



Title	Length-Marked Osteotome for Secure Le Fort I Osteotomy
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Citation	Journal of maxillofacial and oral surgery, 17(4), 634-635 <a href="https://doi.org/10.1007/s12663-018-1090-7">https://doi.org/10.1007/s12663-018-1090-7</a>
Issue Date	2018-12
Doc URL	<a href="http://hdl.handle.net/2115/76236">http://hdl.handle.net/2115/76236</a>
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Type	article (author version)
File Information	matsushita_JMOS .pdf



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Title

Length-marked osteotome for secure Le Fort I osteotomy

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Abstract

To avoid injury of the descending palatine artery during Le Fort I

osteotomy, I believe that it is important to measure the right distance between the piriform rim and the most anterior point of the descending palatine canal on the CT images and to insert the chisel to the correct distance. To achieve this maneuver easily, a novel chisel with depth markings is developed. The osteotome is based on a general thin osteotome of 6 mm width. Laser striped markings are made for easy identification of 25, 27, 30, 33, 35, 37, and 40 mm from the top, with unique color-coded stripe. It enables easy bone cut without anxiety in a short time. It is also a useful instrument for bone-cut where the length and depth are critical.

Keywords:

Le Fort I osteotomy; osteotome; descending palatine artery; complication

## Title

Length-marked osteotome for secure Le Fort I osteotomy

## Acknowledgement

This study was not funded by any fund.

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Le Fort I osteotomy is one of the most commonly performed procedures to correct dentofacial deformities. The number of complications reported has been rising as the number of surgeries increases [1]. Injury of the descending palatine artery during osteotomy of the medial maxillary sinus walls, using thin chisel, is one of the most common complications. Pterygoid process fracture may result in hemorrhage from pterygopalatine fossa or pterygoid venous plexus during posterior wall osteotomy via infrazygomatic crest. To avoid these injuries, it is essential to ensure that the osteotomy instrument is not plunged too deep. I measured, on the CT images, the actual distance, such as one between the piriform rim and the most anterior point of the descending palatine canal, every time we performed the procedure and marked the blade with methylrosanilinium chloride (gentian violet) to indicate the position at which the blade should be inserted. However, the dye got blurred during handling, leading to incorrect positioning of the blade. To avoid serious complications and optimize surgical time, I developed a novel osteotome with markings, based on the frequently observed length in the clinical situation.

The osteotome is based on a general thin osteotome of 6 mm width (Fig. 1). Laser striped markings are made for easy identification of 25, 27, 30, 33, 35, 37, and 40 mm from the top. The stripes above and below the position of 30 mm were 3 mm apart and those above and below the position of 35 mm were 2 mm apart. The concept for these markings is based on the periodontal color-coded probe. Preoperatively, the length of osteotomy line between piriform rim and the most anterior point of the descending palatine canal is measured on the CT axial image (Fig. 2). During surgery, after protecting the nasal mucoperiosteum by inserting a malleable retractor between the lateral wall of the nasal cavity and the mucosa at the inferior meatus, horizontal osteotomy at the medial wall of maxillary sinus was performed first, using a reciprocal saw. Additional osteotomy to the required length toward the posterior direction, just anterior to the canal of descending palatine artery, was performed (Fig. 3). Osteotomy of the lateral wall is also performed to the additional depth necessary, using the marked osteotome, after osteotomy using reciprocal saw. But in these procedures, I should keep in mind that true osteotomy length is often slightly different from that measured by CT because CT axial image is taken parallel to the Frankfurt

plane. During a clinical osteotomy, the mallet sound becomes shriller while approaching the descending palatine canal, because the bone gets slightly thicker mediolaterally. It is a reliable guide for osteotomy. The laser marked osteotome and close attention to the change in the mallet sound can act synergistically to minimize complications during maxillary horizontal osteotomy.

#### Reference

1. Kramer FJ, Baethge C, Swennen G, Teltzrow T, Schulze A, Berten J, Brachvogel P (2004) Intra- and perioperative complications of the LeFort I osteotomy: a prospective evaluation of 1000 patients. *J Craniofac Surg* 15(6): 971-977

#### Figure Legends

Fig. 1

The new osteotome with length markings.

Fig. 2

Measurement of the length from piriform rim to the most anterior point of the descending palatine canal. Osteotomy can be carried out safely in this case up to 34.5 mm.

Fig. 3

Performing an osteotomy using the laser-marked osteotome. It is easy to recognize the length of insertion posteriorly into the bone. In this picture, the blade is inserted into the bone up to a little point short of the striped line at 35mm.

Fig.1

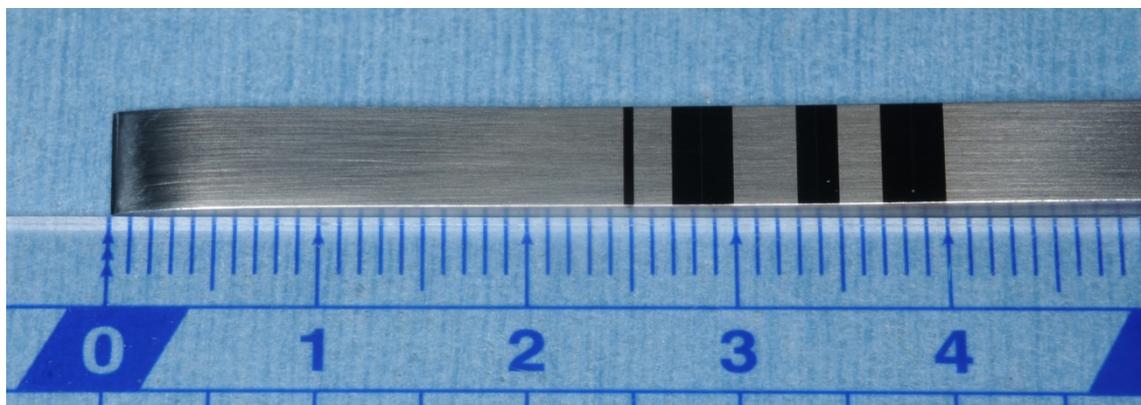


Fig.2



Fig.3

