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CASE REPORT
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The Remineralization of a Second Molar after Extraction of Mesioangled Third Molars: A Case Report

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Abstract

Impacted mesioangled third molars can cause carious lesions to develop on the distals of second molars. The management of these carious lesions has not been standardized in dentistry. Once the third molars are removed it may be in the best interest of the patient to wait and see how the lesion progresses once the area can be routinely cleaned. In this case report, we demonstrate that the removal of mesioangled mandibular third molars created an environment for the remineralization of the second molar to occur without the treatment of a permanent dental restoration.

Background

The most common teeth in the dental arch to be impacted are third molars. Impaction can be caused by the lack of space, blockage from an adjacent tooth, poor eruption pathway, poor development of a third molar and various other reasons [1]. Several sequelae can occur from a partially erupted third molar which can lead to periodontal issues, infections and the development of carious lesions on the third molar and adjacent second molars [2]. Extraction is often indicated for third molars particularly when their eruption pathway will cause negative sequeale.

Carious lesions on adjacent second molars can develop from impacted third molars. Most commonly, these lesions are associated with mesioangled third molars that are impinged underneath the distal aspect of the second lower molar [3]. While caries incidence rates can vary from study to study with this type of situation, they all show that there is an increased incidence of caries with impacted third molars [4-7]. Treatment of these carious lesions with restorations on lower second molars post extraction typically occurs with favorable outcomes. A poor outcome of a carious lesion on the distal of a second molar would be characterized by extraction due to large caries and loss of periodontal support or the need for a restoration [6,8,9]. However, preventing a cavitated lesion from developing is the most ideal outcome for a second molar.

In a normal oral environment, cyclical demineralization and remineralization occur continuously throughout the day. The remineralization process occurs when the pH in the oral environment returns to a state in which minerals can be added back in to the tooth structure. The presence of saliva and fluoride can neutralize the dip in the pH of the oral environment after consuming food and sugary or acidic beverages [10,11]. Saliva enhances the enamel remineralization process to prevent cavitation and arrest a cavitated lesion by increasing the pH and promoting an environment of mineral resaturation. However, impinging third molars limit the amount of remineralization that can occur on the distal of a second molar and can lead to the development of a carious lesion. In the following case report, we demonstrate how a carious lesion on a lower second molar remineralized after extraction of an impacted lower third molar with no further clinical intervention.

Case Report

A 31-year-old male presented at the University of Michigan, School of Dentistry student clinics for a new patient exam. The health history was unremarkable and he was taking a daily multivitamin. A full mouth series of radiographs and a panoramic radiograph were taken prior to the new patient exam. Intra-oral and extra-oral examinations were completed along with a full periodontal chart and a periodontal evaluation by the periodontal specialist in the clinic. He was diagnosed with a high caries risk based on 5 active lesions of

decay on teeth 8 facial, 18 distal, 29 distal occlusal, 30 occlusal and buccal, 31 distal and buccal and five observed tooth surface lesions. Over 80% of teeth sites had sub gingival calculus and 126 sites of bleeding on probing along with the presence of stagnant plaque on nearly all sites in the mouth. The gingiva was generally inflamed and he was diagnosed with ADA 2 periodontal disease. Four quadrants of scaling and root planing were prescribed based on the number of sites with probing depths of 5 without bone loss.

Teeth numbers 1 and 16 were fully erupted in the arch and tooth number 17 was impacted mesioangly and tooth number 32 was impacted horizontally with slight mesioangulation (Figure 1). It was noted that tooth numbers 17 and 32 were impinging on the mesial second molar and contributed to the development of a carious lesion on the distal of tooth numbers 18 and 31 at the initial visit based on the radiograph. These lesions were not cavitated. The patient was referred to the oral surgery clinic where teeth number 1 and 16 were simply elevated for removal (Figure 1). Tooth number 17 and 32 were extracted after a full mucogingival periosteal flap was created and the teeth were sectioned under copious amounts of water.

