

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

Louis W. McArdle*, Tara F. Renton

Department of Oral Surgery, GKT Dental Institute, Guy's Hospital, London Bridge, London SE1 9RT, UK

Accepted 29 July 2005

Available online 5 October 2005

Abstract

Aims: Distal cervical caries (DCC) in mandibular second molar teeth are responsible for the removal of up to 5% of all mandibular third molars. Our aim was to identify the clinical features of these patients.

Methods: We evaluated the records of 100 patients who had 122 mandibular third molars removed because of distal cervical caries in the second molar.

Results: Eighty-two percent of third molars had a mesial angulation of between 40° and 80°. The peak age for removal of third molars was 5 years later than in other studies and patients had better dental health than average. The incidence of distal cervical caries DCC has been shown to increase with age.

Conclusion: Distal cervical caries is a late phenomenon and has been reported only in association with impacted third molars. The early or prophylactic removal of a partially erupted mesio-angular third molar could prevent distal cervical caries forming in the mandibular second molar.

© 2005 The British Association of Oral and Maxillofacial Surgeons. Published by Elsevier Ltd. All rights reserved.

Keywords: Third molar; Indications; Distal cervical caries

Introduction

Partially erupted mesio-angular or horizontally impacted mandibular third molars that contact the amelocemental junction of the second molar place this tooth at risk of developing caries in the distal cervical region (Fig. 1).^{1–3} The relationship of the mandibular third molar with the second molar results in exposure of the distal root surface of the second molar to the oral environment. The guidelines of the National Institute for Clinical Excellence for the management of third molar teeth, advise against the prophylactic removal of third molar teeth.⁴ Current practice is, therefore, not to remove third molars until they cause disease. The removal of a mesio-angular third molar before the development of distal cervical caries in the second molar could, however, benefit the dental health of a patient. A second molar with distal cervical caries requires either restoration or extraction in addition to

the removal of the third molar (two procedures). If the third molar is removed before distal cervical caries forms on the second molar then consequent dental treatment of this tooth is avoided.

Our aim was to evaluate patients who presented for third molar removal with distal cervical caries in their second molars to identify any clinical features that would help to differentiate those patients who are at risk of developing distal cervical caries in the second molar.

Methods

We reviewed the records of 100 patients who attended the oral surgery department at Guy's Hospital who had mandibular third molars removed because of the presence of distal cervical caries in the second molar. Data were collected over a 1-year period.

The variables that we recorded were sex, age, decayed, missing, or filled (DMF) score, angulation and eruption status

* Corresponding author. Tel.: 44 7885 137050.



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

of the third molar, proximity of the third molar to the amelocemental junction of the second molar, dental charting of associated buccal teeth, and presence of an erupted ipsilateral maxillary third molar.

The mesial angulation of the third molar tooth was calculated by measuring the angle of intersection between the mandibular occlusal plane and the occlusal plane of the third molar. Tracing paper was attached to the dental panoramic radiograph and the mandibular occlusal plane was drawn. This plane was defined as a line through the tips of the cusps of the mandibular premolar and molar teeth. The occlusal plane of the third molar was then drawn through the tips of the cusp of the third molar. The angle of intersection between these two planes equates to the mesial tilt of the tooth from the occlusal perpendicular and this angle was defined as the tooth’s mesial angulation.

Results

There were 59 men and 41 women; 78 patients had distal cervical caries in a single mandibular second molar and 22 had

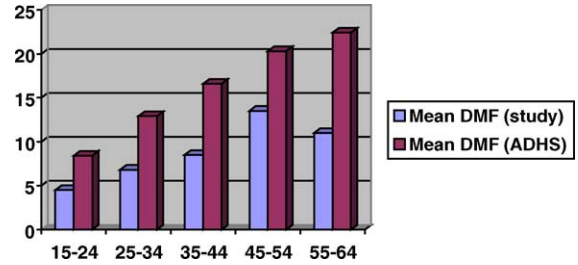


Fig. 3. Mean DMF score in our study compared with mean DMF score reported in Adult Dental Health Survey (1998).

distal cervical caries in the mandibular second molars on both sides. In total 122 mandibular third molars were extracted due to distal cervical caries in the second molar—62 left-sided and 60 right-sided.

The median age of the group was 30 years (range 18–64 years, Fig. 2). Dental disease was measured by calculating the DMF score (decayed, missing, or filled); 39 patients had a DMF score of 5 or less; 36 between 6 and 10, and 24 of 11 or more.

