Case Report

Non-surgical management of immature maxillary lateral incisor with palato-gingival groove with MTA

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ABSTRACT

Palato-gingival groove is a developmental anomaly often affecting the maxillary lateral incisor. The aim of this presentation is to describe the clinical management of a maxillary lateral incisor tooth with a palato-gingival groove with perio-endo lesion having immature apex. Despite complex anatomy, this case was managed by using Mineral Trioxide Aggregate plug technique with as a non-surgical endodontic treatment. The tooth was functional without any complication on the basis of regular clinical and radiological evaluation.

Introduction

The region in which the lateral incisors are located is considered to be an area of embryological risk.[1] A great number of major and minor malformations occur in this area, for instance cleft palate, the globulo-maxillary cyst, missing or supernumerary tooth, dens in dente and peg shaped lateral incisors. Another anomaly occurring in this region is the palate-gingival groove.[2]

It has a similarity to dens invaginatus; however, it differs from it in such a way that it occurs due to an unfolding of the epithelium (resulting in a groove), rather than an invagination (resulting in a circular opening).[3] These grooves can be classified into mild, moderate and complex based on its depth and extent. root surface. The most complex forms are deeply grooved defects that separate an accessory root from the main root trunk.[4]

Mild ones terminate at the CEJ whereas moderate grooves continue apically along the

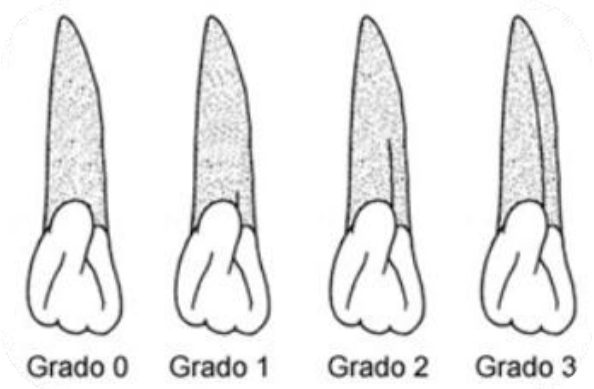

Figure 1: Different types of palato-gingival groove.

Different studies have revealed a prevalence rate for palatal groove of about 2.8 to 8.5%, the most prevalent being the maxillary lateral incisor.[5] In lateral incisors 43% of the grooves on the root extended less than 5mm. 47% between 6-10mm and only 10% more than 10mm.[6]

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Case report

A 18 years old male patient came to the department of conservative dentistry and endodontics, BSMMU with the complaint of occasional discharge of pus from its labial aspect for last 5 years. His medical history was non-contributory.

On clinical examination, a discoloured maxillary lateral incisor was found on right side but neither tooth mobility nor any swelling was detected. On palpation a bony depression was found along with a draining sinus labially over the apical area. A pit was found on the palatal aspect of the tooth near the cingulum. A periodontal probe was inserted through the pit where a 19 mm pocket was found there. Pus was also draining through the pit. Pulp vitality test was negative. The affected tooth was tender to percussion.

Figure 2: Measurement of pocket with perio probe

Radiological evaluation revealed periapical radiolucency of about 3mm above the right lateral incisor. The apex was immature with blunder bass canal. An anomalous internal structure consists of a straight radio-opaque line running from the cemento-enamel junction throughout the canal up to the apex. The anomaly was detected as palato-gingival groove. Then the case was diagnosed as perio-endo lesion (type IV) with immature apex due to palato-gingival groove. Different treatment plan was discussed with the patient. The patient was not interested in surgical treatment. So a non-surgical treatment plan was formulated by using MTA as 'Apical Plug' followed by obturation of the rest of the canal by gutta percha by Vertical compaction technique.

After proper isolation, a straight line access cavity was prepared. A single canal was detected which was wide mesio -distally. A working length measuring x-ray was taken with number 80 k file at 19 mm length. Bio-chemical preparation was done with copious irrigation with 2.5% sodium hypochlorite solution and filing the canal wall cautiously using no. 80 k file circumferentially. Calcium hydroxide mixed with glycerine was placed with lentulo-spiral as intra-canal medicament for one week. Access cavity was sealed with ZnO eugenol cement.

At the next visit the tooth was symptom free and the canal found dry. A Plugger was custom made by heating and rolling two ProTaper gutta percha (F1). ProRoot MTA (Dentsply) was mixed with distilled water to a creamy consistency at 3: 1 proportion. MTA was introduced in the canal using lentulo spiral 1 mm short of the radiographic apex. The MTA was condensed in apical 5mm using custom made plugger. Confirmation of the plug was done with radiograph. A moist cotton pellet placed over the canal orifice and the access was sealed with ZnO eugenol cement and reappointed after 24 hour.

In next visit, the hardness of MTA was checked and rest of the canal was sealed with gutta percha and ZnO sealer in vertical compaction technique. The access was sealed with Glass ionomer cement. Post-operative radiograph was taken to check the obturation. Patient was recalled at 3, 6 and 12 months from the initial work. After 12 months follow up, the tooth was sound clinically and radiologically there was evidence of barrier formation as well new bone formation.

