

Comprehensive Management of Cinguloradicular Groove Complicated by Periodontal and Pulpal Pathosis

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ABSTRACT

Background: The initiation and severity of progression of periodontal disease is usually caused by accumulation bacterial plaque and calculus. Certain developmental anomalies of tooth also play a major role in progression of periodontal disease and even worsening the prognosis. The presence of developmental anomalies like cinguloradicular groove may lead to severe periodontal and endodontic problems. It often predisposes to pulpal necrosis and the establishment of combined periodontal - endodontic lesions. This case report describes the comprehensive management of cinguloradicular groove complicated by periodonto-pulpal pathosis.

Keywords: Cinguloradicular groove, localized periodontal disease, pulpal necrosis.

INTRODUCTION

The cinguloradicular groove was first described by Black in 1908.¹ It is as a type of anomaly of shape which is defined as a developmental groove in a root is usually found on the lingual aspect of maxillary incisor teeth. Its occurrence varies among different populations and sub-populations.² It may be an ectopic anomaly and it occurs after the embryonic period.¹ Its prevalence is 5.6% in maxillary lateral incisors and 3.4% in maxillary central incisors.³ It is a rare developmental anomaly of maxillary central and lateral incisors and is often associated with periodontal pockets and bone loss, which may lead to pulpal necrosis.² The most common location is the mid palatal area followed by distal and then mesial.³ It occurs probably by infolding of the enamel organ and the epithelial sheath of Hertwig

during odontogenesis and has been considered to be an aborted formation of an additional root.⁴ Ennes and Lara stated that the palatal groove could also be due to an alteration of genetic mechanisms.⁵ Lee et al in 1968 was the first to find the association between palatoradicular grooves and localized periodontitis.⁶ The groove provides the site or pathway for bacteria to penetrate into the periodontal ligament area, resulting in a periodontal pocket along the length of the groove. Necrosis of the adjacent pulp tissue can develop because of the presence of irritants in an area that is separated from pulp tissue by only a thin layer of enamel and dentine or cementum. This anomaly is also termed as the radicular anomaly, distolingual groove, radicular lingual groove, cinguloradicular groove, radicular groove, palatogingival groove and syndesmocoronoradicular groove.⁵ It often presents a diagnostic and treatment planning dilemma.

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CASE REPORT

A 24 year old female patient reported to the department of periodontics, Meghna Institute of dental sciences, Nizamabad, Telangana state with a complaint of swollen and bleeding from gums in upper right front tooth region since 2 months. Periodontal examination revealed 14mm pocket associated with a deep palatoradicular groove in relation to the maxillary right lateral incisor on its palatal surface extending apically beyond the cervical line along with grade II tooth mobility (figure 1). There was neither caries nor any history of trauma in relation to the concerned tooth. Patient had no history of pain in that region. The tooth was not discolored and patient revealed a positive response to cold test and an electronic pulp tester (Parkell Electronics Division, New York, USA), confirming the diagnosis of a vital pulp. A radiovisiography in relation to 12 revealed a diffused periapical radiolucency involving the apical one third of the root with localised bony defect (figure 2). Since there is a possibility of a bilateral occurrence of the palatoradicular groove, examination of tooth 22 was also done but no evidence of a palatoradicular groove was found after sulcular probing. Based on the above clinical features and radiological findings it was diagnosed as localised periodontitis resulting from cinguloradicular groove in relation to tooth 12. The treatment of cinguloradicular groove procedure was explained to the patient and informed consent was taken before performing the treatment.

A treatment strategy was planned that comprised of scaling and root planning followed by elective endodontic therapy and periodontal surgery for pocket elimination and groove repair. Root canal treatment was completed (Figure 3). After one week, the periodontal flap surgery was done. Following local anesthesia, using intrasulcular incision, a full thickness mucoperiosteal flap was reflected on labial and palatal aspect of 13, 12, 11 and 21 (figure 4). After flap reflection, granulation tissue was curetted and cleaned and a clear deep cinguloradicular groove extending into the radicular area was visible in the palatal aspect of 12 (figure 5). Prior to restoration of groove, it was widened by using a round bur and after correction, a smooth surface develops (figure 6). This process is called Saucerisation. Acid etching was done and was



Fig 1: 14mm periodontal pocket in relation to 12.



Fig 2: Pre operative radiograph.



Fig 3: After root canal treatment.

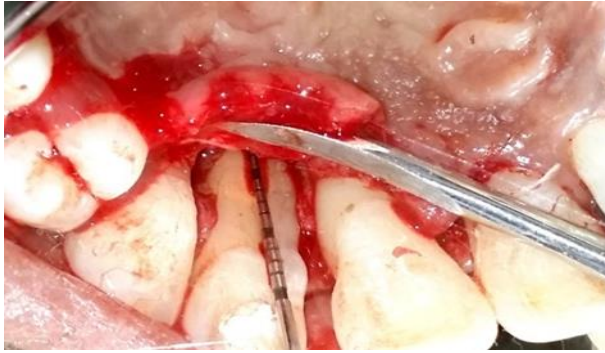


Fig 4: After elevation of mucoperiosteal flap.



