## Orthodontic Treatment of a Congenitally Missing Maxillary Lateral Incisor

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## ABSTRACT

Clinicians agree that, regardless of gender or race, tooth agenesis has become more prominent in recent societies. The congenital absence of one or more maxillary lateral incisors poses a challenge to effective treatment planning for the restorative dentist. However, the one-sided orthodontic approach of just moving canines mesially to eliminate restorative procedures leads to compromise. Adult patients presenting with malocclusions, missing lateral incisors, or anterior crowding but who fail to get proper orthodontic treatment, requesting instead esthetic solutions that do not establish a stable occlusion, proper alignment, and proper axial inclination of the teeth will have compromised esthetic and periodontal results. An evaluation of anterior smile esthetics must include both static and dynamic evaluations of frontal and profile views to optimize both dental and facial appearance. This article presents how orthodontics is combined with other specialties in treating a congenitally missing lateral incisor. One case is used to illustrate how orthodontic treatment is progressed in collaboration with other specialists.

### CLINICAL SIGNIFICANCE

Patients with missing teeth, crowding, midline deviation, unesthetic gingival contours, or other restorative needs may require the interaction between various specialists. For the successful treatment of orthodontic-restorative patients, an interdisciplinary team effort is vital. (*I Esthet Restor Dent* 22:297–313, 2010)

#### INTRODUCTION

Present-day demands and expectations of esthetic dentistry are growing. To provide esthetic anterior tooth shape and correct agenesis, patients must be informed of their total dental needs, not just those associated with a limited specialty. To integrate and coordinate treatment, patients need to be offered a total treatment approach

\*Associate Professor and Chair, Postgraduate Orthodontic Program, Arizona School of Dentistry & Oral Health, A.T. Still University, Mesa, USA and International Scholar, the Graduate School of Dentistry, Kyung Hee University, Seoul, Korea <sup>†</sup>Private practice of orthodontics, Okayama, Japan <sup>‡</sup>Private practice of general dentistry, Okayama, Japan <sup>¶</sup>Visiting Adjunct Assistant Professor, Postgraduate Orthodontic Program, Arizona School of Dentistry & Oral Health, A.T. Still University, Mesa, AZ, and private practice of orthodontics, Okayama, Japan that maximizes function, esthetics, and oral health. In many routine dental malocclusions, just orthodontic treatment alone may not be enough. We must evaluate the patient's facial profile, smile line, buccal corridor, black triangles, lip line, and crowding. Onesided approaches to multifaceted problems often produce compromised results.

Agenesis of one or more teeth constitutes one of the most common developmental anomalies in man.<sup>1</sup> Familial tooth agenesis is transmitted as an autosomal dominant, recessive, or X-linked condition.<sup>2</sup> The reported incidence of permanent tooth agenesis varies from 1.6 to 9.6%, excluding third molars, which occurs in 20% of the population.<sup>3</sup> Studies vary on what the second most commonly missing teeth are. Some studies<sup>4-8</sup> have shown that they are the maxillary lateral incisors, whereas others<sup>9-12</sup> indicate there is a higher incidence of mandibular second premolar agenesis. Muller and colleagues<sup>5</sup> found an interesting correlation that maxillary lateral incisors are the most frequently missing teeth when only one or two teeth are absent, whereas second premolars are the most frequently missing teeth when more than two teeth are absent.

Maxillary lateral incisors show the highest genetic component of variability in the general population, whereas the smallest genetic influence on size of an anterior tooth is seen in the canine. Numerous twin studies<sup>13-15</sup> illustrate hereditary factors in the mesio-distal dimensions of the teeth, and populations with chromosomal aberrations, such as those that occur in Down's syndrome, display a generalized reduction in tooth size and number.<sup>16</sup> Tooth agenesis is more frequent in the parents and siblings of individuals with missing teeth than in the population as a whole, a finding that supports the hypothesis that this condition is genetically determined.<sup>17,18</sup>

# TREATMENT OF MISSING ANTERIOR TEETH

When examining the esthetics of anterior teeth and a smile, the clinician should be aware of the morphology of the gingival contours, tooth contacts, tooth morphology, and tooth-size problems. To obtain ideal esthetic results, worn incisal edges, tooth shape, incisal contact, the contours of gingival margins, and black triangles should be considered before starting orthodontic treatment. The decision to reshape or add tooth structure should be evaluated, considering the widthto-length ratios of the Golden Proportion.<sup>19</sup> The length of the central incisors should be divided into the width to obtain the proper percentage, with the ideal width being 75

to 80% of the length. The longer teeth in this range are present more often in females while the shorter teeth tend to be found more often in males.<sup>20</sup>

