©Operative Dentistry, 2018, **43-2,** 121-127

Conservative Approach for Treatment of Maxillary Lateral Incisor Agenesis With the Deciduous Tooth Retained: 18-Month Follow-Up

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Clinical Relevance

The treatment of younger patients with maxillary lateral incisor agenesis and contralateral "peg lateral" often requires a multidisciplinary approach to achieve functional and esthetic outcomes.

SUMMARY

This case describes a female patient with agenesis of the maxillary right lateral incisor, with her permanent canine in its position and the deciduous canine retained. Additionally, she presented with a maxillary left peg lateral incisor. To solve her functional and esthetic complaints, a multidisciplinary approach involving perio-restorative procedures was proposed. Periodontal surgeries were performed to align the gingival contour, and the restorative approach utilized ceramic veneers. At the 18-month clinical and radiographic follow-up, the treatment outcome was stable, with maintenance of the clinical results achieved and without any sign of deciduous tooth resorption.

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DOI: 10.2341/17-015-T

INTRODUCTION

Agenesis in anterior teeth can negatively compromise the smile.[1,2] Maxillary lateral incisor agenesis (MLIA) is the third most common type of dental agenesis,[3] and it is more prevalent in females and bilaterally.[4] However, when MLIA is unilateral, the contralateral incisor is usually peg-shaped.[5] Both conditions may prejudice and influence the smile and facial attractiveness.[6,7]

This clinical situation often requires a multidisciplinary approach to provide a functional and esthetic resolution.[8] Orthodontics, periodontics, prosthodontics, and restorative dentistry are common fields that may be involved in all phases of treatment.[1,2,8] The main choice for MLIA patients is between orthodontic repositioning of the canine and recontouring it as a lateral incisor or opening/maintaining the space to insert an implant or prostheses.[1,8-10] According to a systematic review, there is no consensus on the best option for treating MLIA patients.[9] Regardless, the ideal treatment should be the most conservative option that satisfies the patient's functional and esthetic requirements,[8,10] taking into account aspects such as the patient's age, type of malocclusion, and tooth morphology.[8]

This case report presents and discusses an interdisciplinary management to reestablish function and esthetics in a younger patient with unilateral maxillary lateral incisor agenesis, a retained deciduous tooth, and a contralateral peg-lateral incisor. There is a lack of literature presenting similar treatment approaches for MLIA patients.

CASE REPORT

A 14-year-old female presented to the Undergraduate Clinic of Restorative Dentistry complaining about the appearance of her smile. The first clinical examination revealed that she had unilateral maxillary lateral incisor (No. 7) agenesis, with the permanent canine (6) in its position and the deciduous canine (C) in place of the permanent canine with satisfactory bone support and without mobility. Additionally, the maxillary left lateral incisor (10) was peg-shaped. However, her tooth alignment and occlusion were good. Radiographic and photographic documentation (Figure 1) were performed, and impressions of both arches were made using polyvinyl siloxane (Express XT putty light body; 3M ESPE, St Paul, MN, USA). Then, digital smile design was planned (Figure 2).

The possibility of solving the MLIA by using orthodontics was discussed with the patient and her guardian as the most conservative option, but they were resistant to it, wanting a more immediate treatment. The second option considered was maintenance of the deciduous teeth followed by periodontal procedures and indirect restorative treatment. Ceramic veneers were planned for the central incisors, the peg-lateral incisor, and the right permanent and deciduous canines. The decision for including the central incisors in the treatment was determined by the digital smile design, which clearly demonstrated that this would be necessary for a harmonic smile. The second alternative was chosen by the girl and her mother, who signed the consent form.

