



Setback genioplasty with rotation for aesthetic mentolabial soft tissue: a case report

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Abstract (J Korean Assoc Oral Maxillofac Surg 2023;49:365-368)

The mentum plays an important role in the aesthetics of the face, and genioplasty is performed to improve an unbalance of the mentum. Among the various surgical approaches, setback genioplasty is used to create an aesthetic jaw-end appearance by moving the mentum backward when it protrudes more than normal. However, conventional setback genioplasty may be aesthetically disadvantageous because the profile of the mentum could become flat. This case study attempted to overcome the limitations of conventional setback genioplasty by rotating the position of the menton and pogonion. We devised a new method for setback genioplasty by rotating the segment anteroinferiorly. Using virtual surgery, we were able to specify the range of surgery more accurately and easily, and the surgery time was reduced. This case report showed the difference in chin soft tissue responses between conventional setback genioplasty and setback genioplasty with rotation.

Key words: Mentolabial angle, Setback genioplasty, Virtual surgery, Rotation

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I. Introduction

Genioplasty is often performed to promote a harmonious aesthetic of the lower face regardless of occlusion type. The first conventional horizontal sliding genioplasty was performed in 1942 by Hofer; since then, the genioplasty approach has undergone numerous modifications¹. Among them, setback genioplasty is used to create an aesthetic jaw-end appearance by moving the mentum backward when it protrudes more than normal, which is a simpler procedure that carries a lower risk of nerve injury compared to mandibular setback surgery. However, setback genioplasty induces various unexpected change in the soft tissue and leads to a lower soft tissue response to hard tissue changes than other kinds of genioplasty². To improve these limitations, a new method of setback genioplasty was devised.

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II. Case Report

1. Patient information

An 18-year-old female patient presented to our hospital with mandibular prognathism with no family history but an orthodontic history. Clinical cephalometric and panoramic X-rays were assessed. She had no other relevant medical history.

2. Clinical findings

The clinical examination showed a midline shift of the face of 0.5 mm to the left side of the mandible with an edge-to-edge bite. The patient demonstrated stable occlusion with molar key Class I. She also had a straight profile with a protrusive lower lip and chin. Because she had already undergone orthodontic treatment, she had no desire for further orthodontic treatment or mandibular setback surgery.

3. Data analysis and virtual surgery

According to cephalometric and cone beam computed tomography analyses, the patient's soft tissue sella-nasion-pogonion (SN-pogonion) angle was 87°, which is larger than

the normal range, indicating the need for setback genioplasty. In addition, she had a high lower-third ratio (1:1.04). However, since her mentolabial angle (139.9°) was greater than the normal range, there was a strong possibility that an aesthetic outcome would not be achieved even if setback genioplasty was performed³. To solve the problem, the pogonion should be moved anteroinferiorly through clockwise rotation of its distal segment. Based on these decisions, we planned genioplasty with rotation using virtual surgery.(Fig. 1)

4. Surgery

We initially performed a flap reflection through the ves-

tibule of the anterior mandibular region to the border of the mandible. Then, we drew an osteotomy line through the surgery's planned path (Fig. 2. A) and performed mandibular segmentation along the existing line using a saw.(Fig. 2. B) Next, we positioned the distal segment further backward and rotated it clockwise to decrease the mentolabial angle. (Fig. 2. C, 2. D)

An inferior border osteotomy resulted in a more oval-shaped skull and a narrower chin⁴.(Fig. 2. E) Last, we fixed a rectangular-shaped 8-hole plate in place using 8 screws. (Fig. 2. F) The incised mucosa was closed with 4-0 Vicryl and silk sutures.

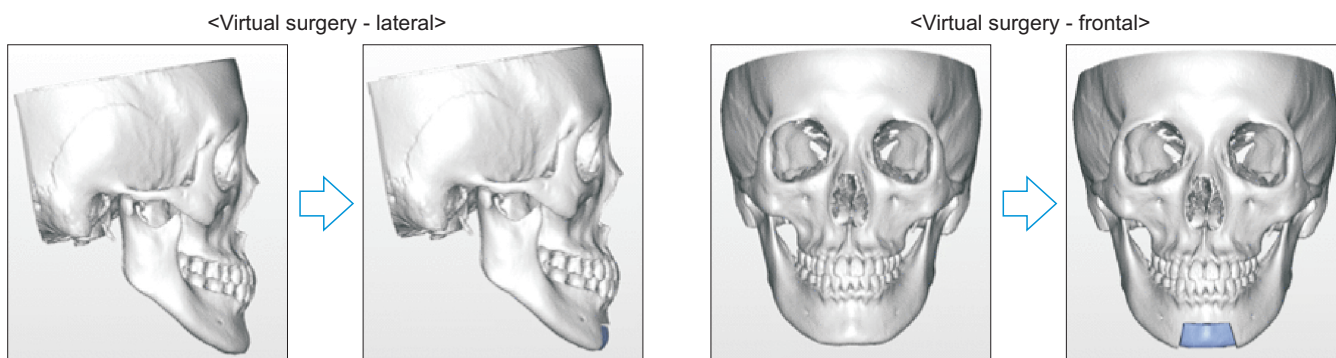


Fig. 1. Virtual surgery of genioplasty. Joon-Bum Hong et al: Setback genioplasty with rotation for aesthetic mentolabial soft tissue: a case report. J Korean Assoc Oral Maxillofac Surg 2023