After the extractions and sufficient healing time, the patient underwent periodontal records and all four quadrants were scaled and root planed in four separate appointments. At the periodontal records appointment, it was noted that the extraction sites were healing properly with no complications. Periodontal reevaluation after 6 weeks showed a positive healing response and the patient demonstrated improved oral hygiene with a plaque score of less than 20%.

Six months after the extractions of the 4 wisdom teeth, the patient returned for restorative work. The plan was to restore 31 distal-facial-occlusal, but upon evaluation, the enamel was solid enamel with no evidence of a cavitated lesion even at the dentinoenamel junction. The enamel surface was dark in coloration, slightly rough but not cavitated. A horizontal bitewing taken in the area of 31 revealed that the distal had completely remineralized from when the initial radiographs were taken (Figure 2). It was decided to watch and observe the area of numbers 31 but the buccal pit of number 31 was completed at that same appointment and was isolated only to the pit. The patient has not returned for a follow-up appointment for tooth number 18.

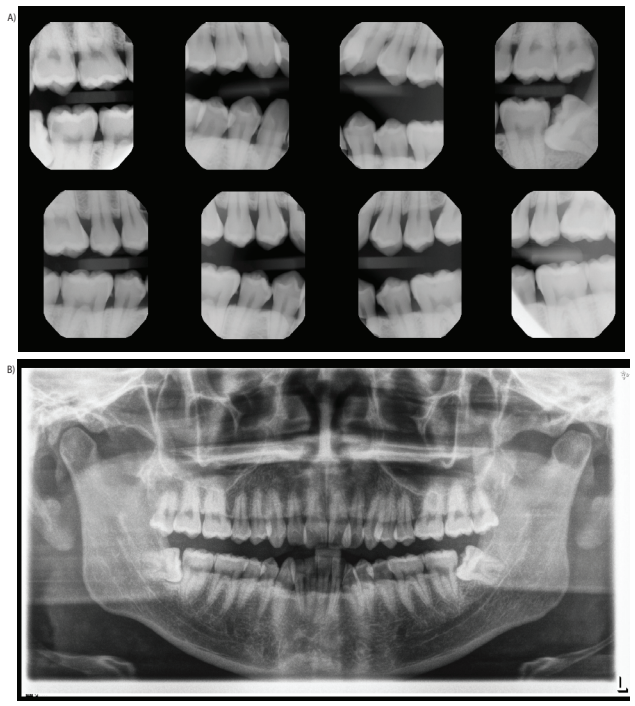

Figure 1: Initial vertical bitewings (A) and Pan (B) taken in an outside private practice prior to starting treatment at UMSoD.

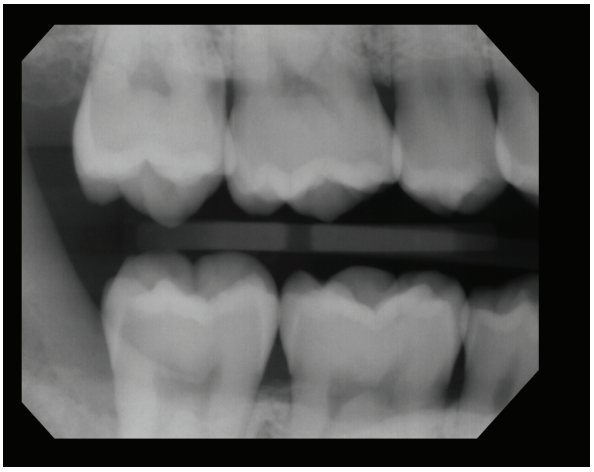

Figure 2: Bitewing of tooth number 31 six months after the removal of mesioangled tooth number 32.

