Summary of: A comparative study of bonded and non-bonded amalgam restorations in general dental practice

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VERIFIABLE CPD PAPER

FULL PAPER DETAILS

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Objective This study compared the performance of non-bonded and bonded amalgam restorations in a general dental practice. **Materials and methods** A retrospective cohort study was carried out in a general dental practice of amalgam restorations, placed by a single operator. Non-bonded amalgam restorations were analysed over a ten-year period and bonded amalgam restorations over a five-year period. Survival analysis using the Kaplan-Maier method was carried out and an analysis of postoperative sensitivity and reasons for failure. **Results** Each group consisted of 231 restorations in 135 patients. Survival rates of non-bonded amalgam restorations were 72.2% over five years and 51.0% over ten years. The survival rate for bonded amalgam restorations was 85.0% over five years. The difference was significant ($p < 0.0001$, 95% CI 1.510–3.226). Analysis of postoperative sensitivity and reasons for failure were inconclusive. **Conclusion** Within the limitations of the study, bonded amalgam restorations demonstrated greater longevity over non-bonded amalgam restorations and offer significant benefit to patients. Clinicians may feel confident to offer bonded amalgam restorations for their patients as a better alternative than non-bonded amalgam restorations.

EDITOR'S SUMMARY

The *BDJ* is very keen to encourage practice-based research to the extent that we are now sponsoring a prize at International Association of Dental Research meetings for the best poster presentation on the subject. It is therefore very pleasing to be able to publish this paper which reports the results of many years of careful work in a general dental practice in the UK.

Not only does the paper indicate the ways in which practice-based research can be achieved, it also touches on some of the considerable problems not only with this type of research but of research in general. These observations are also useful in both alerting potential researchers to the hurdles to be overcome as well as guiding possible future projects.

Amalgam as a restorative has been frequently in the news in recent times, albeit for the controversial mercury-

containing headlines rather than the more mundane but nonetheless important characteristics of its still widespread use in the UK and around the world. What is interesting in this paper is the detail of how amalgam has been developed as a material over the years in terms of its constituents, improving manipulation and consistency, and in terms of its clinical value in relation to changing philosophy of cavity design and adhesion to tooth tissue.

The need for narrative as well as bare scientific facts is highlighted here in the analysis of why bonded amalgam restorations seem to have a greater longevity than the non-bonded variety. Time, technique and experience all play their part. The allusion to the differences between restorations placed under NHS contract and private arrangements, while not the primary thrust of the work, provides a valuable reminder that it is not only the materials themselves

that dictate clinical parameters but also the oral healthcare system under which they are placed.

Overall, a great example of what can be achieved in general dental practice.

The full paper can be accessed from the *BDJ* website (www.bdj.co.uk), under 'Research' in the table of contents for Volume 214 issue 7.

Stephen Hancocks

Editor-in-Chief

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IN BRIEF

- Describes a bonded amalgam technique, which can be readily applied in general dental practice.
- Reports that the longevity of bonded amalgam restorations is greater than non-bonded amalgam restorations over a five-year period.
- Discusses some of the limitations and variables associated with bonded amalgam restoration placement, which may be relevant in other settings.

COMMENTARY

It is amazing that since the widespread acceptance of dental amalgam as a restorative material, founded upon the scientific endeavours of many including G.V. Black,¹ that 100 years on there is still much to learn about its application.

The present paper reports the durability of bonded and non-bonded amalgam restorations within general dental practice. Such a technique offers clear advantages over conventional non-bonded placement such as conservation of tooth substance, avoidance of dentine pins and micro leakage reduction. On the negative side it is more time consuming and expensive to carry out, through use of bonding materials. This research is carried out meticulously by a single operator in general dental practice who should be commended for this and therefore represents real data as compared to a trial in an academic institution. I have no problem with this having been involved in similar work myself.² Often such studies are found to be wanting when evidence-based reviews are conducted, but funding for the recommended multi-operator randomised controlled trials remains elusive. It is acknowledged that the placement of bonded restorations was carried out under private contract and occupied more time than the non-bonded control restorations placed under NHS regulations. This, together with the investigator's further post-graduate training, may potentially explain the better performance of the bonded restorations. The paper reviews the development of modern bonded

amalgams well. This clinical concept is not, however, new, for in 1897 Baldwin³ advocated the placement of dental amalgam upon setting zinc oxyphosphate cement in an endeavour to achieve the same end. Although at first glance in the present study it would appear that there were proportionately more failures of bonded amalgams this is an erroneous reading, for in over 70% of cases the reasons for failure of non-bonded amalgams was not recorded in the clinical notes compared to only 18% of those bonded. Although bonded restorations outperformed non-bonded, others² have observed a possible time dependent failure of bonded amalgams of around 1,800 days. This is beyond the follow-up period of this study and it will therefore be of interest to see which finding is corroborated in future studies. A factor not considered by any bonded amalgam study to date is the ease of removal of a failed bonded amalgam and the attendant consequences upon the resultant cavity size. Thus, despite the antiquity of dental amalgam there is still need for further research.

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AUTHOR QUESTIONS AND ANSWERS**1. Why did you undertake this research?**

The principles behind bonded amalgam restorations are well established, but how do they compare with non-bonded amalgams? And how relevant are the results obtained in academic settings? When discussing treatment options we should be able to answer the patient's question: how long will it last? As clinicians, we should be able to provide answers based on reliable evidence. I was aware that there was little published evidence of direct comparisons and as I had been in practice for many years and could access many years of clinical records, I endeavoured to answer these questions.

2. What would you like to do next in this area to follow on from this work?

The most natural extension of this work would be to carry out a further review at the ten-year stage for bonded amalgams to complete the comparison of the existing data. However, this would still only be a retrospective study and more reliable data could be obtained by carrying out a prospective study, ideally using several operators, perhaps using a double-blind crossover approach. The practicalities of undertaking this type of study may be difficult to overcome and may be of limited value if amalgam is eventually banned. Considering other forms of restoration, the opportunity for GDPs to perform this type of investigation is limited but the potential benefits are immense. Consideration by the relevant authorities should be given to making research easier for GDPs to carry out in their own practices.