

A Technique for Repositioning the Posteriorly Displaced Premaxilla Following Prior Repair of Complete Bilateral Cleft Lip

Yuki Arimura, DDS*†
Seiji Iida, DDS*†
Aiko Hyodo, DDS†‡
Ayaka Mikami, DDS*†
Satoru Hayano, DDS†§
Fumiko Takemoto, DDS†§
Hiroshi Kamioka, DDS†§

Summary: It is well known that osteotomy of the premaxilla is an effective surgical procedure for the correction of a displaced premaxilla in patients with bilateral cleft lip and palate. In cases with a posteriorly displaced premaxilla, it is not easy to move the premaxilla forward because of scarring of the palatal mucosal attachment, narrowing of the adjacent maxillary segments, and the stable fixation of this bone segment after its movement. This fixation is also important in cases without secondary bone grafting. We propose a new method that combines osteotomy and a method such as bone distraction for cases with significant premaxilla displacement that are difficult to repair by osteotomy alone. A conventional orthodontic palatal expander was used as the distractor. The anterior arms were bent at the posterior part of the lingual side of the anterior teeth, and a resin base was attached to the arm parts. The posterior arms were bent and waxed onto the bands of both first molars. Supportive stainless steel wire arms, which are attached to the rest of the deciduous molars, stabilize the distractor. After the osteotomy of the premaxilla, distraction was performed at a rate of 1.0 mm per day, starting the day after surgery. Because the premaxilla of patients with bilateral cleft lip and palate has undergone multiple surgical interventions, the soft tissue is not mobile, making it impossible to guide the premaxilla to an ideal position in a single stage. However, this procedure, using this semirigid distractor, makes it possible to move the osteotomized premaxilla to the planned position with firm stability. (*Plast Reconstr Surg Glob Open* 2026;14:e7467; doi: [10.1097/GOX.00000000000007467](https://doi.org/10.1097/GOX.00000000000007467); Published online 6 February 2026.)

INTRODUCTION

The most common and difficult maxillary deformity to cope with is that of the patient with a cleft lip and palate and arrested growth of the middle third of the face. The severity of the growth arrest in the middle third of the face depends on the time and type of operation.¹

From the *Department of Oral and Maxillofacial Reconstructive Surgery, Okayama University, Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, Okayama, Japan; †Advanced Cleft Lip and Cleft Palate Center, Okayama University Hospital, Okayama, Japan; ‡Department of Oral Reconstructive Surgery, Okayama University Hospital, Okayama, Japan; and §Department of Orthodontics, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, Okayama, Japan.

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Recent efforts in presurgical orthodontic treatment, including presurgical nasoalveolar molding, for positioning the displaced premaxilla in patients with bilateral cleft lip and palate (BCLP) show better results, but it is true that some cases require osteotomy of the premaxilla at the time of lip repair. However, these methods often result in damage to tooth germs, significant disruption to maxillary development,^{2,3} and rotation of the premaxilla. In such cases, osteotomy of the premaxilla is performed for repositioning, but the scar at the hard palatal mucosa, lip tension, and narrowing of the adjacent maxillary segments make it difficult to reposition the premaxilla (Fig. 1). Indeed, gradual soft-tissue elongation through distraction osteogenesis is an ideal method for repositioning the premaxilla. But it is difficult to apply the severe dislocated case by a common technique using an intraoral distractor because of the straight movement of the bone due to the rigid securing of the distractor with the teeth and/or bone.

In cases of premaxillary deformity after lip repair, our proposed procedure allows adjustable rotational

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movement of the bone piece with stable soft tissue enlargements. This is achieved by using a simple adjustable resin attachment between the teeth and distractor. This is done in conjunction with palatal expansion to allow adequate room for the anterior transposition of the premaxilla. After distraction is achieved, the position of the moving premaxilla can be secured rigidly with the distractor through wire teeth fixation and resin molding, which also promotes bone regeneration in the osteotomy gap in the vomer.

PALATAL DEVICE

A conventional orthodontic palatal expander (Hyrax Maxi-12 Abgewinkelt from Dentaaurum) was used (Fig. 2). It can be extended up to 12 mm. The anterior arms with a resin base are bent at the posterior part of the lingual side of the anterior teeth. This resin base is designed to accommodate any position of the premaxilla after osteotomy. The posterior arms are fixed to the bands on both first molars. The supportive arm, consisting of 0.9 mm wires, is waxed to the posterior arm to stabilize the distractor by attaching it to the rest of the deciduous molars.

PROCEDURE

To ensure blood flow from the upper lip to the premaxilla, an incision was made at the center of the labial side of the premaxilla to approach the vomer. After osteotomy of the premaxilla at the vomer and mobilization, the premaxilla was located at the start position. Wire fixation of the erupted maxillary anterior teeth with the anterior arm was used to maintain an adequate vertical position.

