CASE REPORT

Revamping the Peg Smile: An Art of Rehabilitation of Peg Laterals with Ceramic Veneers and Composite Restorations—A Case Report

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Abstract

Background: Esthetic management of peg laterals can be involving various factors such as patient expectations, minimally invasive biomimetic treatment approach, use of biomimetic materials, clinician's skills, and experience on case selection. Among various options, ceramic no-prep veneers have been the esthetic restoration in trend for the peg laterals.

Case description: Minimally invasive bonded restorations were planned in order to provide a smile makeover for a 26-year-old male patient who had diastemas caused by peg laterals. Lithium disilicate-based ceramic no-prep veneers and composite restorations were designed, created, and bonded following diagnostic wax-up and cosmetic mock-up. The patient had a pleasing outcome.

Conclusion: No-prep veneers can be considered as a conservative means for rehabilitation which requires thorough diagnosis and vigilant selection of cases.

Keywords: Composite restoration, Dental ceramic, Lithium disilicate, Mock-up, No-prep veneers, Peg laterals.

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Background

Peg laterals are a manifestation of the developmental disorder affecting the size of the tooth, pathologically known as "microdontia". Also being referred to as conoid upper lateral incisors, these are a major cause of smile disharmony cases. Management of such peg laterals considers factors such as patient's expectations about the posttreatment smile and the experience of the practitioner. The selection of treatment type is based on functional and esthetic requirements, the need for extractions, the position of canines, and the potential for coordinating restorative and orthodontic treatment.[1]

Common treatment options for peg laterals include the following:[2–4] (1) No treatment, patient not concerned; (2) orthodontic treatment first to align the teeth in the arch; (3) direct and indirect restoration of the peg-shaped laterals to develop normal tooth morphology after orthodontic alignment. The restorative techniques include direct composite restorations, porcelain laminate veneers, metal–ceramic restorations, and all-ceramic crowns, as well as minimally invasive indirect composite veneers; (4) crown-lengthening surgery to get better gingival heights then restorative bonding; (5) extractions and implant placement; and (6) combinations of treatment in different sequences.

This case report describes a conservative line of action with bonded restorations to provide a face-lift to the previous smile caused by the bilateral peg-shaped lateral incisors.

Case Description

A 26-year-old male patient reported for management of an unappealing look in his smile caused by his smaller upper front teeth. Clinical examination revealed the presence of bilateral peg-shaped maxillary lateral incisors 12 and 22, causing disproportionate spacing between the corresponding central incisors and canines. Also, the maxillary central incisors comprised defective incisal edges. During the first visit, detailed dental photographs were obtained for documentation and preoperative analysis of the smile (Figs 1A to F). After meticulous analysis, lithium disilicate–based ceramic veneers were planned on 12 and 22. Direct composite restorations were also planned on 13, 11, and 21 to correct the disproportionate intra-arch space around the right lateral incisor (Fig. 1D) and the uneven central incisors (Figs 1C and E). The lithium disilicate veneers were to be designed with the help of diagnostic models, wax-up, mock-up, and silicone guides, while the direct composite restorations using the palatal putty index so as to restore the anatomy, size, function, and esthetics of the upper lateral incisors and the smile.

During the second visit, alginate impressions (Algitex, DPI, India) of the upper and lower arches were made, stone models were poured, and they were mounted on an articulator. A space analysis was performed and a diagnostic wax-up was done based

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Figs 1A to Q: (A to F) Preoperative diagnostic images. (A) Nonretracted full face smile—frontal view; (B) Retracted full smile—frontal view; (C) Nonretracted wide smile—12'o clock view; (D) Retracted maxillary anterior—right lateral view; (E) Retracted maxillary anterior—frontal view; (F) Retracted maxillary anterior—left lateral view; (G and H) Diagnostic wax-up; (I) Composite build-up with palatal putty index; (J) Finished composite restorations on 13, 11, and 21; (K) Loading of bis-acryl self-curing composite into silicone matrix; (L) Cosmetic mock-up; (M and N) Space verification with silicone guides; (O) Shade selection; (P) Gingival retraction; (Q) Final impression

on the smile design analysis (Figs 1G and H). There was excessive space around 12, compared to 22. To reduce the excessive spacing and to create a harmonious smile, additive waxing was done on the proximo-facio-incisal aspects of 12 and 22, and on the mesial aspect of 13, disto-incisal aspect of 11, and incisal aspect of 21. Occlusal contacts were verified. Precise silicone impressions (Photosil, DPI, India) of the wax-up were made to create the templates for the composite mock-up and preparation guides for preparation space verification. Also, a palatal putty index was made to aid the composite restorations.