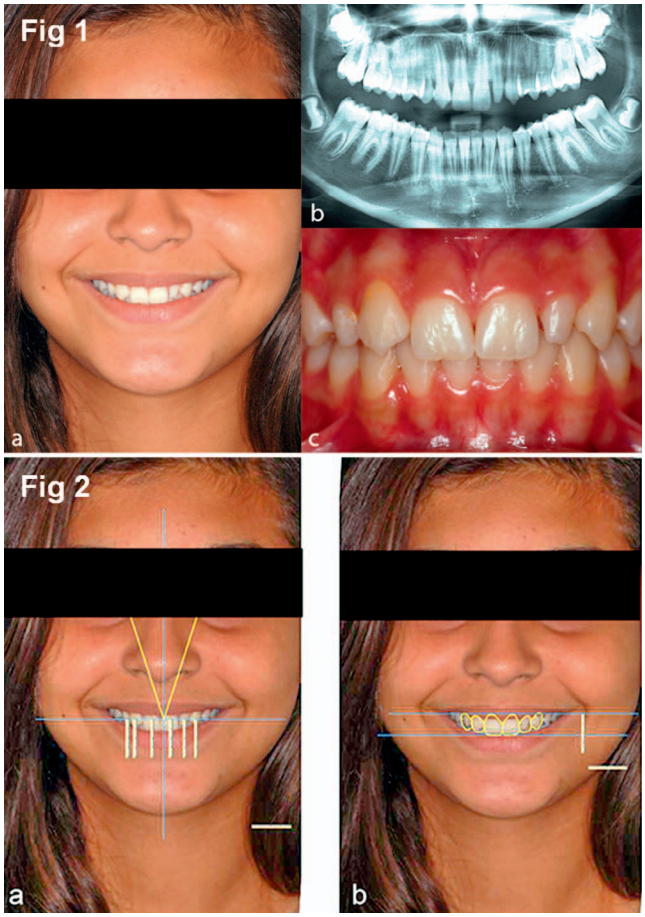

Figure 1. *Pretreatment aspect of the patient. (a) Facial, (b) radiographic, and (c) intraoral view showing the right permanent canine in the absent lateral incisor's position, the retained deciduous canine, and the maxillary left peg-lateral incisor.*

Figure 2. *Digital smile design protocol. (a) Determining the ideal horizontal plane and midline and transferring the measurements of the dental casts to the maxillary incisors and canines; (b) planning the final teeth outline and gingival contour.*

A diagnostic wax-up and mock-up were done, achieving the patient's expectations (Figure 3), followed by the periodontal surgeries. First, esthetic crown lengthening of the central incisors and

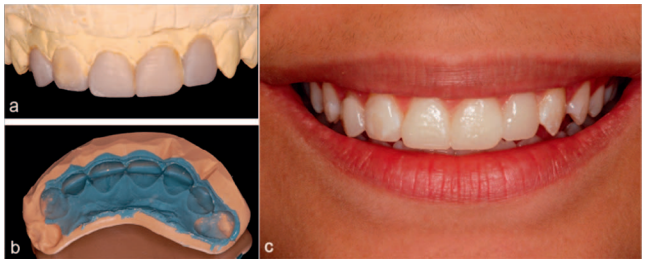

Figure 3. *Mock-up technique. (a) Diagnostic wax-up; (b) silicone matrix used to transfer the restorations previewed in the wax-up to the mouth; (c) mock-up allowing a preview of the result.*

deciduous canine and labial frenectomy were performed (Figure 4a,b). Second, the crowns of both permanent canines were repositioned coronally using connective tissue harvested from the palate to improve the gingival level. Last, a graft was placed in the recipient area and sutured to stabilize the external flap and maintain the graft position.

After 90 days (Figure 4c), the five teeth were prepared for ceramic veneers. The color selected for these veneers was B1 (Vita Classical Scale, Vita Zahnfabrik, Bad Säckingen, Germany). The preparation consisted of fine chamfering of the enamel on the facial surface, which was executed using a tapered-cylinder diamond tip (No. 4138; KG Sorensen, São Paulo, SP, Brazil), without preparing the proximal or incisal regions of any teeth. The cervical margin was at the level of the gingiva. An extra-fine diamond tip (No. 4138; KG Sorensen) and abrasive disks (Soft-Lex Pop-On, 3M ESPE) were used to refine the preparation. The right permanent canine required the most tooth preparation to reshape it into a lateral incisor. However, all preparations were considered conservative, with most of them restricted to the enamel.

