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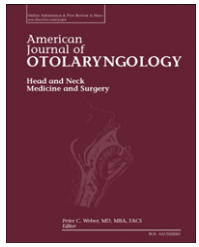

External osteotomy in rhinoplasty: Piezosurgery vs osteotome☆

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ABSTRACT

Purpose: To achieve the desired outcome in rhinoplasty depends on many factors. Osteotomy and surgical reshaping of nasal bones are important steps that require careful planning and execution. The availability of different tools raises the question of which one provides significant advantages for both technique and surgical outcome. Our prospective randomized pilot study compared the outcome of post-traumatic rhinoplasty performed with two different external techniques: ultrasound osteotomic cut using the Piezosurgery Medical Device (Mectron, Carasco, Italy) and traditional external osteotomy.

Material and methods: Forty-four lateral osteotomies of the nasal wall were performed in twenty-two patients. In twelve patients the osteotomies were conducted with a 2-mm traditional osteotome (control group), while in the remaining ten patients these were done with the Piezosurgery Medical Device (experimental group).

Results: At the postoperative evaluation, significantly lower pain, edema and ecchymosis were noticed in the experimental group ($p < 0.05$). Moreover, the endoscopic evaluation showed fewer mucosal injuries in the experimental group ($p < 0.05$), whereas bleeding, symmetry of the pyramid and presence of external scars, were similar in the two groups.

Conclusions: In the present study, Piezosurgery Medical Device allowed for safe lateral osteotomies in rhinoplasty preliminarily demonstrating the potential to reduce some of the most frequent complications of rhinoplasty.

1. Introduction

Lateral osteotomy is generally the last step in rhinoplasty. After hump removal, the nose appears wider and the dorsal roof becomes open. Lateral osteotomy is performed to close the dorsal roof, to narrow and refine the nasal pyramid and to straighten the nasal bones [1]. In this phase, it is important to achieve adequate mobilization of the bony skeleton minimizing the damage to the supporting soft tissue and avoiding excessive narrowing in order not to compromise the nasal physiology. Current methods rely on mechanical energy to perform osteotomies, but extensive trauma of the nasal mucosa may contribute to the prolonged postoperative ecchymosis and edema and comminuted fracture of the

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nasal bones may lead to suboptimal cosmetic outcome [1]. The ideal technique for lateral nasal osteotomy should maintain the integrity of the nasal mucosa and the periosteal attachment of the bony lateral wall of the nose, and it should also be safe, precise and reproducible. There is still considerable debate over the optimal method and approach to perform lateral osteotomies. They may be carried out using an internal approach, through the nose or the mouth, or with an external percutaneous approach using a 2-mm wide osteotome[2,3]. Both approaches are widely practiced, and the surgeon's choice is generally based on his own preference and experience. Many authors have compared the two approaches in order to highlight their benefits and limitations [4]. In our past experience, external osteotomy has proved to result in unnoticeable cutaneous scars one month after surgery, limited bleeding and edema and minimal periorbital ecchymosis with the preservation of the nasal mucosa[1].

A breakthrough in osteotomy was provided by the advent of the Mectron Piezosurgery Medical Device (PMD), an innovative instrument based on piezoelectric ultrasonic vibrations which has successfully been used to perform both closed and open rhinoplasty procedures, with fewer related complications[5,6]. The main benefits of this device are the harmless effect on soft tissues, the minimal bleeding and bruising, and the small pressure required to create bony cuts, which can destabilize the bony and the cartilaginous parts of the nose. The ability to minimize tissue trauma with its associated morbidity and the cutting effectiveness make the piezosurgery an attractive option for lateral osteotomies in rhinoplasty.

Authors skilled in maxillofacial surgery and rhinoplasty have performed lateral osteotomies and removal of the bony-cartilaginous hump by using piezoelectric technology rather than the classic osteotome[5,6]. Our literature research however failed to find a study in which a control group was enrolled.

This preliminary study analyzes the outcome of two different osteotomic techniques for lateral osteotomy: ultrasound osteotomic cut versus traditional external osteotomy.

2. Patients and methods

This prospective randomized pilot study involved patients that underwent rhinoplasty surgery at the ENT Department of the Cattinara Hospital in Trieste, Italy. The study ran from January through September 2013.The study protocol was approved by the Institutional Review Board of the University of Trieste (No. 54); patients were informed about the purpose of the study and gave their written consent to join the experimentation. All procedures were carried out by a single surgeon.

2.1. *Patient selection*

Our institute is a public hospital in which rhinoplasty surgery is performed with a morphofunctional intent and not merely for aesthetic purposes. The inclusion criteria were, therefore, history of maxillofacial trauma with specific nasal involvement, consensual deviation of both the nasal septum and pyramid, presence of a wide nasal dorsum and prominent hump and associated nasal respiratory dysfunction. Patients who had already undergone a previous rhinoplasty procedure, or who presented a narrow nasal dorsum and a minimal hump were excluded.

The study included 22 patients, 10 men and 12 women, who were randomly assigned to two groups: experimental group (G1, n = 10), in which the osteotomies were performed with PMD, and control group (G2, n = 12), in which the osteotomies were performed with traditional 2-mm wide osteotome. Allocation to groups was carried out by opening opaque sealed envelopes and was concealed from the investigators.

2.2. *Anesthesia and surgical technique*

All procedures were performed under general anesthesia and the rhinoplasty surgery was always a morphofunctional type encompassing the septoplasty and conducted with a closed technique. The first steps were the removal of the dorsal hump and the medial nasal osteotomy. Lateral osteotomy was performed with an external percutaneous approach using the selected instrument.

In the experimental group the surgeon performed a 2-mm long incision 8–10 mm below and medially to the medial canthus, involving the skin, the underlying superficial muscular aponeurotic system tissues and the periosteum (Fig. 1). A curved, narrow and unguarded MT1S-10 tip of the PMD was placed through the pilot incision up to the nasal bone. Before activation, the tip was manually pushed cranially and caudally into the incision to produce minimal periosteal detachment, restricted to the ideal line of the lateral osteotomy without the need to create a subperiosteal tunnel. The vibrating chisel was then activated and moved continuously along the ideal osteotomy line, exerting gently pressure on the bony surface, to create a continuous section line (Figs. 2 and 3). In some selected wider noses, the surgeon can choose to perform a second caudal incision to extend the osteotomy to the lower portion of the maxilla (Fig. 4).

In the control group, the 2-mm wide osteotome was used with a traditional technique that has already been described [1].

At the end of the procedure, each nasal fossa was packed with Merocel (Medtronic Xomed Inc, Jacksonville, FL) and Silastic sheeting was placed as a septal splint secured with a through-and-through suture. Externally, a plaster cast was applied to protect the nasal pyramid.

Fig. 1 – Cutaneous incision.