

TIPS FROM OUR READERS

Controlling the depth of ceramic veneer preparations by using a color marker in the depth grooves

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Ceramic veneers are an established conservative treatment option for the restoration of facial defects, fractures, malformation, or misalignment of teeth.¹⁻³ Various clinical studies have determined successful treatments, and reviews have confirmed the clinically acceptable longevity of veneers.⁴⁻⁷

Among the factors influencing the longevity of ceramic veneers are patient traits,⁸ the restorative materials and adhesive techniques used as determined in vivo⁷ and in vitro,⁹⁻¹² and preparation designs.^{5,6} Preparation designs influence longevity by affecting the fracture toughness and furthermore through the preparation's effect on marginal integrity.^{5,7,10,11,13-19} Marginal integrity, in turn, is dependent on dentin exposure in the margins of veneer preparations. This may lead to increased marginal leakage at the composite resin-dentin interface.^{16,20,21}

Consequently, veneer preparations should, apart from other considerations, be restricted to the enamel, especially at the margins of the preparation.²¹ Also, the depth of the preparation should allow for a thickness of ceramic of 0.6 mm in the maxilla²² and a thickness of between 0.3 and 0.4 mm ("thin veneers") in the mandible if state-of-the-art ceramic materials are being used.²²⁻²⁴

The question remains as to how these requirements can be met. Existing studies have determined that even experienced operators, when using a freehand technique, tend to remove more cervical enamel and less incisal enamel than appropriate.¹ Grooves cut as depth guides proved to be inferior, whereas dimples cut with the side of a round instrument as depth guides were superior to the

freehand technique.²⁵ Other authors have investigated the use of special depth gauge instruments for controlling the depth of veneer preparations and concluded that the use of these depth gauge instruments should be considered.²⁶ In this article, a procedure is described that controls the depth of the grooves with color marking.

PROCEDURE

1. Make a trial restoration of the planned veneers by using a silicone index and composite resin.
2. Use a depth gauge rotary instrument (No. 834, cutting depth 0.3 to 0.5 mm; Komet Dental) to cut 3 shallow orientation grooves through the trial restorations and/or enamel on the labial tooth surfaces (Fig. 1A).
3. Remove the trial restoration and mark the depth of the orientation grooves with a water-resistant red felt-tip pen (Multimark 1513 permanent F; Faber-Castell) (Fig. 1B).
4. Use chamfered diamond rotary instruments (Nos. 868B, 868, 8868; Komet Dental) for definitive contouring and finishing of the preparation (Fig. 2A).
5. During the finishing of the preparation, do not remove the red color marking completely (Fig. 2A), to ensure no more than the desired amount of enamel is removed in the contouring and finishing process.
6. Remove the red color marking with a cotton pellet soaked in 70% isopropanol and make the impression.

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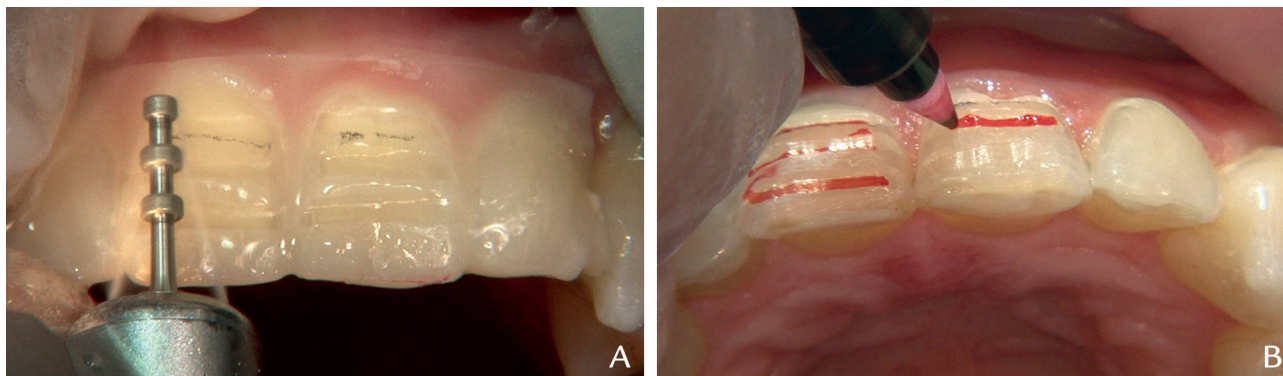


Figure 1. A, Three shallow orientation grooves were prepared through trial restoration on labial tooth surfaces. B, Mark depth of orientation grooves with water-resistant, red felt-tip pen.

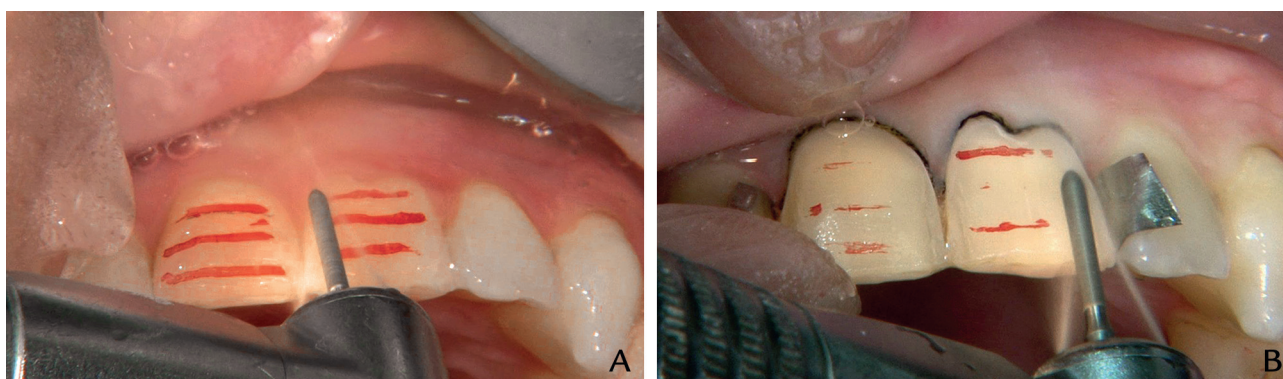


Figure 2. A, Definitive contouring and finishing was done with chamfered diamond instruments. B, During finishing, do not remove red color marking completely.