Of interest is the question of what determines the shape and thickness of the architecture of the scalloped gingiva, the papilla, and the thickness of the labial and lingual alveolar bone. It appears clinically that long, tapered triangular maxillary incisors have thin arched gingival tissue with a longer delicate papilla and thin bone with a smaller incisal contact point. In contrast, rectangular-shaped incisors tend to have thicker gingiva with a flatter, wider free gingival margin. Furthermore, these latter teeth have broad contacts. Generally speaking, the more rectangular the teeth, the thicker the alveolus and the gingiva that houses them.<sup>21,22</sup>

The smile line and lip shape also should be evaluated. The position of the lip attachment at the nasolabial junction has a profound effect on the esthetics of the profile. We all need an understanding of facial proportions and facial esthetics to provide our patients with a comprehensive treatment plan.

There has been ongoing controversy in orthodontic and restorative dentistry over the treatment of agenesis cases, especially of lateral incisors. Restorative dentists have been opposed to mesial movement of the maxillary canine into the lateral incisor space as this precludes the potential for developing a canine-protected occlusion because it places the canine in direct opposition to the mandibular lateral incisor. Stuart and Stallard,<sup>23</sup> and D'Amico<sup>24</sup> advocated canine-protected occlusion in all dentitions. However, Nordquist and McNeill<sup>25</sup> justified the mesial movement of canines into lateral incisor space, which provided many orthodontists with the rationale for space closure. They stated that no difference existed in adequacy of the occlusal function between canine-protected and group function, and no relation with periodontal status existed between the two groups. They also stated that treatment should be designed to eliminate prostheses, which contributed to an accumulation of plaque and irritation.

Furthermore, studies<sup>25,26</sup> have shown that the two groups did not differ significantly in respect to occlusal function and the prevalence of temporomandibular dysfunction. Many orthodontic studies have shown that reshaping maxillary canines to resemble lateral incisors greatly improves esthetics.<sup>27–31</sup>

When maxillary lateral incisors are missing, there are several factors to consider when treating patients with a space opening or closure. These factors include the type of malocclusion, crowing/spacing, tooth size relationships, canine position, shape and color of canines, and maxillary lip length.<sup>27–33</sup>

The choice between these two modes of treatment should not be made empirically. In most instances, the presence or absence of major occlusion problems serves as the primary criterion for either space closure or space opening.<sup>29,30</sup> Lateral incisor spaces should be closed in cases with malocclusions that require the extraction of permanent mandibular teeth. Mandibular extractions may be indicated to relieve anterior or posterior arch length deficiency, to reduce mandibular dentoalveolar protrusion, or to compensate for a Class II molar relationship.

Some orthodontic patients may be missing several permanent teeth, including maxillary lateral incisors. If teeth have been missing for several years, the remaining teeth may have drifted. In these patients, orthodontists and restorative dentists may not know what the restorative requirements are or what the eventual restorative treatment plan should be. For these types of patients, it is recommended to predetermine the final occlusal and restorative outcomes by creating diagnostic wax set-ups.<sup>34</sup> In addition, the trial set-up will allow identification of tooth surfaces that require functional and esthetic reduction so that equilibration may be initiated either at the beginning of or during the orthodontic treatment.

The diagnosis and treatment of growing children with missing lateral incisors can be a problem for many clinicians. If the patient and his/her parents plan on having implants in the future, it is important that the majority of vertical facial growth and tooth eruption be completed before implant placement.<sup>32</sup> Girls mature faster than boys, and their adolescent growth spurt occurs sooner. After completion of growth in stature (height), sequential cephalometric and handwrist radiographs verify the cessation of facial growth over a time frame of approximately 6 months to 1 year. The sequence of treatment in cases of agenesis of anterior teeth must be thoroughly explained to both the patient and his/her parents. They must realize that orthodontic treatment is the beginning of a process, with the scheduling of periodontal therapy and final restorations to follow. All treatment options should be discussed with the interdisciplinary team, just as all the options are explained in the orthodontic treatment phase.