Discussion

The presence of a demineralized lesion represents the loss of tooth structure from the gradual demineralization of tooth surface minerals. This process is typically slow and affects enamel, dentin and cementum. The loss of minerals in tooth structure is due to fluctuations in the pH of the oral environment. Decreases in pH are due to the presence of acidic producing bacteria within dental plaque that are fed by the consumption of carbohydrate rich food and beverages. The production of acid by these bacteria creates an environment where minerals can leave the tooth structure. This process can be reversed by physically removing the plaque and by neutralizing the pH fluctuations in favor of a process in which minerals are saturated in the local environment and return back to the tooth [12]. A reduction in plaque scores was observed from the initial visit to the periodontal re-evaluation (80% to less than 20%, respectively). The plaque scores demonstrated improved oral hygiene and plaque removal, thus, was creating an oral environment to encourage enamel remineralization. Based on data from in vitro studies, it may be beneficial to use acidulated fluoride methods to remineralize non-cavitated smooth surface lesions to promote remineralization [13], but the patient was not given a fluoride prescription.

Early changes in surface minerals can be seen clinically with the presence of a white spot lesion that can be observed on a radiograph. While the progression of a lesion is hard to predict from patient to patient, evaluating present oral hygiene habits and actively decaying lesions can suggest a relative caries risk for a patient. In the case report presented here, the patient had limited dental care prior to being seen at the UMSoD. Modest improvements in oral home care showed vast improvements of plaque levels between the initial visit and a follow up visit after plaque debridement. Plaque sites reduced over 60% from the initial visit to a six-week re-evaluation after scaling and root planing.

Based on a patient's caries risk a whole host of supplemental oral hygiene armamentarium can be implemented to mitigate the effects of lowered pH in the oral environment to promote and environment of remineralization. These include increasing fluoride use with prescription high fluoride toothpastes, fluoride varnishes and gels, along with fluoride mouth rinses. For smooth surface cavitated lesions, sodium diamine fluoride application may be indicated. However, no data is available that evaluates posterior molars and mesioangled third molars and the application of silver diamine fluoride. Additionally, altering patient recall can limit that amount of static plaque buildup between visits and allow for more frequent oral hygiene instructions.

Most dramatically, the radiographic presentation of remineralization on the distal of number 31 (Figure 2) was visible after 6 months after initial scaling and root planing treatment was completed. The area that once was radiolucent on the distal of tooth number 31 was now radiopaque. Removal of the third molars to the time of the planned restorative procedure was less than 3 months. Typical treatment of a carious lesion on the distal of a second molar is to remove the cavitation and repair with a restoration such as amalgam or resin modified glass ionomer after the surgical site has healed [6]. However, it is not clear on how these cavitated lesions on the distal of a second molar react to the oral environment once the impinging third molar is extracted. Moreover, while the initial bitewing was a vertical bitewing taken outside the UMSoD clincs and the follow up bitewing was a horizontal bitewing, this may account for changes in interpretation of the radiograph based on radiolucencies present in both of the images. However, the clinical presentation of the enamel was smooth and firm. No clinical photo is available due to the fact that the patient did not return to the school for further treatment.

The removal of the third molars allowed for access of the toothbrush and oral fluids. It is possible that just the removal of the third molars now allowed oral fluids access to the area and naturally remineralize the posterior smooth surfaces of the lower right second molar. The patient was not given a prescription for a high fluoride containing toothpaste, nor was a topical fluoride varnish applied to any surfaces during an of the scaling and root planing procedures. The patient did not report any sensitivity associated with the completion of the periodontal therapies.

Dental caries develops where microbial deposits are allowed to form biofilms that are not frequently removed or disturbed by mechanical wear (mastication, attrition, abrasion from brushing, flossing or toothpicks). An impacted third molar that impinges on a second molar makes a suitable environment for dental caries to develop because of the inability to removal stagnant plaque. The caries incidences on the posterior second molar increases with mesio-angled third molars and can increase perio-pocketing associated with interproximal regions [6,7]. Increased perio-pocketing may enhance a site for food pocketing, therefore increasing the caries risk at these specific sites. The distals of the second molars will need to be continually monitored for the development of the cavitation as well as the probing depths to ensure that the second molars are periodontally stable when a carious lesion is observed in this area.

