Putting Cements to the Test (9/03)

The retention of complete crowns prepared with three different tapers and luted with four different cements. Zidan O, Ferguson GC. J Prosthet Dent 2003;89:565-571.

The purpose of this study was to evaluate the retention of full crowns prepared with three different tapers and cemented with four different cements. Full veneer crown preparations were completed on human molar teeth at 6, 12 and 24 degree tapers. Impressions were made, dies were poured in stone and crowns were cast in a high noble alloy. The crowns were cemented with zinc phosphate (Fleck's, Mizzy Inc, Cherry Hill, NJ), a conventional glass ionomer (Ketac Cem, 3M ESPE, Norristown, PA) and resin cements (C&B Metabond, Parkell, Farmington, NY; Panavia, Kuraray, New York, NY). Retention was measured by separating the cemented crowns from the prepared teeth under tension on a universal testing machine. The mean strength values of the zinc phosphate and glass ionomer were significantly lower than the mean retentive strength values of both resin cements. Retention was not affected by increasing the taper from 6-degrees to 12-degrees. Increasing the taper to 24-degrees decreased the retention of the crowns significantly. Crowns luted with resin cements demonstrated significantly greater bond strengths for preparations with taper greater than 12 degrees.

DIS comment: This study suggests that the type of cement is not critical if the teeth are prepared with ideal taper (less than 12 degrees). On the other hand, the authors recommend that preparations with compromised taper (greater than 12 degrees), be bonded with resin cement to improve the chances of crown retention and clinical success. However, every effort should be made to provide ideal contours. Resin cements are much more technique sensitive and expensive. Also, tensile forces are not the only type of forces generated and the forces necessary to remove the crowns may have exceeded the maximum force levels possible intraorally. This study should have included a resin-modified glass ionomer cement as an additional group. None the less, this study does support the occasional use of a resin cement in those cases were ideal taper is not possible.