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summary

Evidence suggests more favourable outcomes with preformed metal crowns than amalgam restorations in primary molars

Randall RC, VriJhoef MMA, Wilson NHF. Efficacy of preformed metal crowns vs amalgam restorations in primary molars: a systematic review. JADA 2000; 131:337–343

Objective To evaluate the efficacy of preformed metal crowns (PMC) compared with amalgam restorations in primary molars.

Data sources Medline (1972–2000) and reference lists.

Study selection Studies were included if they had clinical comparisons of longevity or success rate of PMC versus amalgam with data available to compare treatment outcomes.

Data extraction and synthesis Study treatment outcomes comparing successful and failed restorations were tabulated and odds ratios calculated. False failures were excluded where possible.

Results A total of 35 articles were identified of which 10 fulfilled the entry criteria. All but two were retrospective studies. The pooled odds ratio of 0.23 [95% confidence interval (CI), 0.190.28] favoured treatment with PMC.

Conclusions Available evidence suggests more favourable outcomes with PMC than amalgam restorations in primary molars. However, as the majority of studies included were retrospective there is an increased risk of bias.

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Commentary

The review by Randall *et al.* combined data from 10 studies of different designs and without any quality assessment of the primary work for internal and external validities. The use of data abstracted from dental charts raises several questions about the consistency of examiners when diagnosing the need for the restorations, the potential variation in criteria for placement of PMC or amalgam restorations, and the determination of success and failure of the treatments.

The review paper does not meet many of the Quality of Reporting of Meta-analysis (QUOROM) guidelines[1]. A major flaw in this meta-analysis is the lack of testing for heterogeneity of the included studies. The authors conducted a meta-analysis assuming that the studies were homogenous (a fixed-effect model). When their data were entered in the Meta-Analyst[2] we found that there was a significant level of heterogeneity ($Q = 83.29$; $P < 0.0001$). Accordingly, the use of a fixed-effect model is inappropriate and the reported CI is too narrow because the variability between the studies was ignored. When we re-analysed the data using a random-effects model, we found that the odds ratio is 0.15, not 0.23 as reported in the article, ie, the odds of success of PMC under a random-effects model are higher than reported in the article. However, the 95% CI using a random-effects model is substantially wider (0.08–0.30) than that reported in the paper (0.19–0.28).

Practitioners who advocate placing PMC on decayed primary molars may use the Randall *et al.* review to support their position. The review may indeed present strong evidence to some readers: we contend, however, that the design and quality problems associated with the primary studies included in this meta-analysis mean that the question of the success or failure of crowns versus amalgam restorations remains unanswered.

The cost implications to patients and public health programmes can be significant if practitioners decide to use of metal crowns instead of intra-coronal restorations. There is a need for data from well-conducted randomised controlled studies. Until such data are available, practitioners should use their clinical judgement to decide whether to place metal crowns on primary teeth.

1. Moher D, Cook CJ, Eastwood S, Ollkin I, Rennie D, Stroup DF. Improving the quality of reports of meta-analyses of randomized controlled trials: the QUOROM statement. Lancet 1999; 354:1896–1900.
2. Lau J. Meta-Analyst. Boston: New England Medical Center.
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