Le Fort I Osteotomy Under Navigational Guidance for Posterior Repositioning of the Maxilla

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Abstract: Because navigational guidance can localize the operative site 3-dimensionally during maxillofacial surgery and provide precision, reliability, and safety for surgeons, we report Le Fort I osteotomy under navigational guidance for posterior repositioning of the maxilla.

Key Words: Le Fort I osteotomy, navigational guidance, navigation, posterior repositioning of the maxilla

Le Fort I osteotomy is a common, conventional orthognathic surgery to correct dentofacial deformities. Maxillary setback is rarely planned due to the technical difficulties involved; however, it is sometimes required to obtain an ideal profile without nasal deformity in cases of maxillary protrusion or asymmetry with an anteroposteriorly normal maxillary position but horizontal rotation of the maxilla. In particular, Japanese patients with prognathism or asymmetry tend to have less prominent noses than Caucasian patients. Therefore, the removal of the interference must be performed carefully. Because navigational guidance can localize the operative site 3-dimensionally during maxillofacial surgery and provide precision, reliability, and safety for surgeons, we report here Le Fort I osteotomy under navigational guidance for posterior repositioning of the maxilla.

The ultrasonic bone curette (SONOPET UST-2000; Stryker MedTech, Tokyo, Japan) has been reported to decrease the risk of
damage to surrounding soft tissues such as the DPA.\textsuperscript{1} For maxillary posterior repositioning, Ueki et al\textsuperscript{1} used this device to fracture the pterygoid process. As a more minimally invasive approach, we performed Le Fort I osteotomy under navigational guidance for posterior repositioning of the maxilla, when maxillary setback was required to obtain an ideal profile without nasal deformity. Preoperative CT scanning was performed after the patient wore an individual occlusal splint with 6 titanium registration markers. DICOM data were transferred to an optical navigation system (Stealth Station, Medtronic, Louisville, KT). After intubation, a reference frame was fixed to the head. Registration was performed and the navigation system was utilized to identify the pterygoid process. A calibrated ultrasonic bone curette was used to remove bone around the DPA and to perform osteotomy of the pterygoid process slightly above the level of the maxillary osteotomy after down fracture (Figs. 1 and 2). The pterygoid process was fractured carefully with an osteotome following ultrasonic osteotomy of the pterygoid process, enabling mobility of the pterygoid process to be achieved safely and the maxilla to be repositioned posteriorly as determined by a wafer.

Although removal of the maxillary tuberosity bone for posterior movement of the maxilla has been reported,\textsuperscript{4,5} we find the removal to be challenging and time consuming, and it carries a risk of injuring the DPA. We additionally employed a navigation system to fracture the pterygoid process, and because the pterygoid process osteotomy location could be identified 3-dimensionally under such guidance, safe ultrasonic osteotomy and fracture of the pterygoid process could be achieved without complications.

**REFERENCES**