Distal cervical caries in the mandibular second molar: an indication for the prophylactic removal of third molar teeth? Update

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Abstract

In 2005 we reported the clinical findings of 100 patients who had mandibular third molars removed because of distal cervical caries in the mandibular second molar. The aim of this follow-up study was to find out whether the findings in a new group of patients corroborate those of our previous study. We report on the clinical features of 239 patients (mean (SD) age 32.1 (7.85) years, range 20–65) who had 288 mandibular third molars removed because of distal cervical caries in the second molar. Patients had better dental health than average, and 67% had a DMF (decayed, missing, or filled) score of 5 or less. In 89% of third molars the mesial angulation was between 40° and 80°. Distal cervical caries in second molars is a late complication of third molar retention. The prophylactic removal of a partially erupted mesioangular third molar will prevent distal cervical caries forming in the second molar tooth.

Keywords: Third molar; Indications; Distal cervical caries

Introduction

Current UK clinical guidelines for the management of third molars advise against the prophylactic removal of healthy impacted teeth, and suggest that there is no reliable evidence to support it. Consequently, current practice is to remove teeth only if they cause disease.

Partially erupted, mesioangular impacted mandibular third molars that are in contact with the second molar around the amelocemental junction put the second molar at risk of developing distal cervical caries (Fig. 1), which is a carious lesion that forms on the distal cervical root surface of the second molar. Mesioangular impaction of the third molar on to the second molar creates a deficient gingival collar and exposes the distal root surface of the second molar to the oral environment. The area is difficult to keep clean so dental plaque forms and persists, and results in distal cervical caries in the second molar. The third molar must be removed to enable restoration of the second molar, but in certain cases this might not be possible, and the second molar may also need to be extracted.

In 2005 we reported on 100 patients who had mesioangular impacted third molars removed because of the presence of distal cervical caries in the second molar. They tended to be 5 years older than the average for patients having third molars removed and their dental health was also better than average. We suggested that these patients presented with distal cervical caries because earlier in life they had not had any serious third molar disease such as pericoronitis, which would have indicated removal of the tooth. Consequently, retention of these teeth promotes the formation of distal cervical caries in the second molar.

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The aim of this follow-up study was to assess a further group of patients with distal cervical caries in their mandibular second molars to find out if the findings corroborated those of our 2005 study.

Methods

We evaluated 239 patients who had mandibular third molars removed because of the presence of distal cervical caries in the second molar. Data were prospectively collected over a 24-month period.

The variables that we recorded were sex, age, angulation and eruption status of the third molar, DMF (decayed, missing, or filled) score, and the proximity of the third molar to the amelocemental junction of the second molar.

As in our previous study, the DMF score was used as a measure of dental health. In calculating the score we compensated for, and excluded, the second molar if distal cervical caries was the only lesion associated with the tooth. The mesial angulation of the third molar was calculated by measuring the angle of intersection between the mandibular occlusal plane and the occlusal plane of the third molar. This angle equates to the mesial inclination of the third molar relative to the second molar.8

Results

The study included 239 patients (142 men and 97 women). In 190 patients, a single second molar was affected, and both were affected in 49 (bilateral disease). In total, 288 mandibular third molars were extracted, 144 from each side.

The mean (SD) age of the patients was 32.1 (7.85) years (range 20–65) (Fig. 2). A total of 161 patients (67%) had a DMF score of 5 or less; 56 (23%) had a score of between 6 and 10, and 22 (9%) had a score of 11 or more. Of note, 50 patients (21%) had a compensated DMF score of zero as the only lesion was the distal cervical caries associated with the second molar tooth.

Discussion

To our knowledge, distal cervical caries in the second molar has not been reported without an associated mesioangular third molar, and we have not observed it. Although caries can form on the distal aspect of any tooth, distal cervical caries is unique as it is seen at the amelocemental junction and is, in effect, a variant of root surface caries. We think that it would not develop without an associated impacted third molar.

Concern has been raised that in some studies, radiographic cervical burnout may have been misdiagnosed as distal cervical caries resulting in a higher reported incidence.9 In this study, as in our previous study, patients whose radiographic images suggested cervical burnout were excluded from the study (Fig. 3).

A factor that is associated with the risk of distal cervical caries developing in the second molar is the angulation of the third molar. This type of second molar caries is seen

Fig. 1. Radiograph of distal cervical caries in the mandibular second molar with associated impacted mesioangular third molar.

Fig. 2. Age range of patients (years) compared with percentage number of patients. Mean (SD) age 32.1 (7.85) years (range 20–65).

All 288 teeth were partially erupted. Radiographic examination showed that all were in contact with, or close to, the amelocemental junction of the second molar, and all were mesioangularly impacted against the second molar. Mesial angulations of the third molars were grouped accordingly: 255 (89%) had an angulation of between 40° and 80°; in 28 (10%) it was less than 40°, and in 5 (1%) it was more than 80°.

Fig. 3. Radiograph of radiographic distal cervical burnout potentially misinterpreted as distal cervical caries.
primarily in association with mesioangular impacted third molars and, as in other studies, we found that a mesial angulation of between 40° and 80° was common. Of the 288 third molars extracted, 255 (89%) were within this range. Mesial angulations out with this range and in some cases of horizontal impaction have been associated with distal cervical caries in second molars, but it has not been seen in vertical or disto-angular impactions.