At the third visit, the proposed composite resin restorations (Solare Sculpt, GC Dent Corp, Japan) were done on 13, 11, and 21. The palatal index was used as a reference guide to create the palatal shell, onto which composite layers were added to finish the restoration (Fig. 1I). The restorations were finished and polished to their final form (Fig. 1J). To achieve the cosmetic mock-up, the bis-acryl composite material Luxatemp Fluorescence (DMG, Germany) was used (A2 shade). The material was filled into the silicone key (Fig. 1K) and placed onto the teeth. The key was removed after 4–5 minutes. Precise gingival extension of the material is achieved by accurate cutting following the gingival zenith on the buccal aspect of the key. This created a clean mock-up which was very close to the expected final outcome of the restorative treatment (Fig. 1L). The glossy finish and the exact shade allowed for a satisfactory "trial run" of the patient's smile design.

At the fourth visit, the temporaries were removed from the teeth and the silicone preparation guides were used to verify the space available for the ceramic veneers (Figs 1M and N). Shade selection (A2 shade) was done using the Vita Classical Shade Guide (Vita Zahnfabrik, Germany) (Fig. 1O). A full-arch polyvinyl siloxane impression (Photosil, DPI, India) was made for the fabrication of ceramic veneers on the lateral incisors (Fig. 1Q). Gingival retraction cords (Ultrapak, Ultradent Products, USA) were placed at around 12 and 22 (Fig. 1P) to obtain a proper emergence profile and cervical adaptation despite the absence of finish lines. Based on the acquired information from the diagnostic wax-up and mock-up, the dental laboratory constructed the lithium disilicate–based ceramic no-prep veneers (IPS e.Max CAD, Ivoclar Vivadent, Liechtenstein) for 12 and 22 (Figs 2A to C). The laboratory had pretreated the intaglio surface of the veneers with 5% hydrofluoric acid (IPS Ceramic Etching Gel, Ivoclar Vivadent, Liechtenstein) prior to delivery.

During the final visit, the tooth surfaces were cleaned using a prophylaxis paste (Proxyt Prophy Paste Medium, Ivoclar Vivadent, Liechtenstein). The veneers were tried on using a water-based transparent gel (K-Y Jelly, Reckitt Benckiser, UK) to examine the color, contour, fit, and marginal adaptation. Following that, the K-Y Jelly was washed off thoroughly and the veneers were dried. The next precementation protocol was complied with. The surface of veneers was treated with 37% phosphoric acid (Etching gel, Prime Dental Products, India) for 30 seconds (Fig. 2D) to remove the debris, then rinsed, and dried. A silane agent (Silane, Ultradent Products, USA) is applied onto the etched veneer surface for 60 seconds (Fig. 2E) and air-dried. Bonding agent (Single Bond Universal, 3M Oral Care, USA) was applied (Fig. 2F), air-thinned for 5 seconds without light activation according to the manufacturer's instructions, and the veneers were kept aside. Meanwhile, the tooth surfaces were rinsed with water, dried, and isolated. Teflon tape was used to isolate the laterals and to protect the adjacent teeth, and gingival retraction cord was placed. Etching of the teeth surfaces with 37% phosphoric acid was done for 30 seconds (Fig. 2G), rinsed off, and dried. Bonding agent was applied by rubbing for 20 seconds (Fig. 2H), air-thinned for 5 seconds, and left without light activation. The veneers were luted with a light-curable, resin-based adhesive cement (RelyX veneer cement—Translucent Shade, 3M ESPE, USA). The cement was loaded onto the prepared veneer surface (Fig. 2I) and carefully seated onto the prepared tooth using slight pressure (Fig. 2J). The excess cement flash on the margins was slightly removed using a brush. An initial polymerization (tack curing) was done at the center of the veneer for 3–5 seconds. The residual luting cement was peeled off, and the interproximal remnants were cleaned using dental floss. The K-Y Jelly was applied to the margins, and the polymerization was completed by applying 40 seconds of light to each area (Fig. 2K). The gingival retraction cords and the Teflon tape were removed.

