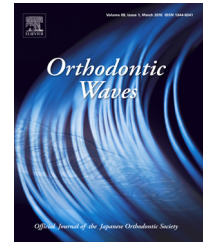


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Case report

Treatment of mandibular retrognathia with unilateral temporomandibular joint ankylosis and skeletal deformity of the mandibular ramus using unilateral mandibular distraction osteogenesis

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ABSTRACT

This case report describes the surgical orthodontic treatment of severely retrognathic mandible and mandibular deviation in a patient with a medical history of unilateral subcondylar fracture and temporomandibular joint (TMJ) ankylosis. Because of the severe skeletal deformity of the mandibular ramus on the side with the injury, it was impossible to perform the conventional sagittal split ramus osteotomy (SSRO) on the affected side for the correction of mandibular retrognathia. The patient was treated by Le Fort I osteotomy, mandibular distraction on the affected side, and SSRO on the unaffected side, simultaneously. After treatment, acceptable occlusion and facial esthetics were obtained, though retrognathic mandible and facial asymmetry still remained.

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1. Introduction

Trauma, including condylar fracture, is one of the major causes of temporomandibular joint (TMJ) ankylosis [1]. TMJ ankylosis in a growing child often brings about mandibular growth problems, such as severe mandibular deficiency and mandibular asymmetry [1,2]. Possible treatment options for TMJ ankylosis with mandibular deficiency consist essentially of two stages. Initially, release of ankylosis with/without

condylar reconstruction is performed, and this is followed by correction of mandibular retrognathia in an effort to maintain jaw function and improve growth [2,3].

According to previous case reports concerning the patients with TMJ ankylosis, several surgical procedures for mandibular advancement have been described, including modified sagittal split osteotomy [4] and mandibular distraction osteogenesis (DO) [2,5].

The present case report describes surgical orthodontic treatment of a patient with skeletal class II jaw base

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relationship and a medical history of unilateral subcondylar fracture and TMJ ankylosis. Because of the severe skeletal deformity of the mandibular ramus on the injured side, it was impossible to perform the conventional sagittal split ramus osteotomy (SSRO) on the affected side for the correction of mandibular retrognathia. This patient was treated by combined orthodontic treatment and orthognathic surgery by Le Fort I osteotomy, mandibular distraction on the affected side, and SSRO on the unaffected side.

2. History

The patient was a 28-year-old Japanese male in good general health. His chief complaint was chewing dysfunction. He was afflicted with unilateral subcondylar fracture at the age of 5, and it caused restricted jaw movement and the disturbance of mouth opening. The right TMJ was ankylosed. He underwent osteoarthrotomy at age 6, condylectomy of TMJ with replacement by an artificial ceramic condylar prosthesis at age 11. A revision osteoarthrotomy was performed, and the artificial condylar prosthesis was removed at 27 years of age.

He had a convex profile, severely retrognathic mandible, and absence of chin prominence with significant facial asymmetry and mandibular deviation to the right (Fig. 1A). He had a skeletal class II jaw base relationship on account of retrognathic mandible and maxillary protrusion with a dolichofacial skeletal pattern and labially inclined upper incisors. Computed tomography showed that the right mandibular ramus was splintered into several segments (Fig. 2). The molar relationship was Angle Class II on the both sides. Overjet and overbite were 24mm and 12mm, respectively (Fig. 3A). The maxillary and mandibular dental midlines were deviated to the right with a canted maxillary occlusal plane. The upper right second premolar was congenitally missing, and the lower right second molar was lost because of decay. The upper left third molar was found in panoramic radiography (Fig. 4A). Cast analysis revealed arch length discrepancies of +6.5mm and -2.7mm in the upper and lower arch, respectively. A deep curve of Spee was shown in the lower arch. The jaw-movement trajectories during chewing on both sides had a chopping pattern.

3. Treatment plan and progress

The treatment objectives were as follows: (1) to establish proper overjet and overbite, (2) to achieve an acceptable occlusion, (3) to correct the mandibular deviation, and (4) to improve the retrognathic appearance of the facial profile.

