COMMENTARY

CLINICAL EVALUATION OF DIRECT CUSPAL COVERAGE WITH POSTERIOR COMPOSITE RESIN RESTORATIONS Daniel L. Leonard, DDS*

The authors present a simple, well-controlled clinical study. The results are impressive, but as the authors admit, the study encompasses only 30 months with a relatively small sample size (N = 25). Their findings are as expected for short-term composite clinical studies according to a study by Brunthaler and colleagues.¹ He found a linear correlation between failure rate and observational period. He reviewed 24 longevity studies and found that 13 terminated at 36 months. He postulated that favorable composite clinical studies are frequently based on short-term results. In fairness, one must realize that the evolution of composite materials and bonding systems/techniques advances rapidly. For that reason, long-term results are of little value for materials and techniques that have become outdated or are no longer available.

Despite the relatively low number of long-term composite clinical studies, longevity data have been reported. Van Nieuwenhuysen and colleagues² reported a survival rate of 12.8 years for amalgam, 7.8 years for composite, and 14.6 years for crowns. Mjor and colleagues³ found similar results in a study of 6,761 restorations. He reported a median age of longevity for amalgam and composite to be 11 and 8 years, respectively. He also found that the longevity of restorations was shortest when placed by clinicians with limited clinical experience and longest for restorations placed by clinicians with over 30 years of experience. However, a recent clinical study evaluated Class I and Class II restorations placed between 1990 and 1997 by two dentists in general practice.⁴ The authors, using life tables calculated from data, projected a 91.7% survival rate for composite restorations at 5 years and 82.2% at 10 years. For amalgam, the survival rate was calculated to be 89.6% at 5 years and 79.2% at 10 years. The type of material (composite or amalgam) or operator did not make a significant difference in longevity; however, the number of surfaces restored was significant.

In the present study, the authors purposely restored teeth with thin remaining enamel walls based on the hypothesis that bonded restorations reinforce weakened teeth and thus present a way to preserve tooth structure. The authors have stretched this hypothesis to the extreme, but with obvious success. Conversely, amalgam restorations have no adhesive attributes and therefore clinicians routinely remove unsupported enamel walls sacrificing tooth structure, and cap the cusps for a more predictable restoration. Studies on the cusp-strengthening ability of bonded restorations are equivocal but tend to support the hypothesis. However, one of the most comprehensive studies on cuspal fracture reviewed 10,869 posterior teeth in a general dental practice.⁵ No significant difference was found in the prevalence of cuspal fracture in amalgam-restored teeth versus composite-restored teeth in patients aged 18 to 54. Patients aged 55 to 96 had a marginally significant greater incidence of cusp fracture with composite-restored teeth. Overall, there was no significant difference. Teeth with more than one restored surface, regardless of restorative material, and teeth in older patients were more likely to suffer cuspal fracture.

The restorations placed in this study were placed in an ideal controlled clinical environment using rubber dam isolation and an innovative yet sound incremental composite placement technique shown to reduce the effect of polymerization shrinkage. In addition, the study limited the patient population to those with only canine-protected occlusion and without parafunctional habits. When restoring significant occlusal anatomy, the patient's occlusion is a major determining factor in the selection of materials and design of the restoration. The overwhelming success of the restorations placed in this study may in part be a result of favorable occlusion of the study patients.

Increased composite restoration success in recent years is a result of not only improved materials and bonding systems but of increased clinician expertise, adherence to proper moisture control using rubber dams, and proper manipulation

of the materials.⁶ The bottom line remains that the average dentist can place a successful amalgam restoration regardless of technique, but only more experienced, more meticulous clinicians willing to take the time to follow proven techniques should expect long-term success with posterior composite resin restorations. It is imperative that we as professionals are familiar with the literature, understand the strengths and weaknesses of every material and technique we use, and select the best evidence-based restoration the research supports.

The present study as reported is very encouraging and I applaud the author's study design. It is hoped the authors will be able to follow these patients and their restorations into the out years and report their findings.

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