



Aesthetic Correction of Peg Lateral and Diastema, with Resin Composite using Putty Index Technique : A Case Report

Abu-Hussein Muhamad

Practice limited to Children's Dentistry, Athens, Greece.

Corresponding Author: Abu-Hussein Muhamad, DDS, MSc D, MSc, M Dent Sci (Paed Dent), 123 Argus Street, 10441 Athens, Greece.

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Abstract

The teeth that are smaller than usual are referred to as microdontia. The lateral incisors of the upper arch are one of the most typical sites for localised microdontia sometimes known as peg laterals. An undersized maxillary lateral incisor is a tooth development defect that is identified by a change in crown morphology. The teeth typically have a narrower incisal dimension and a smaller mesial-distal diameter, with a sharp convergence of the proximal surfaces. The word is typically used to refer to second incisors in which the middle lobe calcifies during development. The teeth that are smaller than usual are referred to as microdontia. The lateral incisors of the upper arch are one of the most typical sites for localised microdontia sometimes known as peg laterals. The following case report describes a restorative protocol using direct composite resin build up using a putty index.

Keywords: Diastema, direct composite, esthetic, peg-shape lateral, Putty index, Direct veneer resin composite

Introduction

Dental anomalies occur in the developmental stages of the tooth bud as a result of MSX1, PAX9 and AXIN2 gene mutations which are the consequences of hereditary or environmental factors . [1,2] The type and severity of the anomaly is related with the germ layer's embryological period at the time of the development of the mutation. [3,4] One of the anomalies related with the volume and shape of the teeth is "conical tooth anomaly" where the tooth crown has a blunt shape similar to a cone and the mesiodistal width of the crown is smaller than the cervical width. [1-6]

Autosomal dominant hereditary anomalies may appear in different forms in different members of the same family. It is suggested that these anomalies may occur by environ. [7,8].

Different factors, such as genetics, environment, and development, can affect the likelihood of ever having peg teeth:

1. The most common cause of pegged teeth is genetics. When a parent has pegged teeth, their children are more likely to develop them, too. Pegged teeth are also associated with other genetic conditions, including cleidocranial dysostosis and ectodermal dysplasia.[2]
2. It is also possible that environmental factors contribute to pegged teeth. For instance, if a mother contracts a viral infection or has a high fever during pregnancy, the teeth of her baby may be affected. [2]

3. The chances of pegged teeth increase if a baby's teeth don't develop properly in the womb. Trauma to the mouth can also cause them. [2].

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.[8-16] 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.[9-16] 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.[10] According to Grahnen, a peg-shaped tooth is defined as a tooth in which the incisal mesiodistal width of the crown is smaller than the cervical width. [8] 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.[9, 10] Gupta et al. [13] concluded that maxillary laterals were the most affected and bilateral peg-shaped tooth is more commonly seen compared to unilateral. [11-14] 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.[12-15] 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.[13-19]

The selection of treatment type is based on functional and esthetic requirements, need for extractions, the position of canines, and the potential for coordinating restorative and orthodontic treatment.[6-12] Treatment options include the following:

- (1) Extraction of the lateral followed by orthodontic movement of canine and its recontouring
- (2) extraction and replacement with single tooth implant-supported restoration or a fixed partial denture, and
- (3) direct and indirect restoration of the peg-shaped laterals to develop normal tooth morphology after orthodontic alignment.[1,3]

The restorative techniques include direct composite restorations, porcelain laminate veneers, metal-ceramic restorations, and all-ceramic crowns as well as minimally invasive direct resin composite bonding veneers.[1,4,10,11] The present case report presents the restoration of unilateral peg laterals with Building direct composite layers after orthodontic alignment. Fig.1



Figure 1: Peg-shaped maxillary lateral incisors with diverging axes were found on the clinical examination. The central incisors were with irregular incisal edges and small diastema between. The maxillary right canine tooth was rotated mesially and appeared large and bulky.

Case Report

This report describes the esthetic management of a 21-year-old female patient presenting with peg-shaped lateral incisors, incisal edge wear on the central incisors, and a naturally dark chroma across all anterior maxillary teeth. A non-invasive, additive approach was used with direct composite veneers on teeth #13 to #23. A polychromatic layering technique using the GC composite system was employed, including TE for palatal shells, BW for dentin core, JE for labial and proximal layers, and OM with white tint for opalescent incisal effects. The result achieved natural morphology, harmonious color blending, and high patient satisfaction—without any tooth preparation.



Figure 2: Right lateral view. Note the irregular shape of the lateral and canine teeth.

Peg-shaped lateral incisors and dark chroma in anterior teeth can impact the esthetic quality of a patient's smile. Direct composite veneers, especially when placed with a polychromatic layering approach, offer a conservative and highly esthetic solution. Using no-prep techniques and modern materials such as the GC composite system allows for enamel preservation while achieving lifelike optical results.

Chief Concern: Unesthetic shape and size of upper front teeth

Clinical Findings

Peg-shaped lateral incisors (#12 and #22), Incisal wear on central incisors (#11 and #21). Naturally dark chroma in all anterior maxillary teeth (#13–23). No existing restorations, caries, or pathology. Good oral hygiene and stable occlusion. Fig.1



Figure 3: Left lateral view. A peg-shaped lateral incisor with distal inclination was evident. There was a large gap between the central and lateral incisors.

A fully additive, no-prep approach was chosen. Direct composite veneers were planned on all anterior maxillary teeth to correct tooth morphology, enhance brightness, and improve smile harmony using the composite layering system. Fig.1

Clinical Procedure

1. Shade Selection:

Composite shade tabs were used in natural light. Trial spots were placed and light-cured directly on the teeth to confirm shade layering combinations.

