



## Correspondence

# Correction of facial asymmetry and posterior bite collapse by orthodontic treatment combined with temporary anchorage devices and orthognathic surgery: Case report

**KEYWORDS**

Facial asymmetry;  
Occlusal plane canting;  
Temporary anchorage  
devices;  
Orthognathic surgery

Severe facial asymmetry has significant impact on function, esthetics and psychosocial relationship of the patients.<sup>1,2</sup> Most patients with severe facial asymmetry have the problem of both maxillary and mandibular occlusal planes canted toward the deviated side.<sup>3</sup> For adult patients, traditional therapies for these disorders include orthodontic treatment together with two-jaw orthognathic surgery.<sup>3,4</sup> In this case report, the treatment plan was more complicated because both posterior bite collapse and the sequelae of long-term unrestored missing molars should be concerned simultaneously. With the aids of temporary anchorage devices, the therapeutic alternative of orthodontic treatment combined with temporary anchorage devices and one-jaw surgery achieved satisfactory outcome.

This 19-year-old female patient complained of severe facial asymmetry and poor chewing function, and had social withdrawal because of her asymmetric facial appearance. On extraoral examination, severe facial asymmetry was noted with the mandible deviated to the right. No gummy smile but a disharmonious smile arc with mentalis strain was observed. Maxillary dental midline tilted toward the right for approximately 1.5 mm. She had a straight profile with normal lip support and prominent maxillary occlusal plane canting with the left side down. Intraorally, the

whole lower dentition shifted toward the right side with 7-mm lower dental midline deviation to the right. Therefore, the right buccal segment showed lingual cross-bite and the left buccal segment was completely out of occlusal contact. Under the long-term impact of the left unilateral buccal cross-bite, prominent elongation of the left upper and lower dentitions had developed, which further resulted in the left maxillary and mandibular occlusal planes canted down and upward, respectively (Fig. 1A–E).

Panoramic radiography revealed missing of bilateral maxillary third molars and mandibular first molars, resulting in mesially tilted mandibular second and third molars. The left mandibular third molar was impacted, while the right mandibular third molar was partially erupted. The left condylar height was much more prominent than the right condylar height. Lateral cephalometric radiography showed Class I skeletal relation with Class III tendency and steep mandibular plane angle. Six-mm chin point deviation to the right and differences in antegonial heights were exhibited on posterior anterior cephalometric radiography (Fig. 1F–H).

Due to personal concern, the patient refused two-jaw orthognathic surgery. The alternative treatment was to limit the orthognathic surgery to the mandible only and correct maxillary canted occlusal plane with temporary anchorage devices. Four mini-screws were used to assist pre-surgical orthodontics: three buccal ones between teeth 23 and 24, 33 and 34, and 44 and 45 to intrude the elongated teeth in the left maxillary and mandibular arches and to facilitate uprighting and protracting mandibular second and third molars; and a palatal one between teeth 16 and 17 to constrict the right maxillary molars. Twenty-two months after the treatment, the maxillary occlusal plane was parallel to the interpupillary line, and both arches

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**Figure 1** Clinical, stone-model, and radiographic photographs of a 19-year-old female patient who received orthodontic treatment by the aids of temporary anchorage devices and bilateral mandibular sagittal split osteotomies because of facial asymmetry, canted occlusal planes, and posterior bite collapse. (A) The pre-treatment extraoral photograph showing severe facial asymmetry with chin deviation to the right side. (B and C) The pre-treatment intraoral closed- (B) and open-mouth (C) views revealing the maxillary and mandibular occlusal planes canted toward the opposite directions. (D and E) Intraoral photograph from the buccal aspect (D) and the closed view of initial stone model from the lingual aspect (E) exhibiting the left buccal segment with complete buccal crossbite and vertical overgrowth of dentitions. (F, G, and H) Pre-treatment panoramic (F), lateral cephalometric (G), and posterior anterior cephalometric radiographs (H) of the patient. (I and J) Twenty-two months after the treatment, pre-surgical records showed that initially canted maxillary occlusal plane was corrected. (K, L, M, N, O, P, Q, R, and S) Post-treatment records demonstrated the significantly satisfactory clinical outcomes. (T, U, V, and W) The successful clinical outcomes persisted 10 years after the treatment.

were well-aligned (Fig. 1I, J). Bilateral sagittal split osteotomies were performed with 5.5 mm-shift of the mandible to the left side. Thus, normal overjet and overbite with centered dental midline were achieved. Bilateral posterior teeth also had positive occlusal contacts and good interdigitation. Thirty-three months after the treatment (Fig. 1K–S), not only the patient's masticatory function but also her facial appearance and self-esteem were greatly improved. The successful clinical outcomes persisted 10 years after the treatment (Fig. 1T–W).

### Declaration of Competing Interest

The authors declare no conflicts of interest relevant to this article.

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