The final impression of the teeth was obtained using retraction cord (Ultrapack, Ultradent Products, Indaiatuba, SP, Brazil) (Figure 5a), using a double-viscosity polyvinyl siloxane material (Express XT, 3M ESPE) (Figure 5b). Provisional restorations were fabricated for the right canine and left lateral incisor. Porcelain veneers were made of glass-infiltrated, pressed ceramics (Lithium-disilicate; IPS e.max Press, Ivoclar Vivadent, São Paulo, SP, Brazil).

The veneers were carefully verified using a try-in paste (Rely X Veneer; Ivoclar Vivadent) to verify marginal adaptation, alignment, shape, and color. Before beginning the luting procedures, we cleaned the teeth using pumice and a rubber cup. The veneers had their internal surfaces treated with 9.5% hydrofluoric acid (Condac Porcelana; FGM Products, Joinvile, SC, Brazil) for 20 seconds followed by application of a silane coupling agent (Monobond; Ivoclar Vivadent).

Then the anterior teeth were isolated using a rubber dam (Figure 6a). After conditioning with 37% phosphoric acid (Condac 37; FGM Products) for 30 seconds on the enamel and 15 seconds on the dentin (in the case of the right canine), rinsing and drying, applying a one-bottle bonding system (Single Bond; 3M ESPE), gently air-drying, and light-polymerizing for 20 seconds, each restoration was cemented individually (Figure 6b). A luting agent (Rely X Veneer shade B1/2; Ivoclar Vivadent) was applied to the internal surface of the veneer, which was positioned on the tooth. A slight polymerization of 5 seconds to stabilize the veneer was done, and excess luting material removed. Subsequently, the veneers were light cured from the facial and palatal sides for 40 seconds.

After placement of all veneers, the cervical margins were carefully checked and any excess cement was removed. Occlusion was also verified and some adjustment was performed to the decidu-

Figure 4. *Periodontal surgical procedure. (a) After correcting the gingival level with crown lengthening of the deciduous canine and repositioning it using palatal connective tissue harvested from the palate (the same procedure was performed on the left side); (b) after esthetic crown lengthening of the central incisors and labial frenectomy; (c) postoperative aspect 90 days postsurgery.*

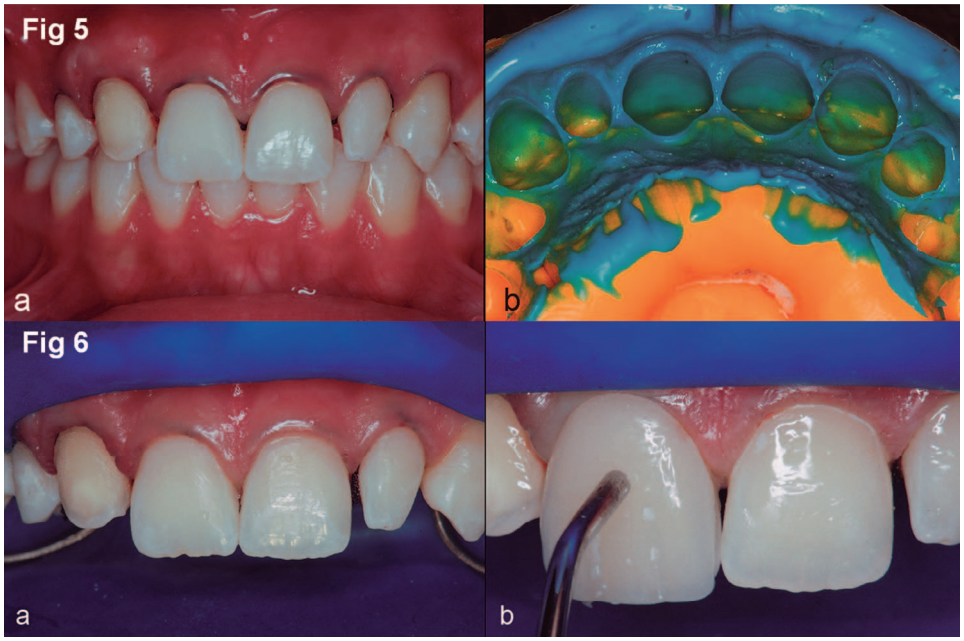

Figure 5. *Aspect of tooth preparation. (a) Placement of retraction cords for impression; (b) impression obtained using a double viscosity polyvinyl siloxane material.*
Figure 6. *Luting phase. (a) Isolation of the teeth using rubber dam and retraction cords; (b) placement of each veneer individually.*

