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Case Report

Adult gummy smile correction with temporary skeletal anchorage devices

Satoshi Uzuka [a], Jong-Moon Chae [b], Kiyoshi Tai [c], Takashi Tsuchimochi [d], Jae Hyun Park [e,*]

[a] Associate Professor and Chair, Division of Orthodontics, The Nippon Dental University Hospital, Tokyo, Japan
[b] Professor, Department of Orthodontics, School of Dentistry, University of Wonkwang, Wonkwang Dental Research Institute, Iksan, Korea; Visiting Scholar, Postgraduate Orthodontic Program, Arizona School of Dentistry & Oral Health, A. T. Still University, Mesa, Arizona
[c] Visiting Adjunct Professor, Postgraduate Orthodontic Program, Arizona School of Dentistry & Oral Health, A.T. Still University, Mesa, Arizona, and Private Practice of Orthodontics, Okayama, Japan
[d] Clinical Assistant Professor, Division of Orthodontics, The Nippon Dental University Hospital, Tokyo, Japan
[e] Professor and Chair, Postgraduate Orthodontic Program, Arizona School of Dentistry & Oral Health, A. T. Still University, Mesa, Arizona; International Scholar, Graduate School of Dentistry, Kyung Hee University, Seoul, Korea

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ABSTRACT

Temporary skeletal anchorage devices were used to correct the gummy smile of a 27-year-old woman. She was also missing her maxillary left second molar and mandibular right central incisor. Her mandibular anterior missing space was closed with orthodontic treatment. Her occlusion, smile esthetics, dental midline, and soft tissue profile were significantly improved after her orthodontic treatment. A 2-year follow-up showed that the patient had a stable occlusion and the results of the orthodontic treatment were maintained.

1. Introduction

An excessive gingival display on smiling, referred to as “gummy smile,” “high lip line,” or “high smile line,” is often esthetically unpleasant and is undesirable [1,2]. Less than 2 mm of gingival display is acceptable and is considered youthful, as the amount of exposure of the maxillary central incisors both at rest and smiling gradually decreases with age [3]. A gummy smile can be defined as 2.0 mm or more of maxillary gingival exposure in full smiling. The sexual dimorphism in smile types indicates that women are twice as likely as men to have gummy smiles. Although the incidence of excessive gingival display has not been established, it is common [4,5].

The etiologies of gummy smile include abnormal lip length/activity, diminished clinical crown length because of gingival hyperplasia or altered passive eruption, dentoalveolar extrusion, and vertical maxillary excess (VME) [6]. It is necessary to diagnose the etiologies associated with each individual gummy smile to prescribe the appropriate treatment modalities. Traditionally, dentoalveolar extrusion and VME could be effectively corrected only with invasive orthognathic surgery [7,8], but the upsurge of temporary skeletal anchorage devices (TSADs) in orthodontic therapy offers an alternative to surgery in some cases. TSADs have been successfully used for maxillary intrusion, improving gummy smiles resulting from dentoalveolar extrusion and VME [9–13].

For cases with a multifactorial etiology, a combination of treatment methods should be prescribed to improve each problem. If possible, overcorrection of one etiological factor can camouflage another etiological factor that is indirectly or incompletely corrected. This case report details successful correction of a gummy smile because of VME using TSAD-assisted maxillary intrusion. Further a 2-year follow-up record of the patient is provided to establish the stability of the treatment result.

2. Diagnosis and treatment planning

A 27-year-old woman presented with concerns of spacing in her upper and lower arches at the Division of Orthodontics, The Nippon Dental University Hospital in Japan. A review of her medical history, as well as temporomandibular joint evaluation, showed nothing remarkable. She had a convex profile with

* Corresponding author. Postgraduate Orthodontic Program, Arizona School of Dentistry and Oral Health, A. T. Still University, 5835 E. Still Circle, Mesa, AZ 85206.
E-mail address: JPark@atsu.edu (J.H. Park).