Any gross excess was removed using a No. 12 scalpel blade and gingival curettes. Edge alignment was rechecked, and occlusal alignment was confirmed with articulation paper in all jaw movements. The excess cement on the margins was finished with fine and extra-fine diamond points. The proximal surfaces were finished with fine diamond-coated strips. Spiral finishing and polishing wheels (Sof-Lex Diamond Polishing System, 3M ESPE, USA) were used for the final polishing of the restoration. Immediate postoperative photographs were taken and recorded. Figures 2L to Q shows the final result. Postcementation instructions were given to the patient.

Discussion

The esthetic disharmony of his smile was the patient's chief complaint. The concept of "smile" includes an array of components—the teeth, gingiva, lips, and facial muscles.[5,6] Any sort of deformation or derangement in any of these components could affect the overall smile of a person. This signifies the importance of oral health, particularly of teeth and gums, in giving a person a psychological boost in their confidence. Inability to flaunt their smile subconsciously affects the self-esteem of most of the population. Improvements in the field of esthetic dentistry have given multiple treatment options for patients with smile derangement depending upon the components involved and the extent of involvement. In this specific case, the obvious findings were the peg laterals along with minor discrepancies in the form of maxillary central incisors. There were no major complaints in the gingiva, the lips, or the facial structures. This permitted the plan of cosmetic modification of the involved teeth rather than any other structures.

The major esthetic disharmony in this patient was the aftermath of the malformed lateral incisors in conjunction with the diastema created. In order to address this issue, the esthetic proportions[7] of the teeth were reckoned with in the process of making the restorations. The wax-up[8,9] and cosmetic mock-up[8–10] allowed us to perceive the final outcome of the proposed restoration, and in particular, the cosmetic mock-up helped three-dimensional visualization of the patient's smile, integrating the gums, lips, and face. This favored the evaluation and approval of the expected results by the patient. The use of direct composite restorations provided a conservative and economical option to help with additional space closure around the right lateral incisor instead of partial ceramic veneers.[11] Hong et al. had also showed that closing diastema using porcelain laminate veneer was more stress-inducing in the bonded interface than when using composite resin.[12]

Among the various options given for restoration of the peg laterals, the patient wanted a minimally invasive, long-lasting esthetic solution, hence leading to the option of no-prep ceramic



Figs 2A to Q: (A to C) Fabricated lithium disilicate no-prep veneers for 12 and 22; (D to F) Surface treatment of veneers: (D) 37% H_3PO_4 etching of veneers; (E) Silane application; (F) Bonding agent application; (G and H) Surface treatment of teeth: (G) 37% H_3PO_4 etching of 12, 22; (H) Bonding agent application on 12, 22; (I) Loading of veneer luting cement into veneer; (J) Seating of veneer; (K) Light curing; (L to Q) Postoperative esthetic outcome: (L) Nonretracted full face smile—frontal view; (M) Retracted full smile—frontal view; (N) Nonretracted wide smile—12'o clock view; (O) Retracted maxillary anterior—right lateral view; (P) Retracted maxillary anterior—frontal view; (Q) Retracted maxillary anterior—left lateral view

veneers for the peg laterals. Ceramic no-prep veneers have been the esthetic restoration trend during the last decade for cases requiring additive correction.[13] Though resin-based restorations are stable, ceramics have a better color stability in a longer run. Advances in ceramic materials and adhesive dentistry have enabled all bonded-ceramic restorations to become an esthetic and functional approach to restoring smile harmony.[14] Lithium disilicate–based ceramic materials have created numerous possibilities to be used for anterior and posterior restorations due to their advantageous properties such as high esthetic potential, high mechanical strength, high edge strength, adhesive bonding strength, abrasiveness quite close to enamel, excellent quality of soft tissue response, low viscosity, and superb dimensional stability, allowing pressed restorations to be finished as thin as 0.3 mm.[15,16] These characteristics make lithium disilicate ideal for no-preparation and minimal-preparation veneers.