Takeaways

Question: What is the safest and most effective procedure to correct severe premaxilla displacement?

Findings: Our newly proposed procedure for correcting the severely displaced premaxilla in the patients with bilateral cleft lip and palate is an effective treatment that uses a simple palatal expander.

Meaning: Our proposed procedure is a surgically assisted orthodontic treatment that allows flexible movement of the premaxilla by semirigid fixation of the anterior teeth and the palatal distractor.

After the consolidation period, the expander is activated, pushing the premaxilla forward, which can produce a fan-style movement of the premaxilla.

After distraction is achieved in this procedure, the premaxilla becomes movable owing to the loose fixation. Therefore, the bone can be easily adjusted to the ideal position, followed by rigid fixation between the expander and the maxillary central incisors using resin molding and additional tooth wire fixation, producing a stable bone position. Additional orthodontic wire-bracket treatment on the labial side may be useful to increase the mechanical strengthening (Fig. 3).

The palatal expander was removed 2 months postoperatively and replaced with a lingual arch. At this time, the mobility of the premaxilla was diminished because of osteogenesis of the osteotomized line (Fig. 4). One year postoperatively, a secondary alveolar bone grafting was performed.

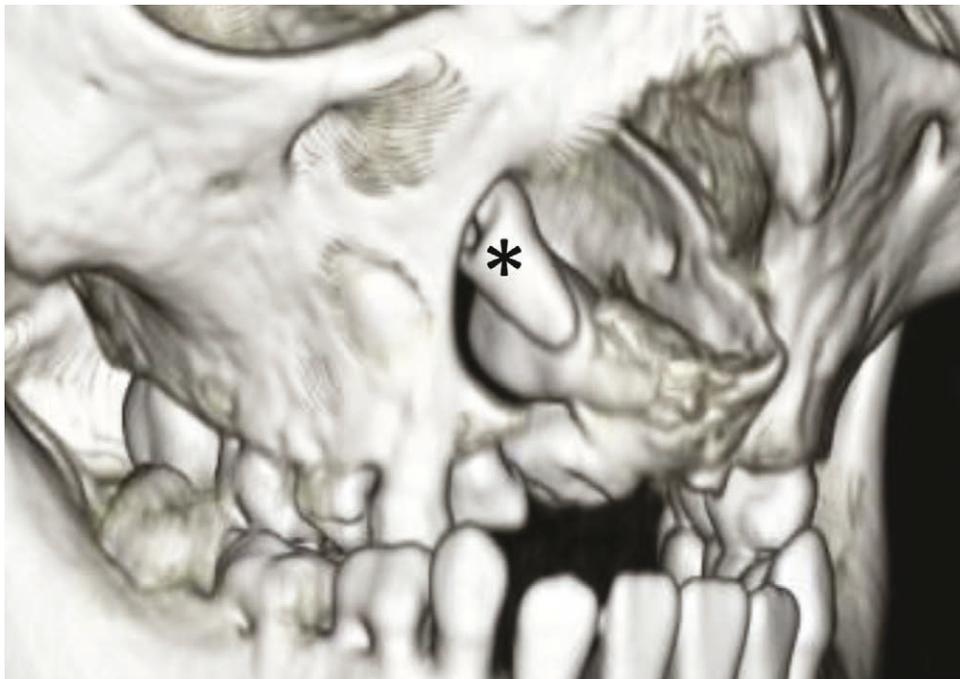


Fig. 1. A photograph of a 3-dimensional computed tomography image showing the premaxilla rotated backward. The premaxilla is rotated approximately 90 degrees to the right and 90 degrees posteriorly. The maxillary right lateral incisor erupted into the nasal cavity (*).

