

Contemporary Class II Division 2 nonextraction adult treatment

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Achieving ideal results when treating a difficult malocclusion is a challenge that orthodontists frequently encounter. Maintaining those results is sometimes more challenging than the correction itself. As specialists in orthodontics, we should be able to apply bone physiology concepts during the diagnosis and treatment planning process and predict how bone will react after biomechanical stimuli. Understanding bone physiology and the biology of tissue response during orthodontic tooth movement should allow us to develop the proper mechanical design and consequently the therapeutic procedures necessary to achieve the expected tooth position and bone architecture. Surgically facilitated orthodontic therapy uses basic bone biology and physiologic bone turnover procedures as well as basic orthodontic biomechanical principles to correct dental malocclusions in the shortest, safest, and most conservative manner. The correction of such malocclusions with this approach is expected to be functional and stable. (*Am J Orthod Dentofacial Orthop* 2018;153:568-76)

The patient was a 39-year-old white woman with an unremarkable medical history who came with a chief complaint of discomfort in her right temporomandibular joint and a desire to improve her smile. She had a symmetrical face and a Class II Division 2 smile. Her profile was convex, with a 90° nasolabial angle and a skeletal mandibular deficiency. Intraorally, the upper midline was coincident to the face, but the lower midline deviated by 5 mm to her right side; an overjet of 6 mm was present. She had a Class I molar relationship in both sides, a Class I canine relationship in the left side, and a full-step Class II canine relationship in the right side. The mandibular right second premolar was congenitally missing (Figs 1 and 2). The initial full-mouth radiograph showed an adequate bone level and all third molars (Fig 3). The pretreatment cephalometric radiograph and the corresponding cephalometric tracing (Fig 3) confirmed a skeletal Class II malocclusion with an ANB of 7° and a Wits appraisal of 6 mm (Table). The maxillary incisors were in good positions to the face and the cranial

base. The mandibular incisors were anteriorly proclined. The diagnosis was a Class II Division 2 malocclusion with a skeletal mandibular deficiency, temporomandibular joint symptoms in the right side, lower midline deviation of 5 mm to patient's right side, congenitally missing mandibular right second premolar, generalized dental rotations, and poor submental support.

TREATMENT OBJECTIVES

The treatment objectives were to (1) improve her smile, while maintaining proper upper lip support with maxillary incisor position, (2) correct overjet and provide a balanced canine-protected occlusion, (3) correct the deviation of the lower midline, and (4) maintain space closure corresponding to the mandibular right second premolar.

TREATMENT OPTIONS

Treatment options were the following.

1. Extract the maxillary second premolars and mandibular left first premolar, and decompensate using Class III mechanics and a surgical mandibular advancement.
2. Extract the maxillary first premolars and mandibular left first premolar to enable dental camouflaging with compromised esthetic results.
3. Nonextraction, decortication, and bone graft in the labial site of the mandibular anterior segment to bring them forward. Place a minipin (temporary anchorage device) to bring the mandibular right segment forward after overjet correction.

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Fig 1. Pretreatment photographs.

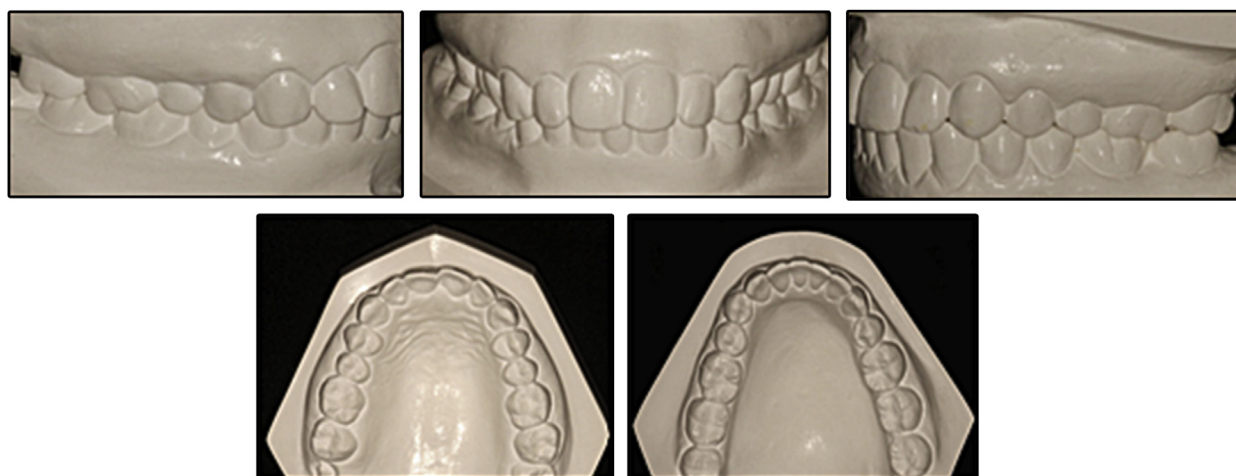


Fig 2. Pretreatment dental casts.

The patient decided not to pursue a surgical procedure. Since retraction of the maxillary incisors would create a problematic result, the first and second treatment choices were rejected, and dental correction by decortication was selected.

TREATMENT PROGRESS

After orthodontic appliance placement, the dental arches were leveled and aligned. Once this phase was completed, the labial part of the mandibular incisors was decorticated from canine to canine, and freeze-dried bone grafts were placed (Fig 4). One week after surgery, a rectangular stainless steel opening loop with

stops mesial to the first molars was fabricated and placed to initiate overjet correction. The patient was evaluated every 7 to 10 days to activate the appliances before full bone remineralization. The overjet was fully corrected within 5 months, and a temporary anchorage device was placed distal to the mandibular right canine to bring the right buccal segment forward. To aid this anterior movement, short Class II elastics were used.

RESULTS

The patient decided on a nonsurgical treatment approach without any expectation of a profile change. Posttreatment facial photographs (Fig 5) show her

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