Based on the 2009 Adult Dental Health Survey (ADHS), the mean DMF score for patients with distal cervical caries was less than half the mean score for similar age groups in the general population (Fig. 4). This also corresponds to our findings in 2005 which were based on the 1998 ADHS. It supports our suggestion that patients with better dental health are more likely to retain a partially erupted third molar later into life, and when this is mesioangular, are at risk of distal cervical caries developing in the second molar. It also contradicts the notion that susceptibility to distal cervical caries in second molars is solely associated with an increased susceptibility to dental caries.

It is logical to assume that people with low DMF scores have a good standard of oral hygiene and this includes the coronal aspect of partially erupted third molar teeth. Good oral hygiene minimises the likelihood of pericoronitis and results in the long-term retention of such teeth, but in the case of a mesioangular third molar and a second molar with a distal cervical root exposed to the oral cavity, distal cervical caries is a potential outcome. It seems to develop in older patients and this may be reflected in the protracted time it takes for dental caries to form compared with the time it takes for pericoronitis to develop after a third molar has erupted.

The mean age of patients in this study was 32.1 years (range 20–65), which is comparable with the mean age (32 years) for all patients who have third molars removed in the UK. In our previous study patients with distal cervical caries tended to be 5 years older than average whereas this study suggests that they are similar in age. This may be because in the UK, the introduction of third molar guidelines by the National Institute for Health and Care Excellence (NICE) and others has resulted in a shift away from the prophylactic removal of third molars, primarily in younger patients, to removal based on definitive clinical indications. The consequence of this has been an increase in the mean age of patients from 28 to 32 years. The incidence of third molars being removed because of caries and related sequelae such as periapical infection has also increased from 4% to about 30% (Fig. 5). The mean age in our group suggests a relation with an increased mean age and a higher incidence of third molar caries in general, as is the case with an increasing incidence of distal cervical caries in older patients.

It is not possible to isolate data from NHS agencies on caries that solely affect the third molar or on distal cervical caries of the second molar that is attributed to the third molar, but the general trend of an increase in caries related to third molars is noteworthy. Distal cervical caries in second molars in association with impacted third molars is becoming more widely reported, and is not isolated to any specific racial group. Recent studies have reported an incidence of up to 20% in patients having third molars assessed, and some report an incidence of about 40% in mesioangular impacted third molars.

Older studies report a mean age of around 25 years for patients having third molars removed, and report pericoronitis as the most common indication. As these studies were published when the prophylactic removal of third molars in younger patients was common, their mean age was lower. The incidence of third molars being removed because of caries in younger patients is relatively low, and historically the reported incidence of distal cervical caries in second molars in these patients has also been relatively low (2–5%).

As distal cervical caries is responsible for a rising percentage of third molars being removed we think that there is a high risk of it developing in a second molar. However, pericoronitis is still the most common indication for the removal of third molar teeth, and it is diagnosed more often in younger patients. In these patients the extraction of mandibular mesioangular third molars removes...
the main contributing factor for distal cervical caries in the second molar. If pericoronitis was less common in younger patients then more third molar teeth would be retained later into life. As a consequence, we suggest that the incidence of distal cervical caries in the second molar will rise accordingly, as is the case with that of general caries that are related to third molars in older patients.17–19

We need to consider whether all partially erupted mesioangular third molars would eventually cause distal cervical caries in the second molar. A study of this latent potential would require the enforced retention of a mesioangular third molar to observe its effect on the adjacent tooth, but this would be unethical and unavoidably protracted over many years. The introduction of clinical guidelines such as NICE has resulted in an older patient population whose third molars are retained until specific problems indicate their removal. In some respects the patient whose third molar is retained later into life is acting as their own control to the long term consequences of retention as is demonstrated by the increasing incidence of third molar caries (4–30%) correlating with the increasing mean age of patients (Fig. 5).

The potential risk of distal cervical caries forming in second molar teeth that are associated with mesioangular third molars presents a clinical dilemma: should the third molar be left until disease develops, or should it be removed, and if so, when? Clinical risk should influence the decision and the relative risk – for example, of nerve damage, is an important consideration. Early removal of a third molar with a high risk of injury to the inferior dental nerve may not be prudent and in such a case alternative options such as coronectomy could be considered.

Conclusion

We do not think that all third molars should be removed prophylactically, but early, prophylactic removal of a partially erupted mesioangular mandibular third molar will prevent distal cervical caries forming in the adjacent tooth. Mesioangular third molars will not always cause distal cervical caries to form as many will be removed because of pericoronitis and other diseases before it ensues, but we do suggest that every partially erupted mesioangular third molar has this potential. Only with further research and debate will we know whether or not targeted prophylactic removal of such teeth is acceptable. The cost–benefit and cost–effectiveness of this are complex issues and are out of the sphere of this paper, but prophylactic removal will be explored in further ongoing research.

The results of our 2 studies and others confirm that distal cervical caries in the second molar is associated with the retention of a partially erupted mesioangular third molar tooth into later life.8,10–14 As this study corroborates our previous findings we suggest that the conservative management of disease-free, partially erupted, mesioangular mandibular third molars may be detrimental to dental health.

Conflict of interest

None.

Ethics statement

Not required.

References