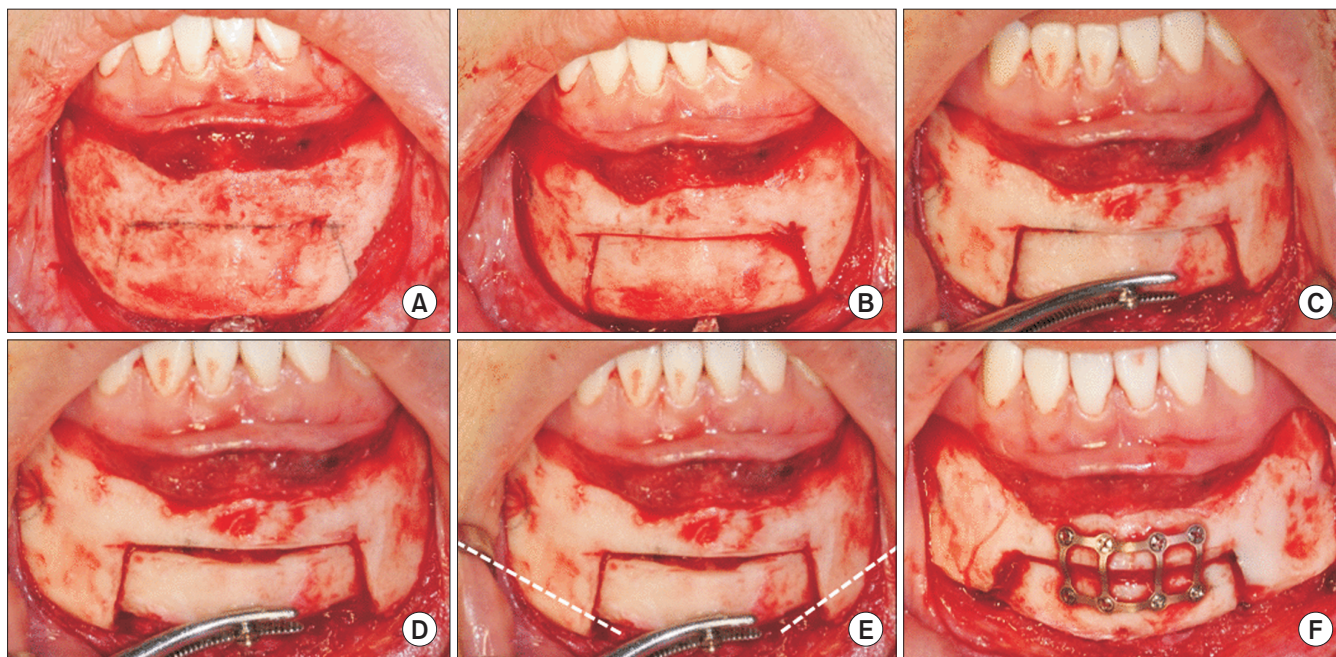


Fig. 2. Rotation setback genioplasty surgery. A. Draw a segmental line in accordance with virtual surgery. B. Segmentation along the line. C. Position distal segment backward. D. Rotate distal segment clockwise. E. Border osteotomy. F. Plating with 8-hole rectangular shape plate.

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III. Discussion

There are various methods of mandibular setback surgery to improve the aesthetics of the face. Mandibular setback surgery is typically performed when the mandible has overgrowth with malocclusion. This procedure can correct a large degree of mandible setback or advance. However, mandibular setback surgery requires orthodontic treatment over a long period. Thus, genioplasty can be performed when occlusion is stable in patients who require a change in the lower-third facial profile by moving the chin backward in a less invasive way⁵.

Conventional setback genioplasty has a limitation of sometimes producing a flat mentum profile, which loss of the mentolabial sulcus. The ratio of soft tissue that changes to horizontal hard tissue in advanced genioplasty is about 0.9:1 in the literature⁶, while the horizontal decrease rate is 0.6:1 in setback genioplasty. Therefore, the soft tissue setback effect is not as easily detected as hard tissue movement. These findings indicate that a more updated method of setback geni-

plasty is needed.