REFERENCES

- Nattress BR, Youngson CC, Patterson CJ, Martin DM, Ralph JP. An in vitro assessment of tooth preparation for porcelain veneer restorations. *J Dent* 1995;23:165-70.
- Brunton PA, Wilson NH. Preparations for porcelain laminate veneers in general dental practice. *Br Dent J* 1998;184:553-6.
- Brunton PA, Richmond S, Wilson NH. Variations in the depth of preparations for porcelain laminate veneers. *Eur J Prosthodont Restor Dent* 1997;5: 89-92.
- Beier US, Kapferer I, Burtscher D, Dumfahrt H. Clinical performance of porcelain laminate veneers for up to 20 years. *Int J Prosthodont* 2012;25: 79-85.
- Peumans M, Van Meerbeek B, Lambrechts P, Vanherle G. Porcelain veneers: a review of the literature. *J Dent* 2000;28:163-77.
- Shetty A, Kaiwar A, Shubhashini N, Ashwini P, Naveen D, Adarsha M, et al. Survival rates of porcelain laminate restoration based on different incisal preparation designs: an analysis. *J Conserv Dent* 2011;14:10-5.
- Petridis HP, Zekeridou A, Malliari M, Tortopidis D, Koidis P. Survival of ceramic veneers made of different materials after a minimum follow-up period of five years: a systematic review and meta-analysis. *Eur J Esthet Dent* 2012;7:138-52.
- Della Bona A, Kelly JR. A variety of patient factors may influence porcelain veneer survival over a 10-year period. *J Evid Based Dent Pract* 2010;10:35-6.
- Dumfahrt H, Gobel G. Bonding porcelain laminate veneer provisional restorations: An experimental study. *J Prosthet Dent* 1999;82:281-5.
- Lacy AM, Wada C, Du W, Watanabe L. In vitro microleakage at the gingival margin of porcelain and resin veneers. *J Prosthet Dent* 1992;67:7-10.
- Lin TM, Liu PR, Ramp LC, Essig ME, Givan DA, Pan YH. Fracture resistance and marginal discrepancy of porcelain laminate veneers influenced by preparation design and restorative material in vitro. *J Dent* 2012;40:202-9.
- Kedici PS, Kalipcilar B, Bilir OG. Effect of glass ionomer liners on bonding strength of laminate veneers. *J Prosthet Dent* 1992;68:29-32.
- Hahn P, Gustav M, Hellwig E. An in vitro assessment of the strength of porcelain veneers dependent on tooth preparation. *J Oral Rehabil* 2000;27: 1024-9.
- Hekimoglu C, Anil N, Yalcin E. A microleakage study of ceramic laminate veneers by autoradiography: effect of incisal edge preparation. *J Oral Rehabil* 2004;31:265-9.
- Segura A, Donly KJ, Croll TP. The effect of polymerization shrinkage during veneer placement. *Quintessence Int* 1992;23:629-32.
- Sim C, Neo J, Chua EK, Tan BY. The effect of dentin bonding agents on the microleakage of porcelain veneers. *Dent Mater* 1994;10: 278-81.
- Stappert CF, Ozden U, Att W, Gerds T, Strub JR. Marginal accuracy of press-ceramic veneers influenced by preparation design and fatigue. *Am J Dent* 2007;20:380-4.
- Wat PY, Cheung GS, Kei LH. An improved preparation for indirect porcelain veneers. *Dent Update* 1993;20:72-6.
- Dumfahrt H, Schäffer H. Porcelain laminate veneers. A retrospective evaluation after 1 to 10 years of service. Part II. Clinical results. *Int J Prosthodont* 2000;13:9-18.
- Zaimoglu A, Karaagacioglu L, Uctasli. Influence of porcelain material and composite luting resin on microleakage of porcelain laminate veneers. *J Oral Rehabil* 1992;19:319-27.
- Ferrari M, Patroni S, Balleri P. Measurement of enamel thickness in relation to reduction for etched laminate veneers. *Int J Periodontics Restorative Dent* 1992;12:407-13.
- Kunzelmann KH, Kern M, Pospiech P, Raigrodski AJ, Strassler HE, Mehl A, et al. All-ceramics at a glance. In: Introduction to indication, material selection, preparation and instertion of all-ceramic restorations. First English ed. Ettlingen, Germany: Society for Dental Ceramics; 2007.
- Ge C, Green CC, Sederstrom D, McLaren EA, White SN. Effect of porcelain and enamel thickness on porcelain veneer failure loads in vitro. *J Prosthet Dent* 2014;111:380-7.

24. Schmitter M, Seydler BB. Minimally invasive lithium disilicate ceramic veneers fabricated using chairside CAD/CAM: a clinical report. *J Prosthet Dent* 2012;107:71-4.
25. Cherukara GP, Seymour KG, Zou L, Samarawickrama DY. Geographic distribution of porcelain veneer preparation depth with various clinical techniques. *J Prosthet Dent* 2003;89:544-50.
26. Brunton PA, Aminian A, Wilson NH. Tooth preparation techniques for porcelain laminate veneers. *Br Dent J* 2000;189:260-2.

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