ous canine to relive occlusal loading and to establish a group lateral disclusion on the right side. The final result can be seen in Figure 7a.

At the 6-month check-up (Figure 7b,c), maintenance of the immediate result—both biological and esthetic—were verified. At the 18-month follow-up, the same results and impressions were verified, but a new condition was noted: a slight staining on the veneer of the left central incisor. The patient admitted that she had been putting the pendant of her necklace in her mouth, precisely against this tooth, as can be seen in Figure 8. The surface of the veneer was polished with ceramic-specific rubber cups, and the patient was instructed to avoid this deleterious habit. Radiographic follow-up indicated stability of the bone around the root of the deciduous canine (Figure 9).

DISCUSSION

This case report presents a multidisciplinary approach employed to achieve the functional and esthetic rehabilitation of a young patient with MLIA. In her situation, the ideal conservative treatment would have been extraction of the deciduous canine, management of the area of agenesis with orthodontics, and placement of a provisional prosthesis for a future implant.[8,9,11] To minimize the need for provisional restorations, this treatment could be

Figure 7. *(a) Posttreatment aspect of the patient. Clinical and radiographic follow-up after 6 months; (b) intraoral view; (c) periapical radiographic view.*

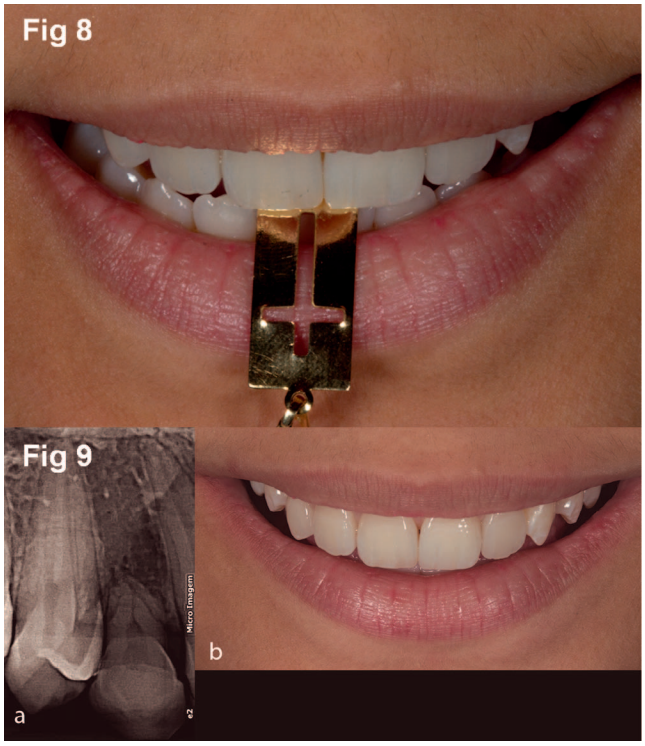

Figure 8. *Clinical follow-up after 18 months showing the veneer of the central incisors stained due to a deleterious habit of the patient.*
Figure 9. *Clinical follow-up after 18 months. (a) Periapical radiographic view showing the stability of the bone around the root of the deciduous canine; (b) clinical aspect after polishing the veneers.*

delayed until the patient reaches the optimum age for a tooth implant, which is 16-17 years old for females.[11] However, the patient was looking for a more immediate solution and complaining about her appearance, which was impairing her interpersonal relationships. Since she presented with good tooth alignment and occlusion and an adequate space for a future implant in the region of the deciduous canine, the treatment with ceramic veneers was suggested to maintain the quality of the patient's bone and to allay her esthetic dissatisfaction.

