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Easily maneuverable osteotome for pterygomaxillary disjunction

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In Le Fort I osteotomy, secure disjunction of the pterygomaxillary suture is essential for maxillary mobilization and avoidance of complications. For desirable disjunction of the suture, the vector of force should be transmitted from posterolateral to anteromedial, but this is often difficult to achieve even if a curved osteotome is used, due to the blockage of the oral commissure. Reckless attempts to split the suture under difficult situations can produce undesirable fractures of the palatal bone, maxillary tuberosity, and pterygoid plate, occasionally accompanied by severe hemorrhage.¹ To overcome these problems, a specially designed Swan's neck osteotome is commercially available (Fig. 1).² This piece of equipment has a unique loop, resembling a swan's neck, to accommodate the cheek. Under clinical situations, however, this osteotome is not always easy to handle because of the narrow range of possible angular adjustments, particularly in cases of deeply located pterygomaxillary sutures, and the force transmitted to the cutting edge will decrease at the loop, which acts as a buffer. Furthermore, mucous membrane incision has to be continued more distally and the periosteum has to be elevated widely to insert this chunky instrument, or the periosteum will be torn and the buccal fat-pad will be exposed. We have developed a simple osteotome to enable easy access to the pterygomaxillary suture and allow direct transmission of the force without decrease (Figs. 2, 3).

The top blade is parallel to the grip to transmit the force in the same direction, with a slight curve to the cutting edge to wedge apart the pterygomaxillary suture. The relatively long top blade can sufficiently reach the deeply located suture. The intermediate part is curved and bent to accommodate the cheek. There is no twisting like the swan's neck osteotome, because the only requirement is to circumvent the commissure without decreasing the force exerted by malleting. For this purpose, the tool should not be bent, but rather should be straight as long as the commissure is not injured. A crank-shaped osteotome is superior to the present instrument from the perspective of avoiding the oral commissure, but the top blade may not be long enough to reach the deeply located suture because the long top part represents an obstacle when inserting under the periosteal tunnel into a desirable position. The unique shape of our instrument was developed based on these reasons. The simple configuration facilitates sliding along the lateral wall of the maxillary sinus toward the pterygomaxillary suture and improves the range of manipulability in 3 dimensions without interference from surrounding structures. Due to its characteristics, this osteotome is also useful for extra splitting to achieve complete separation when amending greenstick fracture or

mal-splitting, since the simple shape allows easy placement onto the unsplit portion and delicate control of the vector compared to other osteotomes, including the swan's neck osteotome.

This novel instrument can reliably and safely perform the steps needed for disjunction procedures.

Conflict of interest: None declared.

Ethical approval: Not required.

References

1. Lanigan DT, Hey JH, West RA. Major vascular complications of orthognathic surgery: hemorrhage associated with Le Fort I osteotomies. J Oral Maxillofac Surg 1990;48:561-73.
2. Wikkeling OM, Tacoma J. Osteotomy of the pterygomaxillary junction. Int J Oral Surg 1975;4:99-103.

Footnotes

Figure 1. Swan's neck osteotome. The curved handle accommodates the cheek. This unique and chunky shape sometimes gives us difficulty in handling.

Figure 2. The shape of the novel osteotome. The blade is parallel to the grip (dotted line). The intermediate part circumvents the oral commissure.

Figure 3. Intra-operative view. The retractor is easily controlled due to its simplicity. Note: Lateral maxillary wall was already removed 3mm in width for the superior repositioning.



