Aesthetic preformed crowns for primary teeth

Abstracted from

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Aesthetic preformed paediatric crowns: systematic review.
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Question: What is the clinical effectiveness of aesthetic preformed crowns (APC) for restoring primary teeth compared to conventional fillings materials or other types of crowns?

Data sources Medline, Cochrane central register of controlled trials, US National Institutes of Health Trials Register and the World Health Organization International Clinical Trials Registry Platform.

Study selection English language randomised clinical trials comparing APCs with conventional restorative techniques for primary teeth.

Data extraction and synthesis Study selection and data abstraction were conducted independently by two reviewers. Risk of bias was assessed using the Cochrane risk of bias tool. Study characteristics and results were described qualitatively. Meta-analysis was not conducted.

Results Seven studies were included, six reported on primary molars and one on primary incisors. There was great variety in the design of the RCTs, however, all compared pre-veneered stainless steel crowns (SSCs) with other crowns or two different pre-veneered SSCs. The risk of bias in all studies was high with significantly different outcome measures used.

Conclusions SSCs cannot be replaced by APCs for restoring decayed primary molar teeth due to the insufficient quality of evidence available. After a follow-up of only six months, zircon crowns gave significantly better results than the others regarding gingival health and crown fractures. Due to the small number of RCTs on this topic and their risk of bias, future RCTs should be carried out in primary teeth.

Commentary

Oral conditions are reported to affect 3.9 billion people worldwide with Marcenes *et al.*[1] reporting that untreated caries in the deciduous dentition was the tenth most prevalent condition affecting 9% of the global population.[1]

British Society of Paediatric Dentistry guidelines recommend that preformed metal crowns are appropriate for managing decayed primary molars when there are more than two surfaces affected or where one or two surface carious lesions are extensive.[2] The traditional method of complete caries removal was advised in this guideline, however, minimally interventive approaches of placing preformed metal crowns using the Hall Technique, have revolutionised the way decayed primary molars are managed.[3-5] Using the Hall Technique overcomes the need for tooth preparation, which inevitably would require local anaesthesia, and therefore allows for the restoration of decayed primary molars in children who historically may have not coped with the traditional approach.

Some parents or patients may complain about the appearance of preformed metal crowns.[2,5] Aesthetic crowns are of growing interest in the management of decayed primary molars but are not commonly used due to the need for tooth preparation, inability to place using the Hall Technique and the high potential for fracture of the material.[2,4]

This systematic review focuses on the clinical effectiveness of all types of aesthetic preformed crowns for restoring primary teeth (both anterior and posterior) compared with conventional fillings materials and other types of crowns. Clinical effectiveness is non-specific as a primary outcome as it will often encompass quite specific clinical and radiographic outcome measures, such as associated pain, pathology, longevity of restorations etc. As such, the aim of this review was rather vague in terms of PICO, and the authors could have been more precise with their primary outcome measure. Keywords were used to search electronic databases, Medline and Cochrane central register of controlled trials, up to March 2016. A specific search strategy, including Boolean terms, was not provided. The authors searched the US National Institutes of Health Trials Register and the World Health Organization International Clinical Trials Registry Platform for ongoing trials. The reference lists of selected studies were screened, however, specific paediatric dental journals were not hand searched. Published randomised clinical trials were only included in this study with case series, descriptive and *in vitro* studies being excluded. Although low in quality, case series can provide important data when there are limited published

studies available for the topic. Only studies reported in English were considered for this review.

The screening and assessment of eligibility process was clearly described and displayed in a PRISMA flowchart. Screening was carried out independently by two reviewers with data extraction performed in a similar way. Disagreements in data extraction were resolved by discussion between the two reviewers and where they could not be resolved, through a consultation with a third reviewer. A measure of intra-rater and inter-rater reliability was not provided. After 527 records were identified (following the removal of duplicates), seven articles (five studies) were included for qualitative synthesis. The authors were unable to complete a meta-analysis due to the significant variation in study methodology and outcome measures used in the included studies. Risk of bias was assessed independently by two reviewers, following the domain-based evaluation described in the *Cochrane Handbook for Systematic Reviews of Interventions*. This was displayed in a table that showed the authors' judgements on each risk of bias item for each included study. The overall risk of bias was high mainly due to the insufficient information being available to make a clear judgement on selection, attrition and reporting bias. Due to the nature of the clinical intervention being studied, adequate blinding of participants and assessors will always prove challenging.

The four studies identified on primary molars greatly varied in their methodology, which prevented the authors from making any recommendations. The authors summarise each study in a table, which enables easy comparisons across studies. The information included in this table was as follows: country of study; type of study; length of follow-up; number of patients and/or teeth; presence/absence of a sample size calculation; intervention and controls; outcome measures; overall risk of bias for each item; and overall results. It is evident from the authors' narrative review that sufficient lack of detail in each study on the use of anaesthesia, any adjunctive endodontic treatment and the total number and calibration of operators and assessors is reported. The main reported outcome measures were related to the gingival health and failure of the pre-veneered aspect of the APCs. The rationale behind restoring a tooth with an APC is to provide a restoration with superior aesthetics to SSCs, however, the interventions being tested were either a pre-veneered SSC or open-faced SSC which does not truly overcome the aesthetic concerns potentially raised by patients or parents. Unfortunately, the authors of this review failed to report that none of the studies addressed the aesthetic concern in their outcome measures, with only one study identifying parental satisfaction with the ease of placement.

The authors did identify one ongoing trial which is comparing zircon crowns with conventional SSCs as the control, in 3–7-year-olds over a follow-up period of 48 months, on 50 paired and prepared first and second primary molar teeth. The results from this study will be interesting, however, it is essential that aesthetic satisfaction is measured as well as the clinical and radiographic outcomes proposed by the trial.

Only one study was identified on anterior primary teeth which showed favourable results for zircon crowns in terms of restoration failure and gingival health when compared to composite strip crowns. The authors report this study alone cannot change clinical practice, as the duration of follow-up was limited to six months, in addition to the high risk of bias in the clinical study.

The authors do not mention that omitting non-English studies could have resulted in important findings not being assessed. The authors confirm that due to the risk of bias in the included studies it cannot be recommended that aesthetic preformed crowns should replace stainless steel crowns, despite the poor aesthetics. With the growing evidence base for a biological approach to caries management in the primary dentition (ie Hall Technique) there is a question over the need for aesthetic crowns, given the need for tooth preparation and local anaesthetic.

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