#### ORTHODONTIC CONSIDERATIONS IN THE TREATMENT OF MISSING MAXILLARY LATERAL INCISORS

In a long-term clinical and radiographic follow-up study by Thordarson and colleagues,<sup>31</sup> adolescent patients who had extensive remodeling of the permanent canines were evaluated. The canines were ground to the shape of lateral incisors as part of the orthodontic treatment and the patients were recalled after 10 to 15 years for clinical examination. The study demonstrated that extensive cuspal, labial, lingual, and interproximal recontouring by the grinding of young teeth associated with orthodontic treatment can be performed without discomfort to the patient and with only minor or no long-term clinical and radiographic reactions. They stated that this finding is encouraging, as better long-term esthetic results and healthier periodontal conditions may be achieved by recontouring canines, rather than by replacing missing incisors with prosthetic appliances.

However, many esthetic dentists disagree with this conclusion. Isler,<sup>35</sup> discussing facial beauty, stated that the bone is the understructure, the scaffolding, and the major determinant of facial beauty. He also mentioned that a good smile is only partly about the teeth; it is primarily about the way in which the teeth appear to be placed in the face. Therefore, the design foundation of the smile is the very foundation of the teeth themselves, that is, the maxillary alveolar arch. Obviously, if a patient has a bilateral agenesis of maxillary lateral incisors, the bone volume of the maxilla will be decreased. By erupting maxillary canines into the lateral incisor space, alveolar bone is developed, and by distalizing the buccal segments for the restoration of the lateral incisors, we can maintain the volume of the maxillary bone.<sup>32,36</sup> In the canine substitution case, the alveolar canine buttressing of the canine roots is displayed anteriorly where the lateral incisors should be, and the dental arch narrows distally. With space closure, the arch form is condensed and constricted. Obvious gingival and tooth esthetics may be improved with gingival margin recontouring, and the reshaping of the maxillary canines. However, even if the canines are recontoured esthetically, the dentoalveolar arch curvature cannot be changed. The patient in full smile displays buccal corridor, because arch circumference is diminished with the closure of the lateral incisor spaces. There is less dentoalveolar bone to work with to create an esthetic smile.<sup>37</sup> On the other hand, Zachrisson<sup>38,39</sup> showed that buccal corridor can be eliminated in extraction cases by adding labial crown torque to lingually inclined canines and

premolars during treatment. Gianelly<sup>40</sup> reported a similar conclusion that extraction treatments do not constrict arch form.

Henns<sup>41</sup> reported that the canine eminence is lost from its normal position when canines are used as laterals because the eminence accompanies the canine as it is moved. However, his study showed that the difference of the canine eminence did not exceed 1.5 mm when the mean arch form recordings of the Class I extraction group and the canine substitution group were superimposed. According to his evaluation, using the upper study casts, the poor esthetic appearance of the canine eminence may have been exaggerated.

#### CASE REPORT

A 38-year-old Japanese female had difficulty biting and desired to improve her facial esthetics. She had facial symmetry with a convex profile (Figure 1). She presented with an end-on Class II molar relationship on the right side and a mutilated molar relationship on the left side because of the loss of the mandibular left first molar. The missing area was replaced by a three-unit bridge. The patient was also missing the maxillary left lateral incisor and the maxillary dental midline was deviated to the left by 3 mm relative to the facial midline. Because of the loss of the maxillary left lateral incisor, there



Figure 1. Initial facial photographs.

were severe gingival marginal discrepancies between the maxillary left central incisor and canine. The lingually displaced madibular right lateral incisor also showed gingival marginal discrepancy. The maxillary arch had mild crowding and the mandibular arch had severe anterior crowding. The maxillary left first premolar and madibular left first premolar were in crossbite, and the maxillary right seocnd premolar and the mandibular right second premolar were in Brodie bite. The patient had several restorations in both arches and had 2 mm overjet and 70% overbite. The maxillary left central incisor showed discoloration. The maxillary right lateral incisor and the first premolar exposed metal margins of porcelain-fused-to-metal restorations because of gingival

recession. The maxillary right first molar also showed gingival recession (Figure 2).

The panoramic radiograph showed no caries or pathologies. The patient recevied root canal treatments on the maxillary right and left first molars, maxillary right first premolar, maxillary right lateral incisor, maxillary left central incisor, mandibular central incisors, and mandibular right first molar. The maxillary and mandibular third molars were missing (Figure 3A). The cephalometric analysis revealed that the patient had a skeletal Class II pattern  $(ANB = 6.4^{\circ})$ . The maxillary incisors were slightly proclined (U1 to FH: 113.5°) and the mandibular incisors showed normal inclination (IMPA: 94.1°). The upper and

lower lips were slightly protrusive (Figure 3B). The etiology of the malocclusion was determined to be a combination of heredity and environmental factors.

