COMMENTARY

MICROTENSILE BOND STRENGTHS TO CAVITY FLOOR DENTIN IN INDIRECT COMPOSITE RESTORATIONS USING RESIN COATING

Roland Frankenberger, DMD, PhD*

Adhesive luting is a fundamental prerequisite for acceptable clinical survival of bonded indirect restorations such as ceramic inlays and porcelain laminate veneers.^{1,2} Although bonding exclusively to the enamel might be sufficient to guarantee good clinical behavior, an additional dentin bond is desirable in order to enlarge the adhesion area and to effectively reduce postoperative hypersensitivities.^{3–6}

However, successful dentin bonding beneath indirect ceramic or resin composite restorations is far more difficult to achieve than with direct restorations: The conventional luting technique with adhesive procedures being carried out during the second visit was shown to be compromised by temporary cements and insufficient light-curing through indirect restorations.⁷ Therefore, the most promising approach in bonding indirect restorations is sealing the dentin prior to temporizing. Dependent of the work group's origin, this technique is referred to as dual bonding,⁸ immediate dentin sealing,^{9,10} or resin coating technique,^{11–13} which all have in common that dentin is hybridized during the first visit of the patient.

The present investigation by Okuda and colleagues clearly confirms the theory that early hybridization is beneficial for internal bond strengths of indirect restorations. Furthermore, it is remarkable that the additional use of a flowable liner together with a two-step self-etch adhesive is significantly better than early hybridization with the adhesive alone.

Finally, it should be addressed that clinical outcome of indirect bonded restorations in terms of retention is still primarily dependent on durable enamel bonding. Further studies should investigate whether it may be beneficial to remove the cured adhesive and flowable resin composite from the enamel margins prior to impression taking in order to allow the etch-and-rinse technique to be carried out, because this approach is still the most promising derived from both in vitro and in vivo data.^{14–18}

REFERENCES

- 1. Kramer N, Frankenberger R. Clinical performance of bonded leucite-reinforced glass ceramic inlays and onlays after eight years. Dent Mater 2005;21:262–71.
- 2. Frankenberger R, Petschelt A, Kramer N. Leucite-reinforced glass ceramic inlays and onlays after six years: clinical behavior. Oper Dent 2000;25:459–65.
- 3. Kramer N, Ebert J, Petschelt A, Frankenberger R. Ceramic inlays bonded with two adhesives after 4 years. Dent Mater 2006;22:13–21.
- 4. Hayashi M, Yeung CA. Ceramic inlays for restoring posterior teeth. Aust Dent J 2004;49:60.
- 5. Sjogren G, Molin M, van Dijken JW. A 10-year prospective evaluation of CAD/CAM-manufactured (Cerec) ceramic inlays cemented with a chemically cured or dual-cured resin composite. Int J Prosthodont 2004;17:241–6.
- 6. Posselt A, Kerschbaum T. Longevity of 2328 chairside Cerec inlays and onlays. Int J Comput Dent 2003;6:231-48.
- 7. Frankenberger R, Lohbauer U, Taschner M, et al. Adhesive luting revisited: Influence of adhesive, temporary cement, cavity cleaning, and curing mode on internal dentin bond strength. J Adhes Dent 2006;in press.

- Paul SJ, Scharer P. The dual bonding technique: a modified method to improve adhesive luting procedures. Int J Periodontics Restorative Dent 1997;17:536–45.
- 9. Stavridakis MM, Krejci I, Magne P. Immediate dentin sealing of onlay preparations: thickness of pre-cured Dentin Bonding Agent and effect of surface cleaning. Oper Dent 2005;30:747–57.
- 10. Magne P, Kim TH, Cascione D, Donovan TE. Immediate dentin sealing improves bond strength of indirect restorations. J Prosthet Dent 2005;94:511–9.
- 11. Nikaido T, Cho E, Nakajima M, et al. Tensile bond strengths of resin cements to bovine dentin using resin coating. Am J Dent 2003;16 Spec No:41A-46A.
- 12. Jayasooriya PR, Pereira PN, Nikaido T, Tagami J. Efficacy of a resin coating on bond strengths of resin cement to dentin. J Esthet Restor Dent 2003;15:105–13.
- 13. Kitasako Y, Burrow MF, Nikaido T, Tagami J. Effect of resin-coating technique on dentin tensile bond strengths over 3 years. J Esthet Restor Dent 2002;14:115–22.
- 14. Mehl A, Kunzelmann KH, Folwaczny M, Hickel R. Stabilization effects of CAD/CAM ceramic restorations in extended MOD cavities. J Adhes Dent 2004;6:239–45.
- 15. Manhart J, Chen H, Hamm G, Hickel R. Buonocore Memorial Lecture. Review of the clinical survival of direct and indirect restorations in posterior teeth of the permanent dentition. Oper Dent 2004;29:481–508.
- 16. Schulz P, Johansson A, Arvidson K. A retrospective study of Mirage ceramic inlays over up to 9 years. Int J Prosthodont 2003;16:510–4.
- 17. Reiss B. Clinical results of Cerec inlays in a dental practice over a period of 18 years. Int J Comput Dent 2006;9:11-22.
- 18. Frankenberger R, Lohbauer U, Schaible BR, et al. Luting of ceramic inlays *in vitro*: marginal quality of self-etch and etch-and-rinse adhesives vs. self-etch cements. Dent Mater 2006;in press.

*Associate professor, Dental Clinic 1—Operative Dentistry and Periodontology, University Medical Center, University of Erlangen, Germany

Copyright of Journal of Esthetic & Restorative Dentistry is the property of Blackwell Publishing Limited and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use. Copyright of Journal of Esthetic & Restorative Dentistry is the property of Blackwell Publishing Limited and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.