

자연스러운 곡선의 하악각 교정을 위한 연속 구멍 연결 골절제술



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Natural Curved Mandibular Angle: Mandible Angle Resection by Burring Hole Connecting Osteotomy

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As Westernization has taken place in the Oriental society, people's concern focuses on the correction of their lower jaw shape. Various methods were recommended to make their mandibular angle slender and beautiful, but it was difficult to achieve natural curves as planned preoperatively. This study was conducted on 6 patients who received burring hole connecting osteotomy for mandibular angle correction from 2005 to 2007. A measurement of the most natural curved line for osteotomy was made by X-ray prior to the surgery. Through intraoral approach, three to five holes were made on the estimated angle line by burring, and the consecutive holes were connected by oscillating saw to perform the one piece osteotomy. There were no unnatural, irregular osteotomy sections or asymmetrical problems in comparison of before and after operation. All of the patients had satisfactory natural mandibular angle lines. Despite difficulties with the conventional techniques, it is possible for patients to achieve natural mandibular angle lines as they wish with the burring hole connecting osteotomy technique. In addition, it was possible to secure outstanding predictability and stability, thus resulting in satisfactory outcomes in the profile.

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Key Words: Facial bone, Mandible, Osteotomy, Orthognatic surgical procedure

I. INTRODUCTION

As Westernization has taken place in the Oriental society and culture, people's recognition of their external look has changed a lot accordingly. This is reflected not only in the plastic surgeries of eyes and noses but also in the facial contouring surgeries.

People's concern focuses on the correction of their lower jaw shape (mandibular angle line) on which their shape of lower face greatly depends. It is the recent trend for women to have a slender and nice shape since broad and square mandibular angle which is typical of Oriental people gives a masculine and strong image. The mandibular angle correction surgery is largely classified into two categories depending on osteotomy method: Curved horizontal osteotomy¹ where the projected portion of mandibular angle is removed as a one block and angle splitting osteotomy² where only outer cortical bones are removed. These techniques are frequently used. Common aim of these techniques is achieving natural, symmetrical and easily predictable mandibular lines. Therefore, the authors of this study believe that burring hole connecting osteotomy techniques can produce satisfactory results not only in the front but also in the profile

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while maintaining the osteotomy line as predicted for the most natural mandibular angle line before surgery.

II. PATIENTS AND METHODS

A burring hole connecting osteotomy was conducted on 6 patients, one male and 5 female patients, for mandibular angle correction from 2005 to 2007. Their mean age was 31.7 and the mean trace observation period was 11 months. Radiologic films (AP, Lat, panoramic view) were used to measure and design the most natural osteotomy line before surgery. The operation was made by an intraoral approach incision from the anterior edge of the ascending ramus of the mandible to the second mandibular premolar tooth. After exposure of the mandibular angle, three to five holes were made as marking point by burring of outer cortex on the predicted osteotomy line, and then consecutive holes were connected with an oscillating saw. Both the outer and inner cortexes of the mandible were cut off (Fig. 1). After that, the irregular surface was smoothed with a long-shaft medium sized round headed burr and we also simply added removal of outer cortex by burring when patients had wide and

broad lower jaw shape. Incisions were irrigated with saline and routine interrupted sutures were used to close the intraoral incision. Bulky compressive dressing was done for 3 days after surgery.

III. RESULTS

In all patients, the outcomes were compared by radiologic films and photos before and after the surgery. The operations were performed without complications such as hematoma, infection, subcondylar fracture, and nerve injury. In comparison of radiologic film, there was no excessive or insufficient osteotomy compared with the osteotomy line predicted before the surgery (Fig. 2). The profile view had satisfactory results without irregularity or asymmetry (Fig. 3 and 4).

IV. DISCUSSION

Ever since Converse³ performed an angle surgery via intraoral approach, it was possible to perform angle contouring surgeries without fear of any external scar. The methods have recently