Before orthodontic treatment, the patient was referred to a general dentist for restorative dentistry consultation as well as a periodontist for the evaluation of the existing periodontal condition, especially thin attached gingiva on the mandibular canines. One treatment option was to open space to replace the missing maxillary left lateral incisor. However, this treatment plan was not chosen because of the potential to procline the maxillary incisors and increase protrusive lips. Furthermore, the patient was reluctant to undergo a restoration for a single tooth space



Figure 2. Initial intraoral photographs.



Figure 3. Initial radiographic images: A, panoramic view; B, lateral cephalometric view.

after orthodontic treatment. The other treatment option was to extract the maxillary right first premolar and mandibular right second premolar, which had restorations. In addition, there were plans to remove the three-unit bridge on the left posterior segment to mesialize the left mandibular second molar using a temporary anchorage device (TAD). However, the patient did not want to extract a tooth in the mandibular arch and did not want to install a TAD during treatment. The last treatment option was to extract the maxillary right lateral incisor to correct the maxillary dental midline and slenderize the mandibular incisors to relieve the crowding. It was explained to the patient that the mandibular first molar would be replaced after orthodontic treatment. However, severe gingival marginal discrepancies would result in a compromised gingival architecture. The patient agreed to choose this treatment plan.

Full-fixed .022" Tip-Edge (TP Orthodontics, Inc., LaPorte, IN, USA) appliances were placed on both arches. Before placing the appliances, the left mandibular three-unit bridge was removed and temporary crowns were delivered. This preadjusted edgewise appliance permitted crown tipping in one direction yet created an anchorage through bodily



Figure 4. A, Recontouring (red area) of the prominent labial ridge of a canine before bonding a bracket. During finishing stage, the lingual surface is reduced (blue area) to establish a balanced occlusion. B, To make the canine look less curved and more like a lateral incisor, the bracket is positioned more distally.

movement in the other direction. It offered easy rotation and angulation control by using auxiliaries like rotating springs and uprighting springs. The Tip-Edge bracket was derived from a single .022" straight-wire bracket, merely by cutting away two diametrically opposed corners from the archwire slot. The addition of rotation wings and a vertical slot enhanced both rotational and tip controls. This unique arch slot was able to close the extraction space without extruding incisors, by tipping in the mesiodistal direction early in the treatment. The brackets had appropriate torque and in-out compensation to assure controlled finishing with rectangular archwires and upright springs.<sup>42</sup>

To substitute canines in the position of missing laterals, special bracket placement was necessary for both maxillary canines and the first premolars. The lateral incisor brackets were bonded to the canines and the canine brackets were placed on the first premolars. Before bonding the lateral incisor bracket on the canine, the labial surface was reshaped for the bracket adaptation. It is necessary to position these brackets gingivally to permit the recontouring of the canines required for esthetics and function (Figure 4A). To make the canine appear less curved and more like a lateral incisor, the bracket was placed more distally in the center of the canine rather than at the height of contour (Figure 4B). In addition,

a canine bracket was placed on the first premolar in the same mesiodistal position (more distally) as it was placed on the canine.

Maxillary and mandibular arches started with .016" high tensile stainless steel archwires with mild bite opening bends mesial to the first molars. To make room for the lingually displaced mandibular right lateral incisor and to prevent proclination of the mandibular anterior teeth, interproximal reduction was performed in the anterior segment. At the leveling stage, .016" nickel titanium archwire was used in conjunction with the main .016" high tensile stainless steel archwire to speed the alignment of the mandibular anterior teeth. In the maxillary arch, space was closed using a .022" round archwire. While protracting the maxillary right canine, the maxillary dental midline was slightly overcorrected because the patient did not wear elastics (Figure 5). During the treatment, enamel was recontoured to flatten and create an incisal edge on the canine cusp tip (Figure 6A). To eliminate traumatic occlusion of the mandibular lateral incisors with the lingual surfaces of the canines and to establish a balanced occlusion, the lingual cusps of the maxillary canines and first premolars were recontoured (Figures 4A and 6B).<sup>28</sup> In the finishing stage,  $.0215'' \times .028''$  archwires were used for torque control.



Figure 5. Intraoral progress after 10 months of treatment.



Figure 6. A, Recontouring (red area) of the maxillary canine to resemble a lateral incisor. B, Enamel recontouring (blue area) of the maxillary first premolar for canine substitution.

