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**Trevor Burke**

# WARNING: Crowns may be bad for the health of (posterior) teeth

The perceived wisdom, when Trevor was a boy at dental school, was that, if a cusp broke, or fell off, a posterior tooth, the correct treatment was to take a 556 diamond bur in a turbine handpiece and prepare the tooth for a gold crown. Indeed, a respected textbook of the time suggested this, advising the placement of a crown if and when 'teeth are so carious that they cannot be restored with amalgam or a gold inlay' or, by inference, if a cusp was lost.<sup>1</sup> The concept of minimally invasive dentistry had yet to dawn! However, results in recent publications,<sup>2,3</sup> on the survival of crowned posterior teeth, have challenged this concept: indeed, they confirm how wrong the concept was.

I confess to some bias, because I was co-author, along with Dr Steve Lucarotti, of a series of papers analysing a dataset<sup>4</sup> consisting of General Dental Services' patients, this being obtained from all records for adults (aged 18 or over at date of acceptance) in the GDS of England and Wales between 1990 and 2006. The data consisted of items obtained from the payment claims submitted by GDS dentists to the Dental Practice Board (DPB) in Eastbourne, Sussex, UK. The sheer size of the dataset, amounting to over 10 million restorations followed for 16 years, allowed not only analysis of how long restorations last, but also how long the restored tooth survived, which arguably is the more important benchmark. One paper<sup>5</sup> examined the key findings from nine publications with regard to recorded

intervals between placing a restoration in any tooth and re-intervention on the tooth, and time to extraction of the restored tooth, while a further two studies examined the time to extraction of restored molar teeth and survival of crowns and crowned teeth in general.<sup>2,3</sup>

Looked at in more detail, the crowning of a tooth, with the attendant need to remove tooth substance in a tooth which might already be challenged, places the tooth one step further on the road towards extraction, with possible sequelae along the way, such as the need for root canal treatment. Nevertheless, a crown provides the patient with a restoration which requires the least number of interventions at 15 years. However, on molar teeth, when survival of the restored tooth to extraction is examined, crowns do not represent the optimally performing restoration in the under 40-year age groups, leading to earlier loss of the tooth: in that regard, I find it difficult to suggest a reason for crowning a posterior tooth for a young patient – in an anterior tooth it may be due to trauma, but this is unlikely in a posterior tooth. In older age groups (over 60 years) a crown presents a better survival to extraction of the restored tooth. Therefore, when examined in terms of lifespan of molar teeth, the crown is only a good option in the older age groups, with the data indicating that it is better to keep a molar tooth going with a direct-placement restoration for as long

as possible. How are these apparently contradictory findings explained? I suggest that, when a direct placement restoration fails, it can be replaced, but crown failure is a more catastrophic event for the tooth.

How treatments have performed in the past may provide hints which may help us decide what might work clinically in a given situation, with Stephen Hancocks, in a *British Dental Journal* editorial, suggesting that 'we can apply what we have observed of actual behaviour in the past to decision making in the future.'<sup>6</sup> Dentine pins are an example. Of course, in my earlier clinical days, I used dentine pins and, of course, they always went vertically into the dentine, not into the pulp, and not into the periodontal membrane. Rubbish, readers cry! Of course, there would be some in the wrong place. From the data,<sup>7</sup> teeth restored with a restoration which included one or more dentine pins performed *circa* 8% less well in terms of time of restored tooth to extraction or survival of the restoration. There may be a potential confounding factor here, given that cavities in which pins are/were placed may be larger than average but, nonetheless, it seems loud and clear that dentine pins are history. There are alternative, contemporary solutions, the use of adhesive techniques such as bonded amalgams being one (although these appear to have gone out of fashion), while dentine bonding and resin composite are the obvious solution, especially given the promising early reports of the performance of the recently-introduced Universal bonding agents.<sup>8</sup>

Finally, the recently-published comments of Opdam and Hickel<sup>9</sup> are worthy of note. In writing about Operative Dentistry in the present changing environment, they stated that, in the past, 'it was assumed that crowns protected damaged teeth'. That was the reasoning in an earlier era (alluded to earlier), which we now know to be misguided. These authors added that 'the bur can remove more tooth substance in a few seconds than caries can destroy in months or years'. The results of the recent results from the massive dataset concur with this statement and serve as

a **warning**: that crowning a molar tooth in younger patients is not good for the lifespan of the tooth. Therefore, the least invasive treatment, involving the least removal of (sound) tooth substance, should be used as the early options for carious or fractured molar teeth, with a crown only being considered when the patient is much older.

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