Summary of: The failure rate of NHS funded molar endodontic treatment delivered in general dental practice

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VERIFIABLE CPD PAPER

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Objective To describe the quality and record the outcomes of root canal therapy on mandibular, first permanent molar teeth provided by GDPs working according to NHS contracts. **Design** Descriptive, retrospective cohort study. **Setting** Twelve general dental practices in Salford, North West England. **Subjects and method** All patients aged 20-60 years attending the practices who had received a NHS-funded root filling in a mandibular first permanent molar between January 1998 and December 2003. The radiographic quality of root fillings in the teeth was assessed by an endodontic specialist and categorised into optimal, suboptimal and teeth which had no radiograph, or an unreadable radiograph. Teeth were also dichotomised into those restored with a crown and those restored with an intracoronal restoration. Failure as an outcome was defined as if a tooth was extracted, the root filling was replaced or periradicular surgery was performed on the tooth. Crude failure rates per 100 years were calculated for optimally, sub-optimally root filled teeth and for those with no or an unreadable radiograph, and according to how the tooth was coronally restored. Survival was assessed using Kaplan-Meier curves and Cox proportional hazards were used to determine factors linked with increased failures. **Results** One hundred and seventy-four teeth were included in the study, of which 16 failed. The crude failure rates per 100 years with a root filled tooth were very low and differed little ($p = 0.9699$) for optimally (2.6), sub-optimally (2.5) root filled teeth and for those with no or an unreadable radiograph (2.9), with approximately one in 37 root filled mandibular first molar teeth failing each year. The majority of root fillings fail within the first two years (N = 10, 62.5%). Some 67 teeth (38.5%) were restored with a crown, none of which failed during the follow up period compared to those with a plastic restoration ($p = 0.0004$). **Conclusions** The very low failure rates have significant implications for the design of research studies investigating outcomes of endodontic therapy. The similar failure rates for teeth that had optimal and suboptimal root fillings suggest that endodontic treatment is not as technique sensitive as previously thought. The results also support the notion that the coronal restoration is more important than radiographic appearance of the root filling.

EDITOR'S SUMMARY

It is intriguing to note just how many layers there are to dentistry, how many variants in treatment modes and how many options in measuring outcome. This study highlights these different layers in relation to one operative procedure under one system of remuneration: molar endodontics provided under NHS contract.

In theory, the measure of success should be reasonably straightforward. Has the treated tooth survived symptom free for a given period or not? That might be the patient's main criterion but the clinician has others by which to assess his or her achievement, such as the radiographic appearance of the apex and the quality of the root filling itself. Where the truth lies no doubt depends on who looks at the figures. A specialist endodontist might be horrified; a politician somewhat pleased to learn that so many root treatments were still done on the NHS despite all the apparent problems of access (that's access to treatment, not access to the root canals). The researchers do point out that this is a relatively small scale study and that because of the low failure rates larger study designs will be required in future to make the results more meaningful. However, the fact that they also conclude that endodontic treatment is not as technique sensitive as previously thought is particularly revealing.

Using another measure entirely, associated with, but not directly pertaining to the endodontic therapy, that of the success of restorative dentistry, the presence of a crown would seem to be the determining factor, since all crowned, root treated teeth were 'successful'. This compared unfavourably with those restored using an intracoronal restoration.

One other large element dominates this subject though, the influence of the system of remuneration under which this treatment is provided. Or not provided.

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IN BRIEF

- Mandibular first molar root fillings have low failure rates over a five-year period.
- Failure is most likely to occur in the first year following placement of the root filling.
- Failure rates are similar for optimal versus sub-optimal appearance of root-fillings on radiographs.
- Coronal restoration is an important predictor of survival with crowns performing better than plastic restorations.

How many teeth were not treated in this way but extracted because of the system? And now that the system has been changed, what influence will that have, not on the success of molar endodontics but on the provision of the treatment at all? Many layers.

The full paper can be accessed from the *BDJ* website (www.bdj.co.uk), under 'Research' in the table of contents for Volume 204 issue 5.

Stephen Hancocks,
Editor-in-Chief

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COMMENT

This is a very interesting paper that will make many practitioners stop and think. The authors report the findings of a retrospective study of the outcome of root canal therapy performed by 12 general dental practitioners. Whilst the study suffers some limitations, which the authors have acknowledged, the results are surprising. The authors conclude that root canal therapy performed in a sub optimal manner appears to work as well as optimal treatment if a simplified measure is used to assess the outcome of treatment. We must be cautious however not to throw the baby out with the bath water. Central to the success of root canal therapy is chemomechanical preparation of the root canal system, not the placement of a technically perfect root canal treatment, although this is desirable. Put simply, any root canal system if appropriately cleaned, disinfected and shaped can be sub-optimally obturated and a successful outcome is likely particularly in the shorter term. A good coronal seal will significantly enhance the outcome of endodontic therapy which the findings of this study support. There is no way of knowing how well these particular cases were cleaned and shaped and therefore the study must be interpreted carefully and more research is required to confirm the findings of this study. The point about radiographs is well made and I believe the guidelines for endodontic radiography need revision let alone the criteria for assessing the success of endodontic treatment. This has at least highlighted the need to develop patient centred guidelines that define what successful root canal therapy actually is.

P. A. Brunton, Professor of Restorative Dentistry, Leeds Dental Institute

AUTHOR QUESTIONS AND ANSWERS

1. Why did you undertake this research?

The majority of endodontic treatment in the UK is provided by GDPs. In 2003 approximately £100 million was spent by the NHS in England and Wales on endodontic treatment. We have little information on the outcomes of this treatment provided by GDPs under NHS terms and conditions. There have been concerns that the outcomes of NHS molar endodontic treatment would be poor due to the comparatively low fee for providing what is a technically demanding treatment. Therefore it was important to provide some understanding of the outcomes of this care provided by GDPs under NHS contracts.

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

This study shows that undertaking studies of the outcomes of endodontic treatment is very difficult as failure is infrequent. Therefore for intervention studies and prospective cohort studies large numbers of subjects are required to test for statistically significant differences between groups. Perhaps this study provides some pointers about a broader research agenda that dentistry desperately needs, concerning what constitutes quality and how do we measure it. Professional ideals of quality need to be compared with patient centred outcome measures of care to start to form a new consensus about defining quality of patient care.

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