

Minimally Invasive Approach for Management of Peg Lateral Incisors: A Case Series

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ABSTRACT

The maxillary lateral incisor is a variable tooth morphologically. Peg lateral is a kind of anomaly that affects the esthetic appearance of this tooth shape and size. Treatment options depend on the case selection, the number of missing teeth, status of occlusion, diastema width, and patient preference. If a minimally invasive treatment approach is indicated, direct composite buildups provide an acceptable treatment alternative for the management of shape and color of anterior teeth. The present clinical report describes a conservative approach for the restoration of the esthetic appearance of peg-shaped lateral incisors with good short-term results.

Key words: Direct composite resin buildups, maxillary lateral incisors, peg lateral, tooth abnormalities

INTRODUCTION

Morphological dental anomalies of the permanent teeth are relatively common. Developmental disturbances of the teeth involved variations in number, position, size, shape, eruption, or structure. Such disturbances may occur independently or in association with some generalized disorders.^[1] The maxillary lateral incisor is a variable tooth morphologically. This tooth frequently shows a reduction in size and shape, for example, barrel-shaped, cone-shaped, and peg-shaped.^[2] A peg lateral is defined as an undersized, tapered, and maxillary lateral incisor that may be associated with other dental anomalies, such as canine transposition and over-retained deciduous teeth.^[3] According to Grahnén, a peg-shaped tooth is defined as a tooth in which the incisal mesiodistal width of the crown is smaller than the cervical width. When this condition affects upper lateral incisors, they are called peg-laterals. The reported prevalence

of peg-laterals ranges from 0.6% to 9.9%, varying by ethnicity, sex, and region.^[4,5] Gupta *et al.* concluded that maxillary laterals were the most affected and bilateral peg-shaped tooth is more commonly seen compared to unilateral.^[6] Because of their reduced size and irregular tooth shape, the malformed lateral incisors may also allow the formation of other diastema in the anterior region, major esthetic patient complaint.^[7] Today, a variety of techniques are available to manage such situations, including orthodontic treatment, crowns, laminate veneers, and direct composite resin restorations. Indirect restorative options generally require preparation of the sound tooth structure. Direct techniques, however, are more consistent with the concept of minimally invasive dentistry.^[8] The present paper's aim was to describe and illustrate, basing on case series, the management of peg-shaped lateral incisors with direct composite resin build-ups.

CASE SERIES

Case 1

A 27-year-old female was referred to the Department of Dental Medicine of Charles Nicolle Hospital of Tunis with the main complaint of improving the appearance of her smile. Patient medical history did not reveal any systemic diseases. Intra-oral examination revealed two peg-shaped lateral upper incisors with paramedian diastema,


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Figure 1: Bilateral peg-shaped restoration with composite resin build-ups technique (a) Pre-operative frontal view showing bilateral peg-shaped lateral incisors; (b) Isolation with rubber dam; (c) phosphoric acid etching 37% for 30 s; (d) dentin layer is placed over the enamel lingual shell; (e) post-operative frontal view; (f) follow-up 1 year later showing no chipping or unacceptable marginal discoloration

incisor overbite CI Angle I canine. Satisfactory oral hygiene and healthy periodontal conditions were noticed. No dental caries or other associated dental anomalies were observed in both clinical and radiological examinations [Figure 1a].

Before moving forward with any treatment plan, orthodontic treatment, and all the options of closing the diastema were proposed to the patient. Because of prolonged treatment and esthetic issues related to these appliances, the patient did not give her agreement to these treatment modalities. Hence, the consent was the restoration of the two lateral uppers incisors by composite resin build-ups. An impression was taken to have a wax-up that will visualize the future shape and size of the teeth.

Next meeting, the restoration of both lateral upper incisors with the direct composite resin technique was achieved. First of all, teeth were cleaned with a silk brush and a prophylactic paste. Then, Shade selection was performed using a VITA shade guide.