Data evaluating the remineralization of second molars after extraction of mesioangled third molars is limited. Epidemiology studies on caries risk and third molars are not collected in the United States making conclusions difficult on caries incidence from third molars. While management of non-symptomatic third molars with an extraction is not advised, active surveillance on these teeth may be prudent to decrease the risk of caries incidence in these sites [4]. Based on this case report, treating carious lesions on the distals of second molars due to impinging third molars may not be in the best interest of the patient. A conservative approach by watching the site, improved hygiene and radiographs may prove to be in the best interest of the patient as the lesion may remineralize after the removal of a mesioangled third molar.

Conclusion

Although active carious lesions are an indication for a restorative treatment, this case reports demonstrates how in some cases if given the chance, the lesion can remineralize. In this case, removal of the impacted third molar presumably allowed saliva to contact the previously covered surfaces (31 distal) and the normal physiological process of remineralization was allowed to occur. This case reports demonstrates that it may be prudent to observe these types of lesions with observation, if the lesion is not cavitated, rather than treat to preserve tooth structure that may mineralize naturally in the oral environment. Treatment should be based on clinical presence as well as radiographic imaging which may change from one appointment to the next if the oral environment changes occur over time.

References

1. Grover PS, Lorton L (1985) The incidence of unerupted permanent teeth and related clinical cases. Oral Surg Oral Med Oral Pathol 59: 420-425.

2. Santosh P (2015) Impacted Mandibular Third Molars: Review of Literature and a Proposal of a Combined Clinical and Radiological Classification. Ann Med Health Sci Res 5: 229-234.

3. Bishara SE, Andreasen G (1983) Third molars: a review. Am J Orthod 83: 131-137.

4. Pepper T, Grimshaw P, Konarzewski T, Combes J (2017) Retrospective analysis of the prevalence and incidence of caries in the distal surface of mandibular second molars in British military personnel. Br J Oral Maxillofac Surg 55: 160-163.

5. Srivastava N, Shetty A, Goswami RD, Apparaju V, Bagga V, et al. (2017) Incidence of distal caries in mandibular second molars due to impacted third molars: Nonintervention strategy of asymptomatic third molars causes harm? A retrospective study. Int J Appl Basic Med Res 7: 15-19.

6. McArdle LW, Patel N, Jones J, McDonald F (2018) The mesially impacted mandibular third molar: The incidence and consequences of distal cervical caries in the mandibular second molar. Surgeon 16: 67-73.

7. McArdle LW, Renton TF (2006) Distal cervical caries in the mandibular second molar: an indication for the prophylactic removal of the third molar? Br J Oral Maxillofac Surg 44: 42-45.

8. Oguz Y, Soydana S, Onay EM, Cubuk S (2016) Incidence of root canal treatment of second molars following adjacent impacted third molar extraction. Journal of Dental Sciences 11: 90-94.

9. Peng KY, Tseng YC, Shen EC, Chiu SC, Fu E, et al. (2001) Mandibular second molar periodontal status after third molar extraction. J Periodontol 72: 1647-1651.

10. Wetton S, Hughes J, Newcombe RG, Addy M (2007) The effect of saliva derived from different individuals on the erosion of enamel and dentine. A study *in vitro*. Caries Res 41: 423-426.

11. Hall AF, Buchanan CA, Millett DT, Creanor SL, Strang R, et al. (1999) The effect of saliva on enamel and dentine erosion. J Dent 27: 333-339.

12. Fejerskov O, Nyvad B, Kidd EA (2015) Pathology of dental caries. 3rd ed. Dental caries: the disease and its clinical management. Oxford (UK): Wiley Blackwell.

13. Gonzalez-Cabezas C, Jiang H, Fontana M, Eckert G (2012) Effect of low pH on surface rehardening efficacy of high concentration fluoride treatments on non-cavitated lesions. J Dent 40: 522-526.