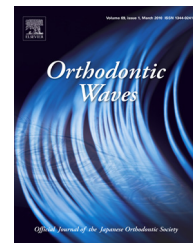


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Case report

Improvement in three-dimensional facial configuration and jaw motion following surgical orthodontic treatment of a case with jaw deviation

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ABSTRACT

The establishment of normal stomatognathic function and an acceptable facial appearance is considered an important treatment goal in orthodontics. The patient, who demonstrated posterior crossbites and jaw deviation, underwent treatment with a combined orthodontic-surgical approach utilizing maxillary transverse distraction osteogenesis, Le Fort I osteotomy, and bilateral SSRO. The smoothness of the masticatory jaw-closing movement and three-dimensional facial configuration were compared pre- and post-treatment. Correction of the posterior crossbites enabled the patient to perform smoother jaw-closing movements during chewing. Additionally, asymmetry in the morphology of the chin, cheek, and lips was reduced. These favorable changes in masticatory jaw movement kinematics and three-dimensional evaluation of the face justify the application of surgical-orthodontic treatment to improve jaw function and facial appearance.

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1. Introduction

For patients with underlying dentofacial deformities, establishment of both normal stomatognathic function and an acceptable facial appearance are considered to be treatment goals in current orthodontic practice. Particularly, establishment of a facial soft tissue configuration that is within the normal range is essential since facial appearance has a strong influence on an individual's social acceptance and self-image.

However, facial soft tissue configurations have been conventionally evaluated by mainly two-dimensional means, and surgical changes have only been assessed by superimposition of pre- and post-treatment facial lateral radiographs. Since these methods are used for qualitative evaluation or anteroposterior assessment, evaluating the soft tissue configuration of faces with transverse problems (*i.e.*, asymmetry) remains challenging, particularly when making proper diagnoses and verifying treatment outcomes in combined surgical-orthodontic approaches. Three-dimensional (3D) imaging

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methods have recently been introduced, facilitating more detailed evaluation of facial soft tissue configurations [1,2]. Utilizing 3D analysis to assess surgical changes in patients with facial asymmetry may contribute to the accurate assessment of facial soft tissue changes [3].

Herein, we describe the treatment of an adult with facial asymmetry by two-jaw surgery in which esthetic and functional improvements were attained and remained stable throughout the retention period. This report aimed to verify the effectiveness of surgical-orthodontic treatment in an adult with jaw deviation by quantifying the improvements in both soft tissue configuration and jaw movement.

2. History

A female Japanese patient, 26 years and 6 months of age, was concerned about her dentofacial deformity and malocclusion. Clinical examination showed a straight-type facial soft tissue profile. From the frontal view, she had severe leftward facial asymmetry and exhibited excessive tooth and gum display on the right side at maximum smile (Fig. 1A).

Intraoral examination revealed a Class III molar relationship on the right side and a Class II molar relationship on the

left side, with an incisor overjet of +3.2mm and an overbite of +2.6mm. The maxillary dentition had severe crowding with maxillary canines in infralabioversion. The arch length discrepancy in the maxillary arch was -16.4mm. The maxillary arch form was narrow in relation to the mandibular arch form. Posterior crossbites were observed in the left premolar and molar regions (Fig. 1B).

Maxillary and mandibular third molars were observed on a panoramic radiograph, and mandibular lateral incisors were congenitally absent (Fig. 2B).

Lateral cephalometric analysis [4,5] revealed that the patient had a skeletal Class I jaw-base relationship with a low mandibular plane angle (Mp to FH=21.7°). Maxillary incisors showed a normal inclination, and mandibular incisors were lingually inclined based on the FH plane (L1 to FH=67.3°) compared with normal ranges for adult Japanese females (Fig. 3, Table 1) [6].

A posterior-anterior cephalometric radiograph showed the mandibular dental midline deviated 5mm and the mandibular skeletal midline deviated 8mm to the left with respect to the facial midline. The maxillary skeletal midline deviated 4mm to the right from the facial midline with significant cant of the maxillary occlusal plane. The maxillary first molar on the left side was positioned 6mm higher than that on the right side (Fig. 2A).



Fig. 1 – Pre-treatment records (age, 26years 9months). (A) Facial photographs. (B) Intraoral photographs.

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