The mentolabial sulcus is one of the most imperative aesthetic parameters that contribute to the appearance of the lower face. It is prominent and forms the transition from the lower lip to the soft-tissue chin in the lateral view⁷. The normal range of the mentolabial angle is $128^{\circ} \pm 12.23^{\circ}$. Through rotation setback genioplasty, we were able to achieve a normal range of soft tissue SN-pogonion angle and pogonion

Table 1. Preoperative and two-year postoperative soft tissue analysis of rotation setback genioplasty

Soft-tissue	Preoperative result	Postoperative result	Mean
Upper lip to E-plane (mm)	-3.87	-3.34	0
Lower lip to E-plane (mm)	-0.37	1.36	0
Nasolabial angle (°)	101.27	102.3	95
SN-Pog' angle (°)	87	84	82
Mentolabial angle (°)	139.9	137.3	128
Facial length ratio	1:1.04	1:1.02	1:1

(SN-Pog: sella-nasion-pogonion)

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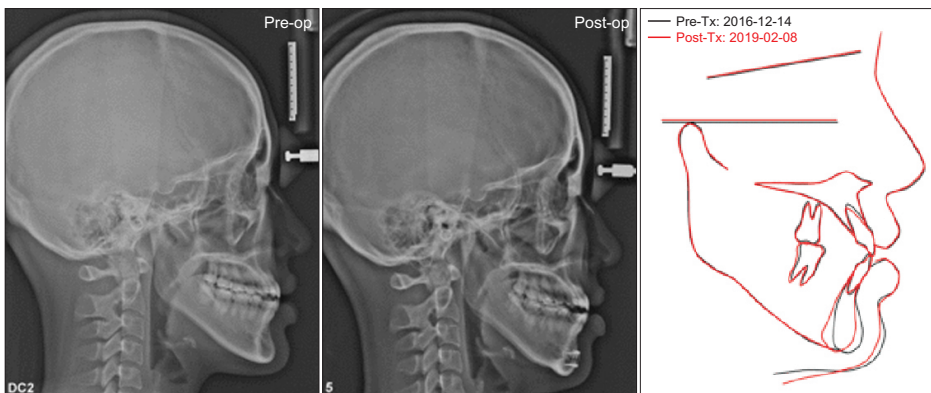


Fig. 3. Preoperative and 2 years postoperative cephalography of rotation setback genioplasty.

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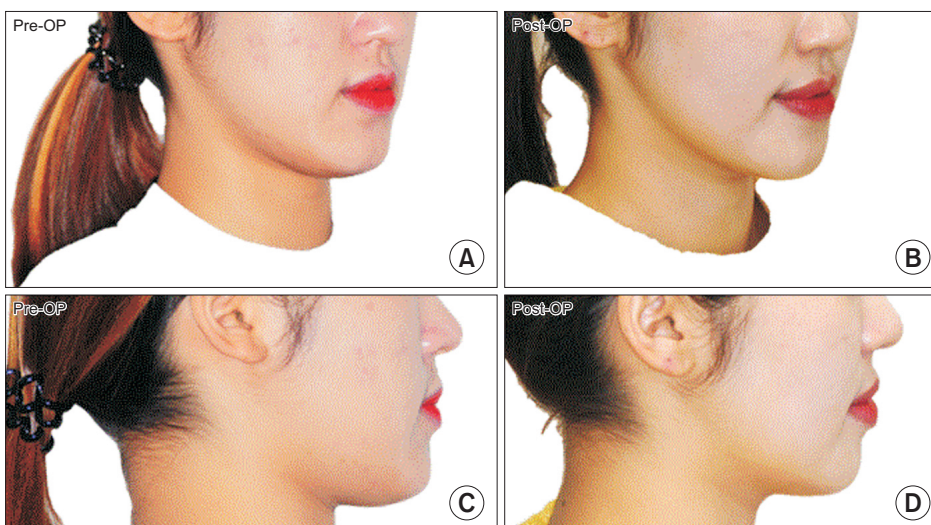


Fig. 4. Preoperative and 2 years postoperative photos of rotation setback genioplasty. A. Preoperative 45° angle view. B. Postoperative 45° angle view. C. Preoperative lateral view. D. Postoperative lateral view.

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to nasion-perpendicular line. Additionally, we reduced the mentolabial angle from 139.9° to 137.3° through clockwise rotation by positioning the pogonion anteroinferiorly. We achieved an ideal face proportion of 1:1.02.(Table 1, Fig. 3) In addition, the patient emerged with a slimmer jawline through border ostectomy⁸.(Fig. 4)

In conclusion, this case study illustrates solution to the limitations of conventional setback genioplasty by rotating the position of the menton and pogonion. Using virtual surgery, we were able to specify the range of surgery more accurately and easily, and the surgery time was reduced. The patient was satisfied with the aesthetics outcome achieved with a simple orthognathic surgery that required no additional orthodontic treatment.

Nevertheless, the effects of rotation setback genioplasty should not be concluded based on the outcome of this case alone. Further cases should be completed and examined to produce more accurate results. It is also meaningful to investigate the actual surgical effects by researching the amount of soft tissue movement according to the amount of hard tissue migration following surgery.

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Authors' Contributions

J.B.H. and Y.D.K. have conceived the manuscript. G.J.S. and J.Y.O. participated in the design and coordination of this study. Y.D.K. have revised and corrected the article. All authors read and approved the final manuscript.

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Consent for Publishing Photographs

Written informed consent was obtained from the patient for publication of this article and accompanying images.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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