2. Isolation:

Rubber dam placement ensured a clean, dry field. Fig.2



Figure 4: Left lateral view. A peg-shaped lateral incisor with distal inclination was evident. There was a large gap between the central and lateral incisors.

3. Adhesive Protocol:

37% phosphoric acid etching on enamel for 30 seconds. Universal adhesive applied and light-cured per manufacturer's instructions Fig.3,4

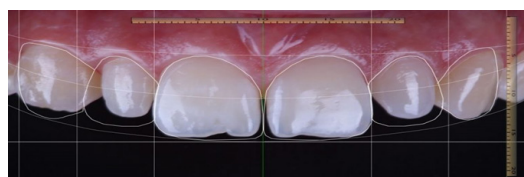


Figure 5: Silicone impressions from both arches and bite registration in MI were taken. A Digital Smile Design of the case was fabricated and sent to the lab.

4. Composite Layering: Fig.5,6,7,8,9,10

-TE (Translucent Enamel): Used to create the palatal shell and guide incisal edge positioning

BW (Bleach White): Built as the core to provide saturation and opacity for masking underlying chroma.



Figure 6: The laboratory made a diagnostic wax up, changing the shape of teeth #13, 12, 11, 21, 22 as proposed in the DSD.

-JE (Junior Enamel): Applied to the proximal and labial surfaces for natural enamel appearance and seamless blending

-OM (Opalescent Modifier) + White Tint: Applied in the incisal third to simulate natural opalescence and halo effects

-Each layer was sculpted with fine brushes and composite instruments and light-cured incrementally.



Figure 7: Composite resin buttons were used for shade determination. Three dentin and three enamel masses were tested.

5. Finishing & Polishing: Fig.11

Final contours were refined with finishing discs and diamond burs. Surface texture and gloss were achieved using polishing spirals and paste, mimicking natural enamel luster



Figure 8: Operatory field isolation. The treated teeth were sandblasted, etched for 30 seconds and a 4th generation adhesive system was applied and cured for 60 seconds.

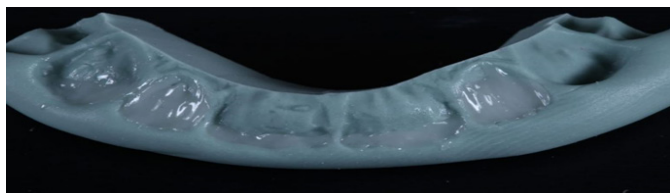


Figure 9: A palatal silicone index was fabricated from the wax-up. Medium value enamel shade composite was applied on the silicon index to recreate the palatal wall of the restorations. The silicone index was applied in the mouth with gentle pressure and cured.



Figure 10: The proximal walls of the restorations were recreated using vertically positioned distal garrison matrices. Medium value enamel mass was layered against the matrix to create the proximal curvature of the lateral incisors.

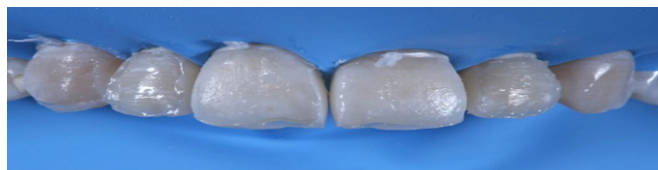


Figure 11: Dentin masses were layered in the formed shell to restore the inner chroma of the tooth and define the mamelon structure. Opalescent masses were added between the mamelons to create natural appearance of the incisal edge and match the adjacent central incisors. Intensive white stains were applied in thin horizontal stripes to mimic the white spots on her natural teeth.

Results

Peg lateral incisors were restored to ideal form and proportion. Central incisor edges were rebuilt to functional and esthetic length. Opalescent incisal effects enhanced natural appearance. Patient reported a significant boost in smile confidence and satisfaction. Fig.12



Figure 12: Restorations after initial finishing and polishing. Pictures were taken to analyze the shape. Patient was called a week after for final finishing and polishing.

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. [9-15] Direct techniques, however, are more consistent with the concept of minimally invasive restorative treatment, which balances need, damage, and risk. [14-18] Fig.1,12

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. [11-21] 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.[11-19] 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. Fig.1,12 [20-31] 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.[32-35] 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. [11-18] 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.[35-37]

This case demonstrates that even in the presence of dark natural chroma, a non-invasive additive approach using GC composites and a polychromatic layering strategy can yield excellent esthetic outcomes. TE provided structural guidance; BW served as a dentin shade to manage optical depth; JE blended seamlessly into the labial enamel; OM and white tint added life-like incisal properties. The success depended on accurate shade selection, careful layering, and precise finishing. [27-35] Fig.1,12

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.[35-37]

Esthetic bonding with resin composite may be the most conservative approach because the sound tooth structure will not be removed, the procedure may not require administration of local anaesthetic, the procedure may be completed in a single appointment and the treatment is also relatively inexpensive. [38-39] Direct composite restorations can easily change the emergence profile and alter the shape and length of the tooth. It can be repaired easily and be polished and repolished to a high lustre. [38-40]

Conclusions

Aesthetic restoration such as direct veneers on the maxillary right and left peg-shaped lateral incisors gave an aesthetic, satisfactory result, and was able to maintain the mesio-distal space during orthodontic treatment. Direct composite veneers using the polychromatic layering technique can effectively restore esthetics in anterior teeth with dark chroma and morphological anomalies—without any tooth preparation. This approach preserves tooth structure while delivering highly natural results and high patient satisfaction.

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Declaration of Interest

The authors report no conflict of interest.

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