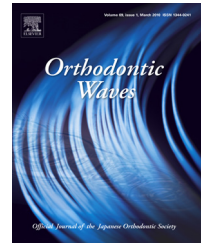


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## Case report

# Treatment of a patient with mandibular deviation and dentofacial various problems on alignment and multidirectional relationships

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## ARTICLE INFO

## Article history:

Received 2 December 2016

Received in revised form

18 July 2017

Accepted 17 August 2017

Available online xxx

## Keywords:

Mandibular deviation

Anterior open bite

Facial asymmetry

Severe crowding

## ABSTRACT

A 22-year-old female with a mandibular rightward deviation, facial asymmetry, lower dental midline rightward deviation, anterior open bite, anterior crossbite, posterior crossbite, Class III molar relationship, and severe crowding had surgical orthodontic treatment. Following extraction of the upper second premolars, lower right first premolar, left second premolar, and all four third molars, the upper and lower teeth were aligned and dental arch widths coordinated in the preoperative orthodontic treatment. The mandible was moved backward and rotated to the left with a bilateral sagittal split ramus osteotomy. Acceptable facial esthetics and occlusion were obtained. The improvements in facial appearance and the dental arches remained stable after 2 years and 11 months.

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## 1. Introduction

Mandibular deviation is usually accompanied by multiple orthodontic problems; facial asymmetry, dental midline deviation, posterior crossbite, anterior shallow bite, and anteroposterior molar relationship discrepancy [1-3]. As a result of these problems, patients with mandibular deviation often present with an indication for surgical orthodontic treatment. The treatment mechanics for improving the multidirectional problems are complicated and difficult to adapt to an individual patient. As a result, in such cases, it is important to implement diagnosis and treatment-planning with careful consideration for the optimal solutions to these problems.

In this report, we described correction of mandibular rightward deviation, facial asymmetry, lower dental midline rightward deviation, anterior open bite, anterior crossbite, posterior crossbite, Class III molar relationship, and severe crowding in a 22-year-old female patient. A comprehensive discussion of the treatment procedures and results follows.

## 2. History and diagnosis

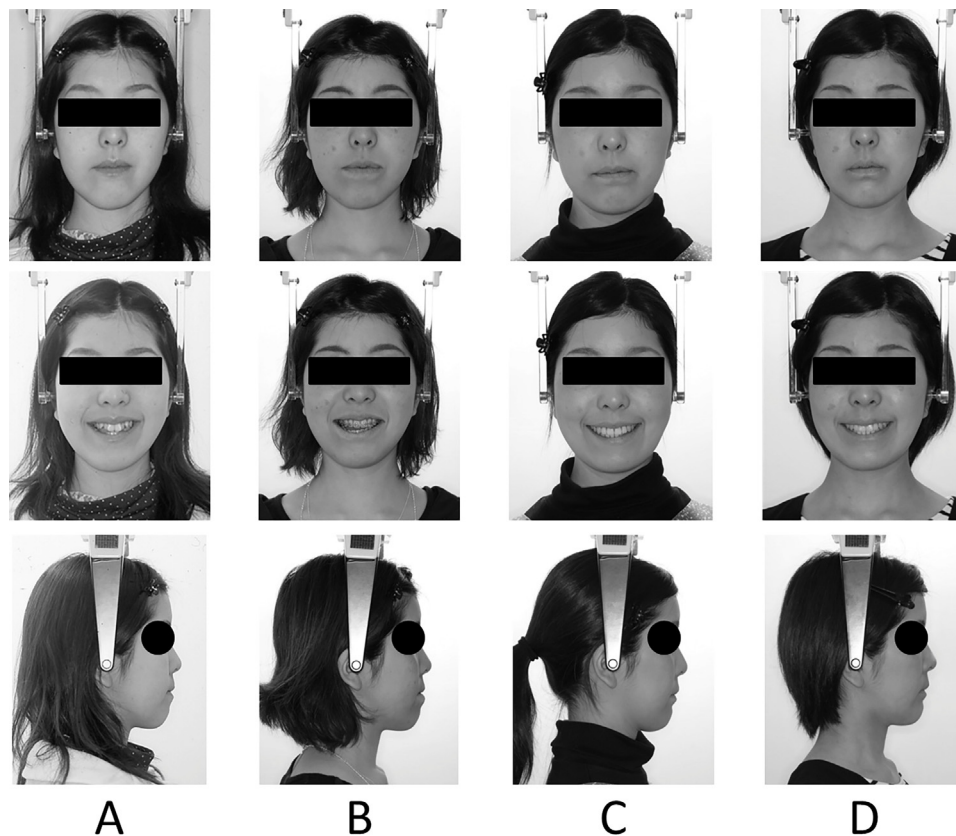
The patient, a 22-year-old female seeking orthodontic treatment for mandibular deviation and malocclusion, had no history of systemic or local disease.

