Calvarial Bone Harvesting With Piezoelectric Device

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We introduce the use of a piezoelectric device in order to harvest calvarial bone grafts. The vibration frequency of the instrument allows for the efficient cutting of bone without the risk of accidentally damaging the dura.

Key Words: Bone graft, ultrasonics, osteotomy

Piezosurgery takes advantage of the cutting capacities of scalpels that microvibrate with ultrasonic frequency. The soft tissue that contacts the scalpel is not damaged, so it is an ideal device to be used in the border between soft tissues and bone,[1] thus reducing the hazard of trauma to the neighbor tissues. We present the use of a piezosurgery device to harvest parietal bone grafts, diminishing thus the risk of damaging the dura (Fig 1).

TECHNIQUE

A standard approach to the parietal bone is used, either with a bicoronal flap, or an incision in the temporoparietal area. An oscillation frequency of 25–30 kHz is used to osteotomize the parietal bone. That vibration frequency does not damage the neighbor dura. The device is used in the highest power level (''boosted''). During the procedure, profuse irrigation with saline is used to avoid overheating of the bone. An oscillating saw tip was used (Fig 2).

DISCUSSION

In the last few years, piezoelectric devices have gained popularity in the maxillofacial area.[1–4] Even though it has been mainly used in intraoral procedures,[5–7] it has been applied in different osteotomies of the facial area, including segmental maxillary osteotomies,[8] mandibular osteotomies,[9] and cranial osteoplasties.[10]

Piezosurgery can be safely used to harvest most bone grafts of the craniofacial region. Its cutting properties allow for the protection of the neighbor soft tissues. Thus, in the maxillary tuberosity, the sinus mucosa can be protected as well as the mental nerve in the chin, the alveolar dental nerve in the ascending ramus, or the dura in the parietal bone.[11–14]

The outer table of the parietal bone is a useful donor area for craniofacial surgeons, not only because of the topographic availability, but also due to the low morbidity and disability that is produced by its harvesting.[15–17] The bone is obtained from the area where the bone is thick and its diploe is rich in spongious bone. The main complication of the procedure is damaging the dura, but as long as it is not penetrated, it produces no morbidity.[18]

Advantages of the procedure include the aforementioned property of its harmlessness regarding soft tissues, avoiding its accidental damage during surgery,[3] and a better control of the osteotomy line due to the physical properties of the device.[19] Complications directly related to the piezosurgery

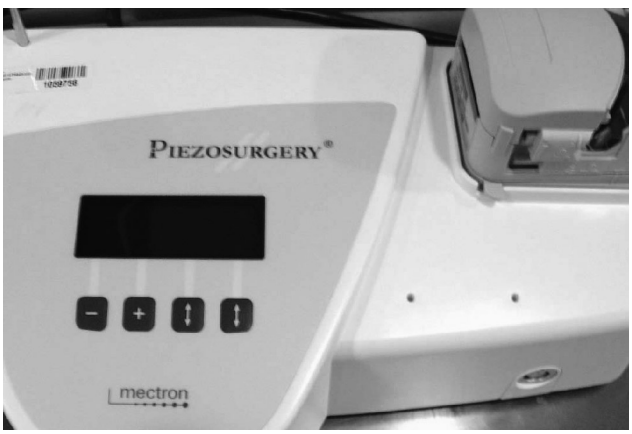

Fig 1 The piezosurgery instrument is used to perform the harvesting of calvarial bone grafts.

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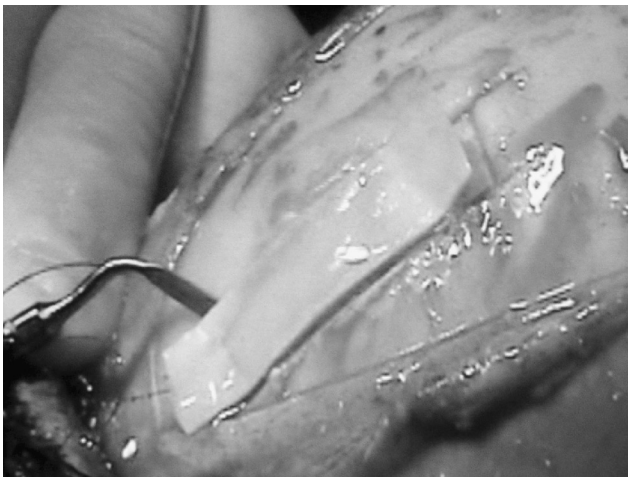

Fig 2 Surgical view of the saw tip used during the bone harvesting.

device are not frequent. Thermal damage of the bone is a hypothetical complication of the procedure, with cavitation.[20] The most common complaint is that procedures are longer in comparison to the conventional saws used in osteotomies of the facial bones.[10] This event is more obvious when compact and thick bone has to be osteotomized as in the calvarial cortex.

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