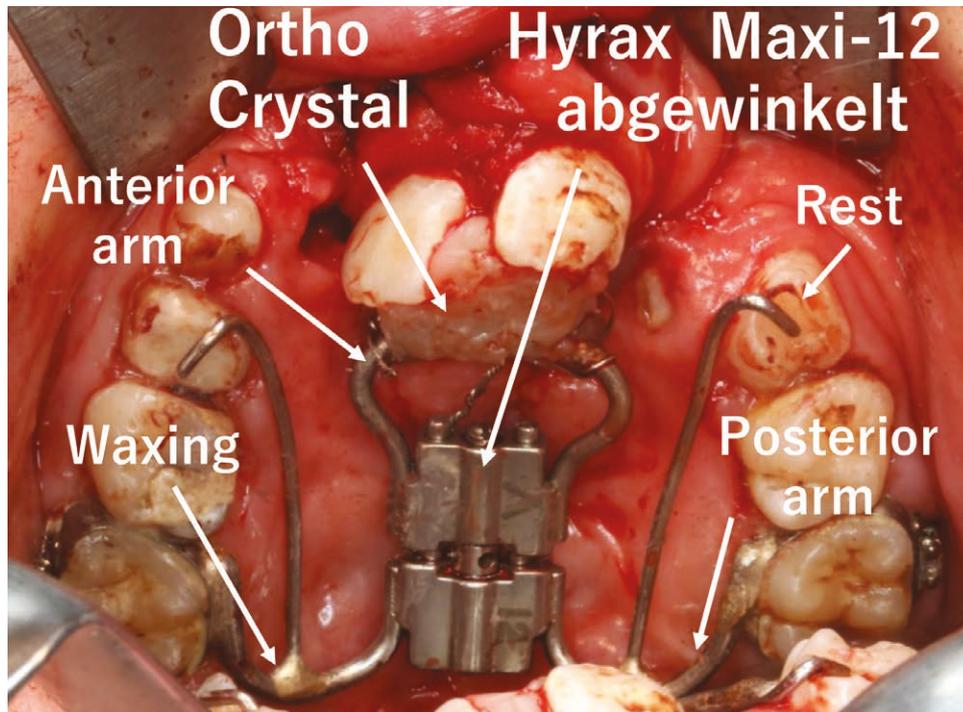


Fig. 2. A photograph of the new palatal expander design.



Fig. 3. A photograph of intraoral appearance after distraction. The premaxilla moved 7.5 mm and fit within the upper dental arch. The palatal mucosa was well elongated without remarkable residual fistula formation.

DISCUSSION

Osteotomy of the premaxilla is performed in 3 major age groups: younger than 8 years old, 8–12 years old, and 12 years old or older.⁴ If this osteotomy is performed on

a child younger than 8 years, mainly during lip repair, it will affect the premaxillary vomerine suture, which is one of the starting points for maxillary growth, prematurely, resulting in significant growth suppression. Growth from



Fig. 4. A photograph of a 3-dimensional computed tomography image taken at 9 months after distraction. Firm bone attachment due to osteogenesis was observed along the osteotomy line.

the premaxillary vomerine suture occurs in the anterior and vertical directions.⁵ The most common age for this procedure is between 8 and 12 years, and it is often performed in combination with bone grafts. Complications include the formation of oral-nasal fistulas and necrosis of the premaxilla, but this is the recommended time because it allows for better development of the maxilla than if it were performed earlier.^{6,7} Osteotomy performed on people aged 12 years and older is often done in developing countries where medical care is limited. Maxillary growth is not inhibited, but premaxillary protrusion and rotation are significant. However, few complications are associated with premaxillary osteotomy.⁸ Considering the timing, osteotomy of the premaxilla is an extremely effective method for repositioning the displaced premaxilla. However, there are many factors that need to be considered, such as ensuring blood flow and fixing the loose premaxilla, and careful planning is required in severe cases with significant deviation. Kyung et al⁹ described a treatment algorithm for patients with BCLP based on the position of the premaxilla and the width of the cleft, but in all cases, the premaxilla was located anteriorly, and not all patients with BCLP showed the same maxillary morphology characteristics.¹⁰ Therefore, this algorithm does not apply to all patients with BCLP.

In patients with BCLP, the position of the premaxilla varies because this bone is essentially connected only by the vomer and surrounding scar tissue. Therefore, this bone always has some mobility, and its positioning may

easily be corrected by orthodontic treatment if the surrounding tissue has high elasticity. Indications for osteotomy of the premaxilla include cases with a severely dislocated premaxilla, such as protrusion, rotation, and excessive vertical growth of the premaxilla, which cannot be addressed by routine orthodontic treatment. In simultaneous osteotomy of the premaxilla, the movement of this floated premaxilla is limited by the surrounding soft tissue and/or interference from the vomer. Therefore, to avoid the risk of necrosis or prolapse of the premaxilla, a delicate procedure is required, and simultaneous bone grafting may be recommended to obtain earlier stability and bony connection. The 2-stage procedure outlined in this report may be recommended for addressing issues with the positioning of the bone.

Our proposed procedure is a surgically assisted orthodontic treatment that allows flexible movement of the premaxilla by semirigid fixation of the anterior teeth and the palatal distractor, performed in conjunction with palatal expansion. Therefore, this method may be an effective treatment for cases of severely dislocated premaxillae.

Yuki Arimura, DDS

Department of Oral and Maxillofacial Reconstructive Surgery
Okayama University, Graduate School of
Medicine, Dentistry and
Pharmaceutical Sciences, 2-5-1 Shikata-cho, Kita-ku
Okayama 700-8558, Japan
E-mail: de17003@s.okayama-u.ac.jp

DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

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