FP85

Piezosurgery® in Pediatric Neurosurgery

Paolo Frassanito, Gianpiero Tamburrini, Luca Massimi, Concezio Di Rocco, Massimo Caldarelli
Pediatric Neurosurgery, Catholic University Medical School, Rome, Italy

Introduction: Piezosurgery® is a piezoelectric bone scalpel based on ultrasonic microvibrations that allows to perform precise and thin osteotomies with soft tissue sparing. We investigate the advantages and drawbacks of this device in neurosurgical procedures.

Methods: In the Pediatric Neurosurgery of Policlinic A. Gemelli (Rome, Italy), Piezosurgery® was used in 40 consecutive spinal and craniofacial surgical procedures (19 cranioplasties, 16 craniotomies, and 5 laminotomies) over a period of 6 months. The time required to perform craniotomy/osteotomy, the risk of damaging the dural layer, the loss of blood, and the early aesthetic result were compared with other techniques.

Results: Piezosurgery® needs up to 10-20% more time to cut bone if compared to high speed drilling devices and bone rongeurs, 80-100% if compared to pneumatic osteotome. Dural layer was always preserved by Piezosurgery®, though 2 cases of dural fissuring occurred in syndromic craniosynostosys. In both cases the bone thickness was highly irregular and the dural layer was extremely thinned.
No differences in term of loss of blood were observed. In all cases the juxtaposition of the bone edges in the reconstruction phase was optimal, with no aesthetic complaints by the patient or parents.

Conclusion: Piezosurgery® warrants an optimal aesthetic result, together with minimal bone loss. The risks of dural layer damage is much lower than pneumatic osteotome but it is not cancelled in peculiar circumstances, such as syndromic craniosynostosis.
According to our results, Piezosurgery® is highly recommended in regions with highly aesthetic impact (e.g. forehead, orbital roof), in case of irregular thickness of the skull bone (e.g. syndromic craniosynostosys), in splitting procedures for cranioplasty. In other craniotomies behind the hairline, this device is time-consuming and the actual advantage, in particular the major rate of bone flap healing compared to pneumatic osteotome, should be further investigated.