Figure 3(a): initial periapical radiograph

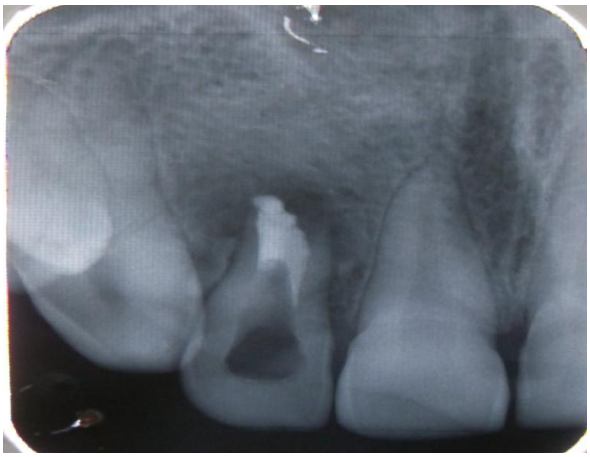

Figure 3(b): after MTA apical plug

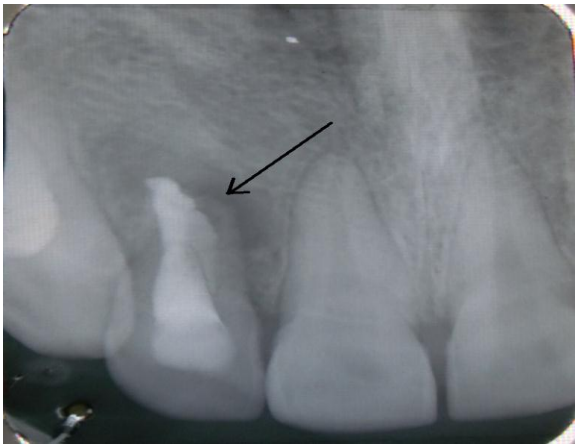

Figure 3(c): 1 year follow up
(arrow shows barrier formation)

Discussion

The palato-gingival groove is a developmental anomaly of variable extent and depth that may or may not involve a communication between the pulp cavity and the periodontal tissue. The anomaly has a variety of names: the palato-gingival groove, the radicular lingual groove, the radicular groove, the palato-radicular groove, the facial radicular groove, the developmental groove, and the disto-lingual groove.[7] These grooves are deep initially after root formation and become shallower with age due to deposition of dentin.[8]

This anomaly shows alterations in the growth and infolding of inner enamel epithelium and hertwigs epithelial root sheath creating a groove that passes from cingulum of maxillary incisors apically on to the root.[3] Consequently periodontal pocket is formed and resulting in retrograde infection involving the apex. Clinician should be aware of the incidence and method for treating palato-gingival groove (PGG). Only rarely can the PGG has been seen on radiographic examination in the form of a parallel radiolucent vertical line[9] or in other cases not following the root canal.[10] It requires early diagnosis and treatment as it may result in radicular and pulpal pathosis. This fissure like channel is a locus of plaque and calculus accumulation, which acts as a secondary local etiologic factor encouraging the development of periodontitis.[11] A patient with PGG may have the symptoms of a periodontal or acute dento-alveolar abscess or may show no symptoms at all. Frequently a lesion related to a groove is characterized by recurrent symptomatic episodes.[12] Lee was the first person to report positive association between palato-gingival groove and localized periodontitis. Clinically, grooved teeth have demonstrated significantly higher plaque, gingival and periodontal disease index scores than non-grooved incisors.

The pulp is also affected by bacteria which are situated in the radicular groove. Bacteria and their products may enter the pulp through the accessory foramen and lateral canals situated along the floor or side walls of the groove. Another route of bacterial invasion into the pulp is via the exposed dentinal tubules on the side of the groove where surface resorption as a result of inflammatory process.[13] In severe case, the pulp is involved earlier as a result the tooth become non-vital before the completion of root. Treatment may vary from case to case. Early diagnosis of the case is very much important for preventive measures. Teeth with deep palatal groove should be treated with fissure sealent before plaque and food impaction and breakdown of the periodontal structurs.[14]

Although several modalities have been suggested for the treatment of this condition, there is general consensus that these are usually predictable failures. Many treatment regimen have been suggested such as conventional root canal treatment, combined root canal therapy followed by saucerization of the defect, repairing the defect with flowable composit, intentional replantation and guided tissue regeneration according to

severity. In the last decades, with extensive knowledge of guided tissue regeneration, mechanical barriers have been used to halt epithelium down growth along the root surface, allowing periodontal ligament, cementum and bone to regenerate along periodontally diseased roots. Calcium sulphate, collagen, methyl cellulose acetate, enamel matrix protein etc have been used as mechanical barrier to allow periodontal regeneration.[15]

In the presented case, the pulp became non-vital at early age due to palato-gingival groove which extended up to the apex as a result the root failed to mature. There were repeated episodes of chronic alveolar abscess. For this reason a depressed area developed over the root surface due to healing with scar tissues. As the patient did not allow a surgical intervention, a non-surgical treatment was planned with MTA where it was not only used as apical plug to allow periodontal tissue regeneration.

MTA has been proposed as a material for immediate closure of the apical opening without waiting for a natural healing process. This will create an apical barrier in the canal preventing the extrusion of root filling material into the periapical tissues.[16] It has been demonstrated that MTA induces the formation of a calcified matrix in the periapical tissue and regeneration of new cement, possibly associated with its high sealing capacity, biocompatibility, alkaline pH and liberation of substances activating the cementoblasts, which in turn will deposit a matrix for the cementogenesis.

Conclusion

The palato-radicular grooves can be managed by using MTA plug technique as a non-surgical endodontic treatment.

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