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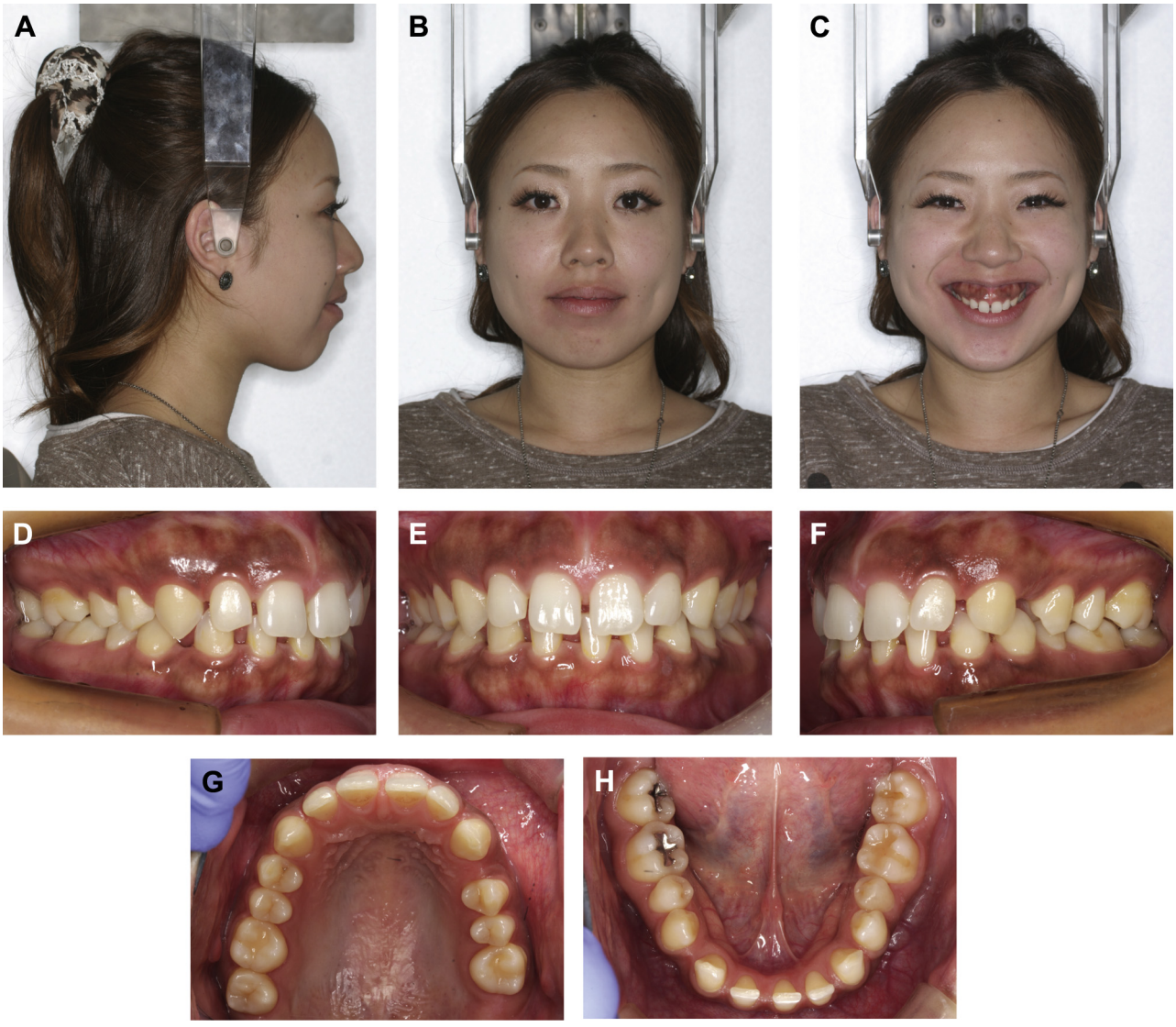

Fig. 1. Pretreatment facial and intraoral photographs.

posterior divergence and her smile revealed excessive gingival show (Fig. 1). Intraoral clinical examination revealed her missing maxillary left second molar and one mandibular incisor. She had Class I molar relationship on her right side and Class III molar relationship on her left side, with bilateral Class I canine relationships. She had an approximately 1 mm overjet and a 50% overbite. Because of her missing mandibular incisor, her dental midline was not coincident with her facial midline, and her maxillary dental midline was deviated by approximately 1 mm to the right (Figs. 1 and 2).

A panoramic radiograph confirmed that she was missing her maxillary left second molar and mandibular right central incisor, and her mandibular left lateral incisor showed short root. It also showed that her left mandibular third molar was horizontally impacted along with a difference in the shape of her left and right condyle. Lateral cephalometric analysis revealed a skeletal Class II (A point, nasion, B point: 7.8°) relationship with hyperdivergent growth pattern (sella nasion to mandibular plane: 42.0°). Her maxillary incisors were retroclined (upper central incisor to sella nasion line: 87.0°), her mandibular incisors were proclined (incisor mandibular plane angle: 97.9°), and her lower lip was protrusive such that it was ahead of the E-line (Fig. 3 and Table 1).

3. Treatment objectives

The following treatment objectives were established: (1) correct VME; (2) correct jaw deformities of the maxilla and the mandible; (2) coordinate the skeletal and dental midlines; (3) correct and coordinate the maxillary and mandibular arch forms; (4) obtain normal overjet and overbite; (5) maintain Class I canine and establish Class I molar relationships; (6) close the spaces between her teeth; and (7) improve her gummy smile and facial esthetics.

4. Treatment alternatives

To improve her gummy smile and facial profile, and to close her spaces in the dental arches and to attain ideal inclination of maxillary and mandibular incisors, we recommended orthognathic surgery, including genioplasty and dental implants to restore her missing teeth, but she declined the surgical and restorative treatment options. She wanted to close all the missing spaces without dental restorations and improve her gummy smile without surgery. Because of the complexity of the case, TSADs were chosen to improve her gummy smile and close her missing