

Effect of variations from the recommended powder/liquid ratio on some properties of resin-modified cements.

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OBJECTIVES: The powder and liquid contents of cements are mixed in accordance with the recommended mixing ratio, but discrepancies occur despite the use of proportioning scoops. Little is known about powder/liquid ratio variations on certain properties of resin-modified cements. **METHODS:** Two resin-modified glass ionomer cements (RMGIC) were mixed using various powder/liquid ratios: (a) Recommended ratio: Fuji Plus: powder/liquid 2:1; ProTecCEM p/l 2.25:1. (b) Maximal variation arising using proportioning aids (17% liquid surplus): Fuji Plus 1.66:1, ProTecCEM 1.875:1. Limits of mixing and specimen construction: either (c) both groups with more liquid (1.5:1) or (d) more powder (3:1). Flexural strength was determined using a 3-point bending test (after 24 h) and wear using a 3-body abrasion device. The extent of cure reaction was characterized using differential thermal analysis (DTA). **RESULTS:** While higher powder content did not significantly affect the flexural strength of Fuji Plus and ProTecCEM, it considerably reduced wear of Fuji Plus. Increasing liquid content reduced flexural strength. A substantial increase in wear for Fuji Plus 1.5:1, and ProTecCEM 1.875:1 and 1.5:1 mixtures was observed. DTA demonstrated that a higher liquid content resulted in incomplete setting reactions, which could be detected even after 24 h of cure. **CONCLUSIONS:** If RMGICs are mixed with powder/liquid variations, given the inaccuracy of proportioning aids the properties of RMGIC will change slightly and may be disregarded. If set with higher powder/liquid variations, a surplus of powder has less influence on the properties than a surplus of liquid.

PMID: 16829496 [PubMed - indexed for MEDLINE]