The restoration was performed using a nanohybrid light-cured composite resin (Reflectys, ITENA®), which was placed using an incremental technique. Dentin (A2) and enamel (E) shades were selected. For better isolation, rubber dam was placed, keeping the operating field dry and free of contaminants [Figure 1b]. No anesthesia or preparations were performed before the restoration. After protecting adjacent teeth with Teflon; enamel was etched with phosphoric acid (Meta Etchant 37% Phosphoric Acid Meta Biomed®) for 30 s [Figure 1c]. Care was taken to completely rinse the etchant gel for 30 s, and then the tooth was air-dried. Enamel margins were then coated with a bonding agent (Iperbond Ultra, ITENA®) and light-cured for 20 s with an LED source.

Since the tooth form of both lateral incisors was peg-shaped, composite addition was needed on the distal and mesial side. The composite was placed and polymerized using a layering technique to simulate natural teeth [Figure 1d]. Each increment

was light-cured for 10 s. Particular attention was given to the contouring of the apical finish line of the restorations and the proximal contour. Assuming the left lateral incisor, the right one was launched. Finally, the rubber dam was removed. The surfaces were polished using fine-grained abrasive flexible discs, silicone polishers, and finishing strips. The patient was very satisfied with her new smile [Figure 1e]. Rigorous and effective oral hygiene was recommended for the patient. Follow-up, 1 year later, showed a favorable clinical outcome with no chipping or unacceptable marginal discoloration [Figure 1f].

Case 2

A 15-year-old male patient was referred to the Department of Dental Medicine of Charles Nicolle Tunis. He expressed dissatisfaction with the appearance of his smile. His medical history was non relevant. The patient was caries-free with a low index of visible plaque. Clinical examination showed a peg-shaped left maxillary lateral incisor [Figure 2a].

After reviewing the direct and indirect restorative options with the patient and parents, a decision was made to restore the shape of the lateral incisor with direct composite resin restoration. For this case, a plastic matrix (transparent strip crown) was used to adjust the final shape of the future restoration, simplifying the sculpture process.

The first step was the selection of the matrix. The most adequate is chosen, according to the mesiodistal dimensions and the incisocervical height, and then fitted by cutting the excess with

scissors. The cervical aspect should be adapted to restore the tooth [Figure 2b].

It is important at this stage to check the occlusion. This preliminary check can avoid any lengthy adjustments at the end. A silicone index was made with putty material consistency over the selected matrix [Figure 2c]. This procedure helped clinically to obtain an appropriate anatomy profile for future restoration. The matrix was then removed, and the direct restorative procedure took place using the layering technique to simulate the natural tooth color and translucency. Teeth were polished with a non-fluoride prophylactic paste, then rubber dam was set to the keep the moisture of the operating field under control.

Enamel acid etching was performed with phosphoric acid (Meta Etchant 37% Phosphoric Acid Meta Biomed®), followed by washing, air drying, adhesive system application (Ambar Universal bonding FGM®), and light-curing. After that, the silicone index silicone was put into place, providing proper fixation [Figure 2d]. The palatal shell of the tooth was built using nano-hybrid composite resin enamel shade (OPALLIS, EA1, FGM®) into the silicone index [Figure 2e], followed by the application of a successive thin layer of a nanohybrid composite resin dentin shade (OPALLIS, A2, FGM®) onto the matrix.

Each layer was light-cured for 10 s. A final increment of the composite resin enamel shade was placed on the facial surface and light-cured for 40 s. The rubber dam was removed, and the final restoration was then contoured and polished with polishing discs, silicone points, and polishing paste.