When faced with an esthetic rehabilitation, the dentist should make a dentofacial analysis by gathering the diagnostic data using esthetic checklists.[6,7,12] Currently, dental casts, photographs, and digital tools help the clinician achieve more reliable planning,[12,13] which aids in communicating with both the patient and other clinicians.[14] After planning, the mock-up procedure shifts the restorations previewed in the wax-up to the clinical situation, allowing the patient to have a tridimensional and realistic view of the treatment outcome so that anatomical changes and adjustments can be made before the definitive restorations are created.[15,16]

As previewed in the digital protocol, the ceramic veneers without the gingivoplasty to align the gingival contour would result in the centrals being shorter than the future right lateral incisor, which, in turn, would be higher (shorter) than the right deciduous canine. This condition would achieve an unbalanced smile without proportion or harmony. These periodontal procedures were thus intended to correct the gingival level and ensure proper width-to-length tooth ratios. The gingivoplasty was done to respect the biological space, and the tissue grafts were aimed to augment the thickness of keratinized tissue and improve the stability of the perio-restorative interfaces.[17] If the deciduous tooth were to exfoliate in the future and require replacement with an implant, the proshesis would have adequate space and an appropriate gingival contour.

In the restorative phase, the central incisors were included to reestablish tooth proportionality in the smile, based on the digital plan. The decision to include these teeth in the restorative phase was made because of the minimal amount of enamel preparation needed and to better fulfill the patient's high esthetic demands. The mock-up indicated no need to extend the preparation depth since the space necessary for the veneers already existed, with the exception of the right canine, which was reshaped into a lateral incisor. Recountouring canines into laterals, with direct resin or ceramics, often requires more tooth preparation due to the anatomical differences between these teeth.[8,10] Thus the canine preparation was deeper, with exposure of dentin, which was properly protected using the provisional restoration and was treated to receive the luting of the ceramic veneer.

When considering an unesthetic situation involving the restoration of anterior teeth in younger patients, one must decide between composite resin and ceramics. The option to use ceramics in this case was determined by the extensive volume of restorative material that would be necessary to reshape the deciduous tooth, the permanent canine, and the peg-shaped lateral incisor with minimal tooth preparation. Glass-infiltrated based ceramics, as used in this report, present high esthetic potential and can be used in different tonalities, in small thicknesses,[18] and are considered a safe treatment option that preserves tooth structure.[19] Clinical studies show that ceramic veneers have high survival rates,[18,19] (up to 10 years).[20] Also, their bonding efficacy in deciduous teeth is comparable to that of permanent teeth.[21]

The main concern for the present clinical situation was the stability of a ceramic veneer on a retained deciduous tooth. However, at the 18-month follow-up, radiographic evaluation indicated stability of the treatment, since the deciduous canine displayed no sign of root resorption. Clinical follow-ups should always be considered part of the treatment, since they may determine the longevity of treatment. After 18 months, the patient returned with black staining on the incisal third of the veneer of the right central incisor as a result of her deleterious habit. This clinical situation should be controlled because it can have an undesirable effect on the veneer, including fracture. The 18-month follow-up demonstrates the stability of the treatment but it cannot assess its durability. However, it is most important that the treatment done in this case provide for possible future interventions such as a single-tooth implant in the right canine site for this patient.

CONCLUSION

The results achieved in this case, as shown by the 18-month follow-up, in terms of the patient's clinical, radiographic, and psychological aspects, lead to the conclusion that our approach was safe and conservative.

Acknowledgement

The authors are grateful to Eduardo Hairashi, the prosthetics specialist who fabricated the ceramic restorations.

Regulatory Statement

This study was conducted in conformity with the local committee guidelines and policies for human subjects of the Araçatuba Dental School, State University of São Paulo. An informed consent was obtained.

Conflict of Interest

The authors of this manuscript certify that they have no proprietary, financial, or other personal interest of any nature or kind in any product, service, and/or company that is presented in this article.

(Accepted 19 June 2017)

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