All 122 third molars were partially erupted and radiographic examination showed that 119 teeth were in contact with the second molar tooth at, or close to, the amelocemental junction. There was no radiographic evidence of contact in three teeth.

Mesial angulations of the third molar fell into three groups; 100 (82%) had an angulation of between 40° and 80°; 12 (10%) less than 40°, and 10 (8%) greater than 80°.

An upper maxillary third molar that could contribute to food packing was associated with 80 mandibular third molars (65%), and was absent in 42.

In 110 (90%) of the 122 teeth the buccal segments were complete with both first and second premolars, and first and second molars being present. In nine a premolar had been lost and in three the first molar had been lost.

Discussion

In this study the DMF score was used as a measure of dental health. In calculating the score the second molar tooth was excluded from the calculation if distal cervical caries was its only lesion. We assumed that distal cervical caries in that

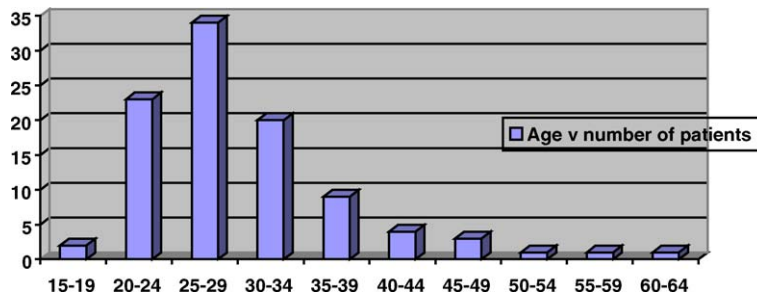


Fig. 2. Age distribution of patients.

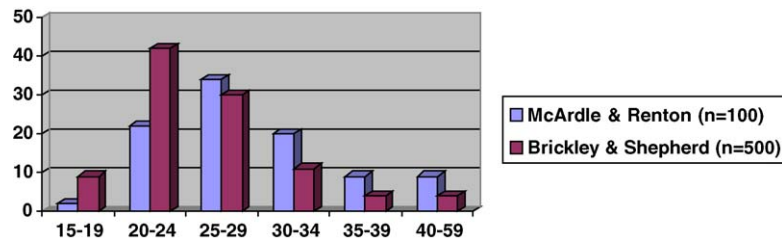


Fig. 4. Patients in our study were older than those reported by Brickley and Shepherd.

tooth is specific and would not develop in the absence of the impacted third molar.

The mean DMF score for patients with distal cervical caries was half the mean score for similar age groups in the general population (Fig. 3).⁶ This confutes the notion that susceptibility to distal cervical caries in second molar teeth is linked to a high susceptibility to dental caries in general.^{1–3}

The incidence of distal cervical caries in the second molar is relatively low (2%⁵) and does not attract much attention in dental journals. Pericoronitis is, however, the most common indication for the removal of mandibular third molars and occurs in relatively young adults.^{3,5,6,9} We suggest that people with low DMF scores have a high standard of oral hygiene, so minimising the risk of pericoronitis associated with the third molar. This would lead to the retention of the tooth and the development of distal cervical caries in the second molar. With good oral hygiene the pericoronal tissues would be easily maintained, however, the contact area between the second and third molars would be relatively inaccessible with consequent long-term plaque accumulation. The development of dental caries is a relatively slow process and would occur over a protracted period of time at the contact point on the second molar. Consequently, these patients are older than the usual patients who have third molars removed.

Normally, the age at which third molars are removed is between 25 and 28 years.^{5,7–10} The median age of patients in this study was 30 years, suggesting that DCC seems to post-date other diseases affecting third molars by almost 5 years.^{5,8,9} This is illustrated by comparing the age distributions of our study with that of Brickley and Shepherd (Fig. 4).⁵ From the graph, a lateral shift to the right is apparent that demonstrates a peak incidence for third molar removal attributable to DCC that is 5 years later than for all third molar removal.⁵ The data suggest that the development of distal cervical caries in the second molar is a protracted process that develops over time and increases with continued exposure to the oral cavity. Further confirmation of this correlation with age was published by Bruce et al. who showed that the incidence of distal cervical caries as an indication for removal of third molars increased significantly with age (Fig. 5).¹¹

The true incidence of distal cervical caries in mandibular second molars may be as high as 5%. This is because most studies report large numbers of third molars that are removed

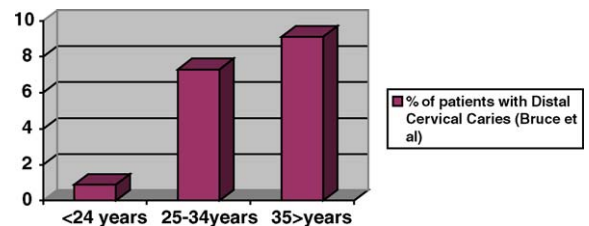


Fig. 5. Percentage of patients in each age group who had distal cervical caries of second molars as the indication for removal of third molars (Bruce et al.¹¹).

for prophylactic reasons.^{5,7–11} Consequently, this distorts the true incidence of disease processes that account for removal of third molars.