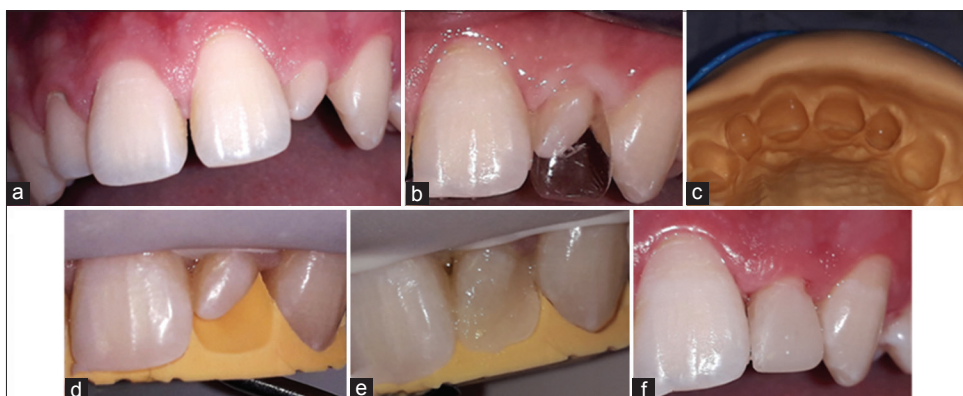


Figure 2: Direct peg-shaped restoration using transparent matrix - (a) pre-operative view showing a left peg-shaped lateral; (b) transparent matrix selection and adaption; (c) putty silicon index matrix confection; (d) intraoral silicone index fixation; (e) enamel palatal shell layer; (f) post-operative view showing an esthetically pleasant tooth shape and size

The final immediate result showed an esthetically pleasant tooth shape and size [Figure 2f]. The importance of rigorous and effective oral hygiene was re-emphasized for the patient.

DISCUSSION

The esthetic defect in patients with peg lateral incisors consists of both the malformed teeth and the presence of diastema between teeth. There are two primary treatment objectives: To restore the shape of the malformed crowns, and to close the diastema.^[7,8] The different restorative techniques available for anterior tooth anomalies such as peg lateral include indirect ceramic crowns and veneers, direct composite veneers, and direct composite resin build-ups. Indirect restorative options generally require preparation, that is, the potential destruction of a healthy tooth structure. Direct techniques, however, are more consistent with the concept of minimally invasive restorative treatment, which balances need, damage, and risk.^[8-10]

Direct composite resin restoration is a good treatment option for peg-shaped laterals as it is an additional incremental technique that can be placed directly onto the tooth. This approach is non-invasive for the following reasons: Sound tooth structure is not removed; the procedure does not require local anesthetic; and the procedure may be accomplished in a single appointment.^[9] This additional technique allows complete control of the restoration of the shape of peg laterals. Using an incremental technique, a restoration can be sculpted to the desired morphology and color, and the esthetic outcome can be monitored right from shade selection until final polishing.^[10,11] In general, composite resin build-ups are reported to have promising results, good esthetic, functional, and biological ratings. They can be used for restorations in a single session with an overall survival rate higher than 88% up to 10 years.^[12] Other advantages of this type of treatment are the lower cost compared to an indirect technique, and the reversible nature of this procedure, which allows for other treatment approaches in the future. A significant advantage of resin composite restorations over other restorative materials is that repair may be possible intraorally without the risk of modifying esthetics or mechanical performance.^[9]

However, the major drawback relates are color stability and possible resin chipping.^[10] It must be

emphasized that survival and quality of this type of direct restoration are determined mainly by the application of appropriate clinical techniques during the fabrication process. Nevertheless, compared with such alternative treatment options as laminate veneers and ceramic crowns, this restoratively method displays a beneficial relationship between minimal invasiveness, esthetic results, clinical effort, and longevity.^[8,11-14]

CONCLUSION

The management of peg-shaped laterals and associated diastema is a real esthetic challenge for clinicians. Many treatment options are used, such as orthodontics, composite restoration, veneers, and crowns. Their indications are related to the case selection (width of diastema, patient motivation) and practitioner skills. The direct composite build-up is a minimally invasive approach option. The procedure is simple, cost-effective without damaging the remaining tooth structure.

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