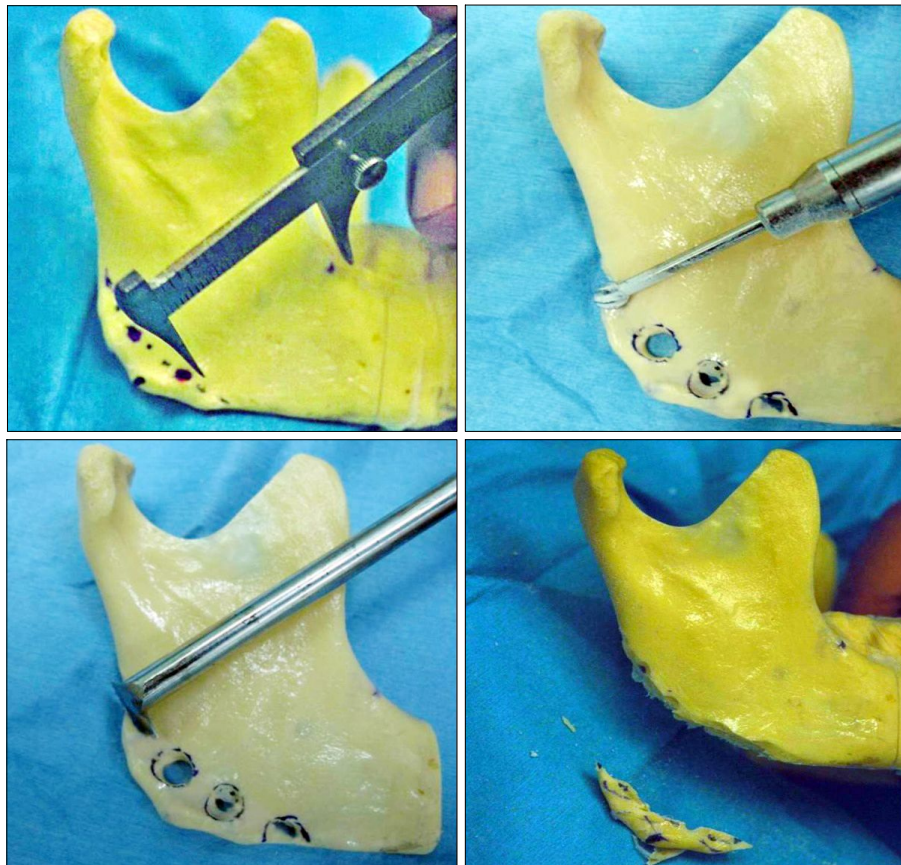


Fig. 1. (Above, left) Distances from reference point to burring points are checked and are compared to calculated distance from X-ray. (Above, right) Multiple holes are made with large headed burrs. (Below, left) Osteotomy is performed with oscillating saw. (Below, right) Bone fragment is removed and irregularities are corrected by light burring.



Fig. 2. A 35-years-old female with broad and square mandibular angle who received burring hole connecting osteotomy. (Above, left) Preoperative X-ray AP view. (Above, right) Immediate postoperative X-ray AP view. (Below, left) Preoperative X-ray lateral view. (Below, right) Immediate postoperative X-ray lateral view.

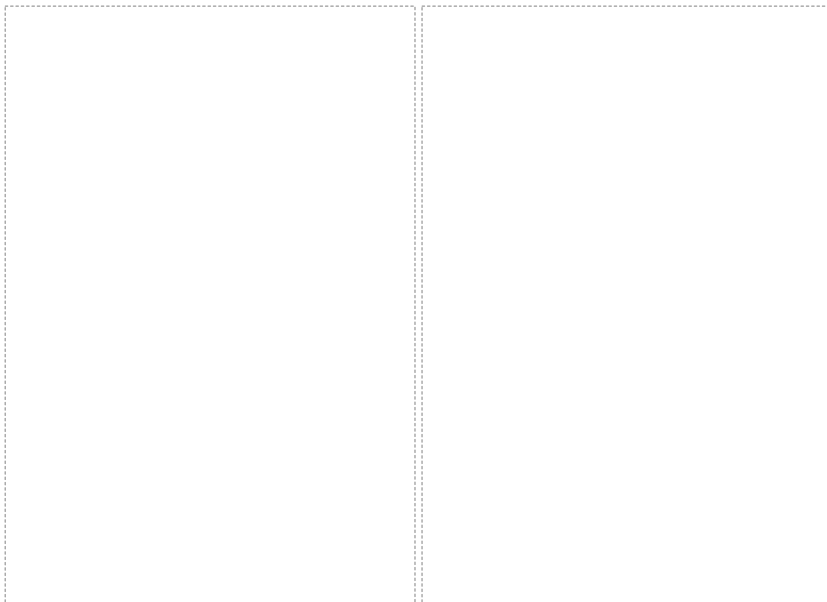


Fig. 3. A 35-years-old female with square mandibular angle and a masculine image (Left) Preoperative lateral view (Right) 3 month postoperative lateral view. after burring hole connecting osteotomy.