We determined that the surgical orthodontic treatment was required to resolve the severe skeletal problems. The procedures selected for mandibular advancement were DO on the right side and SSRO on the left side. Additionally, maxillary repositioning by Le Fort I osteotomy was planned for the canting correction.

In the first stage, the upper left first premolar and the upper left third molar were extracted, and pre-adjusted edgewise appliances were placed in the both upper and lower arches for

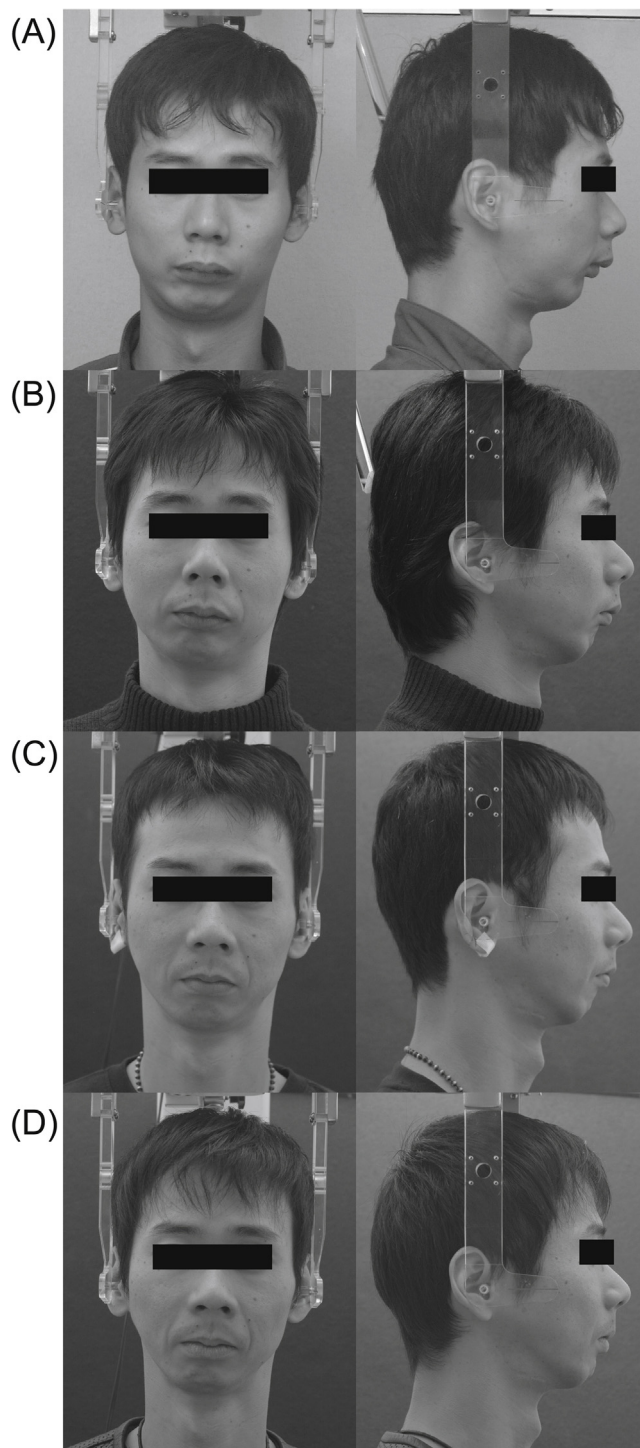


Fig. 1 – Facial photographs: (A) pre-treatment; (B) pre-surgery; (C) post-treatment; (D) post-retention.

leveling and alignment. The biteplate on the maxillary molars also was used for bite raising.

After the leveling phase (Figs. 1B, 3B and 4B), Le Fort I osteotomy, unilateral SSRO, and mandibular distraction were performed under general anesthesia. Le Fort I osteotomy with 4mm of posterior impaction on the left side was designed to improve the cant of the occlusal plane. A distraction device

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