In addition, to improve the interproximal contact points, offset bends (in-out) were needed between the central incisor and canine (Figure 7). At this stage, the patient was referred to the restorative dentist to evaluate space for the three-unit bridge on the left posterior segment. The patient was instructed to use elastics all the time to correct dental midline. Uprighting springs were used to exert continuous, uprighting, and torquing forces on the anterior teeth to ideal angulations.

Total treatment time was 23 months. Following the treatment, a 0.0175-in twistflex wire fixed retainer was bonded from first premolar to the first premolar on the mandibular arch. The mandibular central incisors could not be bonded successfully with the fixed retainer because of ceramic crowns which were fabricated after debonding. A mandibular Essix retainer was also delivered as a removable retainer. On the maxillary arch, an Essix retainer was delivered. The patient was



Figure 7. A, To improve the interproximal contact points in the archwire design, the 1st order (in-out) bends were performed on the maxillary canines. B, Maxillary occlusal view of canine substitutions.

instructed to wear them 24 hours per day for 1 year, and then at nighttime only after 1 year. Recall visits for retainer checks were made at 1, 3, and 6 months for the first year. To ensure continued satisfactory posttreatment alignment of the mandibular and maxillary anterior dentition, the use of fixed or removable retainers is recommended indefinitely. At the end of orthodontic treatment, the patient was referred to her general dentist for the restorative treatment and the periodontist for gingival margin discrepancies.

As a result of treatment, the patient's profile has improved (Figure 8). The severe mandibular crowding has been relieved. Dental midlines were aligned with the facial midline, and overbite and

overjet have improved (Figures 9 and 10). The panoramic radiograph showed proper space closure and acceptable root parallelism, with no signs of bone or root resorption (Figure 11A). Cephalometric analysis revealed no significant skeletal changes  $(ANB = 5.9^{\circ})$ . The maxillary incisors showed decent inclination (U1 to FH: 108.9°) and the mandibular incisors showed no significant changes (IMPA: 92.4°). Her upper and lower lip profile has improved (Figures 11B and 12, Table 1). After 6 years of retention, the patient showed pretty stable occlusion (Figures 13–15).

#### DISCUSSION

From an esthetic viewpoint, observing the natural anatomy of

the maxillary lateral incisor and the maxillary canine, the marked prominence of the canine roots at the corner of the mouth is quite obvious. The natural topography shows labial root prominence of the central incisor, labial concavity of the lateral incisor root, and labial prominence of the canine root. The next natural observation is the gingival scalloping height contours of the natural dentition. The gingival tissue is higher on the central incisors, drops down on the lateral incisors, is higher again for the canines, and again drops down on the first premolar. These heights of contour are critical for the esthetic smiles of our patients.43 When a patient has a high smile line with excessive gingival display, esthetic consideration must be weighed against additional



Figure 8. Final facial photographs.



Figure 9. Final intraoral photographs.

restorative needs. Kokich<sup>44</sup> and Zachrisson<sup>45</sup> outlined steps on how to accomplish this with extrusion of the canines and intrusion of the first premolars to obtain the ideal gingival height. However, this protocol requires prosthetic build-up on both the substituted laterals and canines.<sup>44,45</sup> Placing the dentition into an ideal occlusion when there is agenesis, especially in cases involving the lateral incisors, is critical to obtain an ideal esthetic result. With



Figure 10. Intraoral lateral close-up views before (A) and after (B) treatment.

ectopic canine positions in agenesis of unilateral or bilateral maxillary lateral incisors, the objective is to create space or to allow the permanent canines to erupt mesially adjacent to the maxillary central incisors. The periosteal matrix (the tooth and periodontal ligament) is responsible for the form, size, and shape of the skeletal unit (the alveolar bone), and its maintenance. Basically, the alveolar bone exists if the tooth and periodontal ligament exist.

If there is no tooth to erupt into an area of the dental arch, alveolar bone cannot be formed. As a result, a large defect in the alveolar process can make future implant placement almost impossible. As the canine erupts into the lateral incisor space, alveolar bone will form in a 2 to 4 mm area adjacent to the erupting tooth. It is therefore important for a tooth to erupt in the area where the eventual implant will be.

Carlson<sup>46</sup> has shown that, after tooth extraction, the maxillary anterior labio-lingual width is reduced by 23% in the first 6 months and, after 5 years, an additional 11% loss in ridge-width occurs. After tooth extraction, the ridge-width will narrow by approximately 34% over 5 years.