Conclusion

No-prep veneers can be considered as a conservative means for rehabilitation through additive modification which requires thorough diagnosis and vigilant selection of cases. Proper design and accurate treatment protocols must be developed, taking into account the various optical and mechanical qualities of dental materials since this type of conservative restoration can easily affect the thickness and result in increased contour of the teeth.

References

1. Bello A, Jarvis RH. A review of esthetic alternatives for the restoration of anterior teeth. J Prosthet Dent 1997;78(5):437–440. DOI: 10.1016/s0022-3913(97)70056-8.
2. Greenwall L. Treatment options for peg-shaped laterals using direct composite bonding. Int Dent SA 2017;12(1):6.
3. Proffit WR, Fields HW, Sarver DM. Contemporary orthodontics. 4th ed. St Louis, Mo: Mosby Elsevier; 2007. p. 751.
4. Walls AWG, Murray JJ, McCabe JF. Composite laminate veneers: a clinical study. J Oral Rehabil 1988;15(5):439–454. DOI: 10.1111/j.1365-2842.1988.tb00180.x.
5. Manjula W, Sukumar M, Kishorekumar S, et al. Smile: a review. J Pharm Bioallied Sci 2015;7(5):273. DOI: 10.4103/0975-7406.155951.
6. Londoño-Bolívar MÁ, Botero-Mariaca P. The smile and its dimensions. Rev Fac Odontol Univ Antioq 2012 ;23(2):353–365.
7. Bhuvaneswaran M. Principles of smile design. J Conserv Dent 2010;13(4):225. DOI: 10.4103/0972-0707.73387.
8. Gürel G. Discovering the artist inside: a three-step approach to predictable aesthetic smile designs, Part I. Dent Today 2013;32(5):74, 76–78. PMID: 23720999.
9. Gürel G, editor. The science and art of porcelain laminate veneers. London, Chicago, Berlin, Copenhagen, Tokyo, Paris, Barcelona, Milano, São Paulo, New Delhi, Moscow, Prague, Warsaw, Istanbul: Quintessence Publ; 2003. 525 p. [Quintessence books].
10. Lazar D. Precise mock-up. Styleitaliano.org. 2016. Available from: https://www.styleitaliano.org/precise-mock-up/.
11. Novelli C, Scribante A. Minimally invasive diastema restoration with prefabricated sectional veneers. Dent J 2020;8(2):60. DOI: 10.3390/dj8020060.
12. Hong J, Tak S-M, Baek S-H, et al. The effect of the amount of interdental spacing on the stress distribution in maxillary central incisors restored with porcelain laminate veneer and composite resin: a 3D-finite element analysis. J Korean Acad Conserv Dent 2010;35(1):30. DOI: 10.5395/JKACD.2010.35.1.030.
13. Zarone F, Leone R, Di Mauro MI, et al. No-preparation ceramic veneers: a systematic review. J Osseointegration 2018;10(1):17–22. DOI: 10.23805/jo.2018.10.01.03.
14. Alberton S, Alberton V, de Carvalho R. Providing a harmonious smile with laminate veneers for a patient with peg-shaped lateral incisors. J Conserv Dent 2017;20(3):210. DOI: 10.4103/0972-0707.218311.
15. Zarone F, Di Mauro MI, Ausiello P, et al. Current status on lithium disilicate and zirconia: a narrative review. BMC Oral Health 2019;19(1):134. DOI: 10.1186/s12903-019-0838-x.
16. Reynolds J, Robert M. Lithium-disilicate pressed veneers for diastema closure. Inside Dent 2010;6(5):46–52.