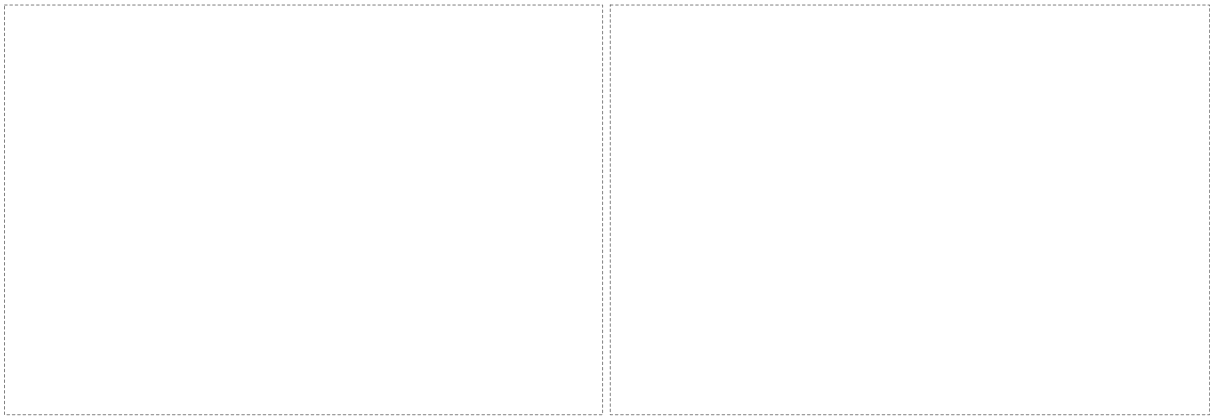


Fig. 4. A 29-years-old female with square and unnatural mandibular angle line (Left) Preoperative lateral view. (Right) 4 month postoperative lateral view after burring hole connecting osteotomy.

been introduced for simpler and safer surgeries.

In the case of conventional osteotomy techniques, where one piece of bone fragment is made through a straight osteotomy line, the technique was quite simple and effective in the profile improvement, but was limited in narrowing facial width in the frontal view.^{1,4,5} Applying the technique, a new secondary angle formation was frequently made in a undesired area. And consequently in some cases, the lower jaw line itself was destroyed. Furthermore, there was a great risk that asymmetry can occur due to size discrepancy of the removed bone fragment, and achieved curves were frequently irregular, so it was difficult to predict the change of the lower jaw angle in the profile after surgery. Hence, Yang et al in 1991 proposed a multiple-staged curved osteotomy where the osteotomy site is divided into three to four pieces⁶ As a result, the predictability was improved, and the result of surgery was close to the predicted natural angle line. In 1994, Baek et al conducted curved osteotomy with an oscillating saw and a reciprocating saw according to the development extent of the outer cortex and the prominence.⁷

However, the methods with multiple curved osteotomy had difficulty with making natural curved lines as desired before surgery due to the narrow and angulated operation view. By inexperienced surgeons, osteotomy was frequently made in a direction not desired, and it was difficult to achieve natural curved line because a linear straight saw was used in the process. In addition, when the detachment of the muscles medial to mandibular angle was incomplete, it was difficult to remove several small bone fragments made in each step.

Choi et al proposed a 3 mm external approach combined with conventional internal approach.⁸ Reciprocating saw was placed to intraoral exposed angle area and connector of saw passed to outside through the 3 mm incision and could connect to the handpiece in the outside. Kim et al also conducted resection of

prominent mandible angle with intraoral and external approach.⁹ By these methods, surgeons could perform the osteotomy easily under the direct vision. But It was difficult to get naturally curved outline of the mandibular angle by linear osteotomy and there were also some possible complications such as unacceptable scar and facial nerve injury.

For satisfactory natural aesthetic results, one-stage or multi-stage curved osteotomy with an oscillating saw is better than linear osteotomy with a reciprocating saw. So, we believe our new technique has many advantages to overcome these technical difficulties to achieve natural curved outline of the mandibular angle and may shorten experiencing periods in less experienced surgeons because this is easy to perform and can be conducted as one-stage osteotomy.

By calculating distances of burr holes from reference points, asymmetrical osteotomized bone fragments are reduced and since burr holes are usually made at points of inflection, natural curved line is easily obtained with straight saw blade. Furthermore, since osteotomy is performed in single large piece, manipulation and removal of bone segment is much easier.

In case of Asians with prominent mandible angles, the mandibular angle area may look very square and unnatural with a masculine image. In the conventional osteotomy, limited improvement was shown on the frontal view due to the lack of reduction of the mandible bone width. Thus, Deguchi et al. focused on the limitation of conventional osteotomy that it did not correct widened feature of mandible in AP view and contrived angle splitting osteotomy which is a method to reduce the thickness of the mandibular angle for better look of not only in the AP view but also in the profile view after surgery.² Thereafter, various methods have been introduced for the reduction of outer cortex of the mandibular angle.^{10,11} In 2002, Lee et al. explained how to differentiate the removal location on

the mandibular angle and described the degree of angle for a satisfactory result.¹²

In our cases, when patients had wide and broad facial features, we simply added removal of outer cortex by burring after hole connecting osteotomy. And we were able to successfully achieve narrow facial feature in AP view as well as natural mandibular angle line in lateral view.

V. CONCLUSION

In case of mandibular angle correction surgery, to have good results, various methods are presented. In these methods, it is the most important objective to make a symmetrical and natural mandibular angle line. Hence, it is possible for patients to achieve natural mandibular angle lines as they wish with burring hole connecting osteotomy techniques, despite difficulties with the conventional techniques. It was possible to secure outstanding predictability and stability, and also possible to reduce the intergonial distance with burring not only osteotomy section but also in the outer cortex of the angle area so that it was possible to achieve satisfactory results in the profile.

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