When canines erupt in close proximity to central incisors, space closure is the best treatment. However, cases presenting with Class I buccal occlusions and neither mandibular arch length deficiencies nor dentoalveolar protrusions favor treatment by orthodontic space opening and subsequent prosthetic lateral incisor replacements. In these patients, when maxillary lateral incisors are congenitally absent, spaces are created to allow ectopic canines to erupt adjacent to the central incisors. As the permanent canine is moved distally to create space for a lateral incisor implant or bridge, an alveolar ridge is created. The labio-lingual ridge width of bone over time in orthodontic cases of canines moved distally was addressed by a study by Kokich.<sup>36</sup> The amount of bone loss was less than 1% over 4 years, compared with the Carlson study of extracted teeth which showed 34%. Kokich concluded that, if the edentulous alveolar ridge was created by orthodontic separation of two teeth, little resorptive change will occur over time.

In many of Class II malocclusion cases with mesial eruption of the canines into the lateral incisor position, extensive distalization of the buccal dentition is required to create the mesial-distal space and to provide an alveolar ridge for esthetic lateral incisor pontic placement. The second molars have to be distalized into a Class I position; the first molars, the second premolars, the first premolars and, finally, the maxillary canines are distalized into a Class I occlusion,



Figure 11. Final radiographic images: A, panoramic view; B, lateral cephalometric view.



Figure 12. Superimposition of cephalometric tracings: pretreatment (black) and posttreatment (red).

to provide the mesial-distal space necessary for achieving ideal restorative dentistry. It is obviously much easier to move the canines mesially, but in some cases, if space opening is required, it is mechanically difficult and sometimes limited by the relative alveolar concavity between the canine and first premolar roots.<sup>29</sup>

In creating the proper mesialdistal space for lateral incisor restoration, the clinician should properly position the central incisors with respect to the midpoint of the cupid's bow of the philtrum of the upper lip and upper face, and to have maxillary and mandibular midlines coincident. The more important of the two is the maxillary midline to the upper lip and face. After the alignment is complete, radiographs should be taken of the created ridge and root positions of the central incisors and the canines. For implant or restorative cases, the root position must be evaluated by both the orthodontist and the surgeon.

If patients will require restorations after orthodontics, the restorative dentist should be involved during the final stage of orthodontic treatment. In this way, the patient will benefit from the evaluation of the final results by the restorative dentist. In addition, the orthodontist and

TABLE 1. CEPHALOMETRIC MEASUREMENTS.				
	Japanese Norm	Pretreatment	Posttreatment	6 years posttreatment
SNA angle (°)	82.3	85.1	84.2	84.7
SNB angle (°)	78.9	78.7	78.3	78.9
ANB angle (°)	3.4	6.4	5.9	5.8
FMA (°)	28.8	31.1	31.5	31.6
U1 to FH (°)	111.1	113.5	108.9	110.9
IMPA (°)	96.3	94.1	92.4	95.0
Interincisal angle (°)	124.1	121.4	128	122
Upper lip (mm)	0	1.5	-0.5	0.3
Lower lip (mm)	0.8	2	1.7	1.9



Figure 13. Postretention facial photographs after 6 years.

restorative dentist will be more aware of the treatment possibilities for the orthodontic-restorative patient.<sup>34</sup>

#### CONCLUSION

In treating congenitally missing lateral incisors, the two major

alternatives, orthodontic space closure or space opening for prosthodontic replacements, can both compromise esthetics, periodontal health, and function. If orthodontists and restorative dentists establish realistic objectives, communicate the sequence of treatment, interact during treatment, evaluate dental and gingival esthetics, and position teeth to facilitate proper restorative treatment, the esthetics and long-term dental health of the patient after all treatment will be greatly enhanced.



Figure 14. Postretention intraoral photographs after 6 years.



*Figure 15. Postretention radiographic views after 6 years:* A, *lateral cephalometric view;* B, *a volume-rendering 3-dimensional computed tomography.* 

#### DISCLOSURE STATEMENT

The authors have no financial interest in any of the companies whose products are included in this article.

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This article is accompanied by commentary, "Orthodontic Treatment of a Congenitally Missing Maxillary Lateral Incisor," Tung Nyguyen, DMD, MS, DOI 10.1111/j.1708-8240.2010.00357.x Copyright of Journal of Esthetic & Restorative Dentistry is the property of Wiley-Blackwell and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.