bone Piece

Intact nasal mucosa after
bone removal



- Follow-up was done at 1 day, 1 week, 1 month, and 6 months postoperatively to observe the postoperative results and complications
- Surgical success was defined by objective and subjective outcomes.



RESULTS



	Conventional DCR	Piezo DCR
Surgical time	✓ Shorter (6-14 min.)	Longer (16-35 min.)
Visibility during Osteotomy	Poor visibility	✓ Perfect , due to hemostasis
Safety	Less safe on the soft tissue	✓ More safe on the soft tissue
Surgeon fatigue	More fatigue	✓ Reduced
Learning Curve	No Need	Required
Efficacy	Effective	Effective
Cost	✓ Low cost	High cost





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The use of Piezosurgery is a **safe** and **effective** tool for creation of the bony osteotomy during external DCR, offering comparable outcomes to more commonly used traditional rongeurs. But the use of a Kerrison rongeurs is associated with **lower cost** and possibly **quicker** operating time.

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