

In deep cavities stepwise excavation of caries can preserve the pulp

Abstracted from

Hayashi M, Fujitani M, Yamaki C, Momoi Y.

Ways of enhancing pulp preservation by stepwise excavation – a systematic review. *J Dent* 2011; 39: 95-107.

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Question: When undertaking stepwise excavation of deep caries in permanent teeth what methods and materials are most effective?

Data sources Medline and the Igaku Chuo Zasshi (Japanese) databases, the reference list of identified studies and personal reprint collections of authors were searched.

Study selection Randomised controlled trials (RCT), controlled clinical trials (CCT) and case series conducted in permanent teeth were included.

Data extraction and synthesis Two independent reviewers extracted the data using specially designed forms. A qualitative synthesis is presented.

Results Ten English and three Japanese studies were finally included (two RCTs, five CCTs and six case series).

Conclusions From this review, stepwise excavation can be concluded as effective for pulp preservation in extremely deep caries where there are no clinical symptoms of irreversible pulpitis. Calcium hydroxide and other materials, such as antimicrobials and polycarboxylate cement combined with tannin fluoride preparation, have been shown to be effective in reducing bacteria after stepwise excavation. Further clinical trials with high levels of study design in this research field are needed to identify the best possible methods for removing carious dentine during stepwise excavation.

Commentary

The present systematic review has included various study designs, as the number of randomised clinical trials is sparse in relation to stepwise excavation, and well-designed tables are presented, with focus on qualitative aspects. However, one of the biggest dangers in non-randomised trials would be confounding by indication, where you run the risk of an uneven distribution of prognostic factors. One such factor is the poor definition of lesion size, which was not critically commented on by the authors. In a few trials within this review, the lesion size is defined as 25% of the dentin and more,¹ whereas in another it is limited to only 2/3 of the dentine. In nine of the trials the deep lesion is defined as causing a pulp exposure if the conventional complete removal of caries has been carried out. This variation may play a role in the various outcome measures. In this light the use of the term extreme deep caries applied in the conclusion seems not to be fully justified. The present review is somehow examining

the effectiveness of stepwise excavation at a stage where it could be argued that we may not have sufficient evidence for choosing this particular treatment modality as opposed to others. This could appear beyond the scope of the review but it needs some attention. The only included RCT² in this present review that investigates the effectiveness of stepwise excavation versus the one completed excavation is not a so-called high-quality trial. In particular, the inadequate allocation sequence reported in this trial may exaggerate the treatment effect as shown by others.³ After this review was conducted, a high-quality RCT has been published comparing the stepwise excavation versus the conventional complete removal of caries.⁴ This trial provides more evidence in favour of stepwise excavation. An absolute risk reduction of 11.7% was found in favour of the less invasive stepwise excavation, when lesions were located within the inner ¼ of the dentin. However, we do not yet have enough information to recommend not conducted new RCTs. For more information the readers may consult references explaining when firm evidence is reached in cumulative meta-analyses using a trial sequential analysis.^{5, 6} Several materials seem to reduce the number of bacteria after stepwise excavation, but much less is known concerning the clinical outcome after long-term follow-up examinations. The present review is not able to select a particular stepwise excavation procedure in favour of another, as also indicated by the authors. Finally, I would suggest that more research is still needed to confirm that stepwise excavation as opposed to other treatment modalities may be the treatment of choice for the best preservation of the pulp in relation to the treatment dilemma of the deep caries lesion.

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Evidence-Based Dentistry (2011) **12**, 68. doi:10.1038/sj.ebd.6400803