Another factor that is associated with the risk of developing distal cervical caries is the angulation of the third molar tooth and the point of contact that the third molar makes with the second molar. We found that a mesial angulation between 40° and 80° was common. Of 122 third molars extracted, 100 (82%) had an angulation within this range. Distal cervical caries in second molar teeth did, however, sometimes occur at angulations outside the 40–80° range.

Distal cervical caries is responsible for a small percentage of third molars removed. To suggest that the risk of developing distal cervical caries is low is wrong. If pericoronitis were not an important reason for removal of third molars, then a large number of these teeth would be retained later into life, and if they were retained then the incidence of distal cervical caries of the second molar as an indication would rise accordingly—as alluded to by Bruce et al.¹¹ The removal of mandibular third molars in young adults for pericoronitis removes the main causal factor (the third molar) of distal cervical caries of the second molar. With the third molar absent the exposure of the distal root surface of the second molar is corrected and so prevents the development of distal cervical caries in second molar tooth.

Conclusion

Distal cervical caries occurs in the second molar in the presence of a mesio-angular impacted third molar. This type of caries has not been reported in relation to any other clinical scenario. It appears to develop as a relatively late

phenomenon, with patients tending to be 4–5 years older than average and having better dental health than average. A mesial angulation of the third molar in the range of 40–80° with a contact point in the region of the amelocemental junction of the second molar tooth are features that also characterise this group of patients.

This study suggests that the non-intervention approach in terms of managing disease-free partially erupted mesio-angular mandibular third molars may ultimately be detrimental to the dental health of the patient. Routine screening for DCC will have no benefit as once the disease process is identified the consequences are apparent. The development of DCC in the second molar will necessitate a restorative and possible endodontic procedure to conserve the second molar tooth in addition to the removal of the third molar and, in some cases, the extraction of the second molar tooth will be indicated also.

It could be suggested that the early, prophylactic, removal of a partially erupted mesio-angular mandibular third molar would prevent DCC affecting the second molar. The authors suggest, therefore, that further studies are undertaken to establish whether the non-intervention approach is potentially flawed and whether consideration should be given to the prophylactic removal of partially erupted mesio-angular third molar teeth.

References

1. van der Linden W, Cleaton-Jones P, Lownie M. Diseases and lesions associated with third molars. Review of 1001 cases. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1995;**79**:142–5.
2. *Current clinical practice and parameters of care: the management of patients with third molar teeth*. Faculty of Dental Surgery of the Royal College of Surgeons of England; September 1997.
3. Knutsson K, Brehmer B, Lysell L, Rohlin M. Pathoses associated with mandibular third molars subjected to removal. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1996;**82**:10–7.
4. National Institute for Clinical Excellence. *Guidance on the removal of wisdom teeth*; March 2000.
5. Brickley MR, Shepherd JP. An investigation of the rationality of lower third molar removal, based on USA National Institutes of Health criteria. *Br Dent J* 1996;**180**:249–54.
6. Office for National Statistics. *Adult Dental Health Survey, oral health in the United Kingdom*. London: HMSO; 1998.
7. Chiapasco M, De Cicco L, Marrone G. Side effects and complications with third molar surgery. *Oral Surg Oral Med Oral Pathol* 1993;**76**:412–20.
8. de Boer PJ, Raghoobar M, Stegenga B, Scheon PJ, Boering G. Complications after third molar extraction. *Quintessence Int* 1995;**26**:779–84.
9. Nordenram Å, Hultin M, Kjellman O, Ramström G. Indications for surgical removal of the mandibular third molar. *Swed Dent J* 1987;**11**:23–9.
10. Lysell L, Rohlin M. A study of indications used for removal of the mandibular third molar. *Int J Oral Maxillofac Surg* 1988;**17**:161–4.
11. Bruce RA, Frederickson GC, Small GS. Age of patients and morbidity associated with mandibular third molar surgery. *J Am Dent Assoc* 1980;**101**:240–5.