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<http://dx.doi.org/10.1016/j.odw.2017.08.001>

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**Fig. 1 – Facial photographs: A: pre-treatment (22 years 0 months), B: pre-surgery (25 years 0 month), C: post-active treatment (26 years 3 months), D: post-retention (29 years 2 months).**

An oral fissure slightly canted with facial asymmetry in the frontal photograph. The lateral photograph showed a straight soft tissue facial profile (Fig. 1A). Intraoral examination (Figs. 2-1A, 2-2A, 3-1A, 3-2A) showed severe crowding in the upper and lower arches (arch length discrepancy, upper:  $-21.5\text{mm}$ , lower:  $-17.0\text{mm}$ ). The coronal arch width in the upper first molar region ( $29.4\text{mm}$ ) was smaller than that in the lower first molar region ( $30.0\text{mm}$ ). Both upper second premolars were palatally blocked out and there was no space on either side between the first premolar and first molar. The lower right canine was displaced mesially, labially, and inferiorly, and positioned labial to the right lateral incisor. The lower left second premolar was lingually blocked out. Anterior open bite from right first premolar to the left canine and anterior crossbite were observed. Posterior right molar crossbite was observed. The patient had a Class III molar relationship bilaterally. No clinically discernible signs in the temporomandibular joints were present.

A panoramic radiograph (Fig. 4A) revealed no congenitally missing teeth. A frontal cephalogram showed that the occlusal plane slightly canted to the upper left ( $2.5^\circ$ ) and the mandible deviated  $3.5\text{mm}$  to the right relative to the facial midline. The upper dental midline was coincident with the facial midline while the lower dental midline deviated  $6.0\text{mm}$  to the right relative to the facial midline. Lateral cephalometric analysis (Table 1) showed a skeletal Class I jaw base relationship ( $\text{ANB}=3.0^\circ$ ). The mandibular plane with a SN-Mp of  $48.0^\circ$  was

larger than  $+2\text{s.d.}$  of the normative mean for Japanese people [4]. The upper and lower incisors were within a range of  $+1\text{s.d.}$  of the Japanese normative mean ( $\text{U1-FH}=105.5^\circ$ ,  $\text{L1-FH}=63.5^\circ$ ). Soft tissue analysis showed that the upper and lower lips were positioned  $-0.5\text{mm}$  and  $+2.0\text{mm}$  in relation to the E-plane, respectively.

The patient was diagnosed with mandibular rightward deviation, a skeletal Class I jaw base relationship, high mandibular plane angle, Class III malocclusion with facial asymmetry, lower dental midline rightward deviation, anterior open bite, anterior crossbite, posterior crossbite, and severe crowding.

### 3. Treatment plan and progress

We planned surgical orthodontic treatment designed to improve mandibular deviation and correct malocclusion. As in Fig. 5, the first option of the orthognathic surgery was to perform two jaw surgery, in order to intrude the maxilla in the right molar region (the amount of intrusion at PNS= $5.0\text{mm}$ , the amount of intrusion at ANS= $1.0\text{mm}$ ) with Le Fort 1 osteotomy and to move the mandible to the left with bilateral sagittal split ramus osteotomy (BSSRO) of mandible (the amount of setback= $9.0\text{mm}$ ). The second option was to move the mandible to the left with BSSRO of mandible (the amount of setback= $7.5\text{mm}$ ). Finally, the second option was

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