Fig 8: Application of bonding agent.



Fig 5: After thorough debridement.

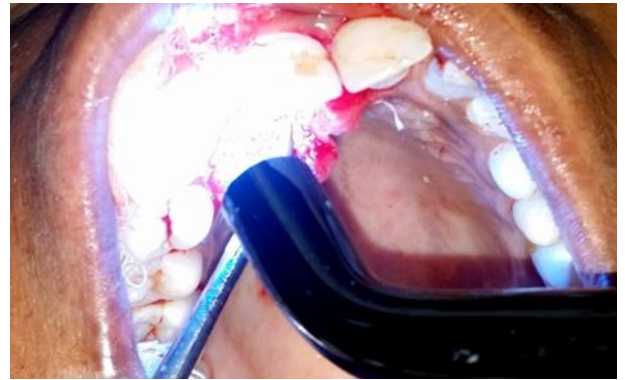


Fig 9: Light curing of flowable composite.



Fig 6: Saucerisation of the groove.



Fig 10: After suture placement.



Fig 7: Acid etching of the tooth.



Fig 11: Placement of periodontal pack.



Fig 12: Temporary splint.



Fig 13: 3 months post operative radiovisiography with bone fill.



Fig 14: 6 months post operative radiovisiography with bone fill.



Fig 15: 6 months post operative showing pocket reduction to 4mm.

restored with flowable composite (figure 7, 8, 9). Flap was approximated and sutured with non resorbable suture (figure10) followed by placement of periodontal pack (figure 11). Post operative instructions were given. Antibiotics and non steroidal anti inflammatory drugs were prescribed and patient was advised to use 0.12% chlorhexidine mouth wash for 4 weeks. Patient was recalled after 10 days for suture removal. The patient was asymptomatic postoperatively and sutures were removed after 10 days. After 10 days, tooth was temporary splinted using composite (figure 12). Reevaluation of patient was done at 1st and 3rd month.

Post operative examination revealed satisfactory healing. Post operative radiovisiography was taken at 3 and 6 months (figure 13 and 14) showed evidence of bone fill. After 6 months, pocket depth was reduced to 4 mm in relation to 12 (Figure 15).

DISCUSSION

Cinguloradicular groove is an important contributing factor for the development of localized chronic periodontitis because it favors the accumulation and proliferation of bacterial plaque deep into the periodontium.⁴As bacteria is present in the accessory channels in the depth of periodontal groove, it may result in treatment failure. Thus, sealing of the groove is very essential to eliminate the pathways of communication between the pulp and the periodontium.⁷

Lee et al (1968) was the first to report an association between palatoradicular grooves and

periodontitis. They described it in eleven cases where unilateral and bilateral defects in lateral incisors were associated with moderate / severe periodontal disease.⁶

The first large survey of the incidence of cinguloradicular groove in extracted teeth was conducted by Everett and Kramer and he reported that the prevalence of the disto-lingual groove on 625 extracted maxillary incisor teeth was 1.9%. These grooves may present radiographically as a radiolucent parapulpal line. Radicular groove can lead to periodontal and pulpal pathology, but they may be difficult to identify as an etiological factor.⁸

Kogon et al observed extracted teeth of 1786 maxillary lateral incisors after staining with methylene blue under microscope. He found 100 of them exhibiting palatogingival groove, 77 originated in cingulum, 15 in lateral fossa, 7 at cemento-enamel junction and 1 on root proceeding apically. Out of 100 grooves 13 were located on the mesial side, 25 were located on the distal side and 62 on the mid palatal surface. In the present case, the groove was located on the mid palatal surface.³ Saucerisation involves elimination of the defect to the crestal bone level with rotary cutting instruments and it has been a helpful method in eliminating shallower grooves. In this case saucerization of the groove was done.⁹ Several materials are used, like Amalgam, GIC, Composite and MTA (Mineral Trioxide Aggregate) to seal the cinguloradicular groove. In this case flowable composite was used to restore the cingulo radicular groove.

Post operative examination revealed satisfactory healing after 1st, 3rd and 6th month with the evidence of bone fill. Radiovisiograph was used to take an image after 3month and 6months. Periodontal probing depth was decreased to 4mm after 6months.

CONCLUSION

Association between cinguloradicular groove and periodontal problems is very rare. It may act as contributing factor for periodontal and pulpal diseases. Most of the times it is left undiagnosed by clinicians so proper clinical examination with radiographic interpretation

should be done to confirm the presence of such condition and should be treated.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

REFERENCES

1. JP Ennes, VS Lara. Comparative morphological analysis of the root developmental groove with the palato-gingival groove. *Oral Diseases*. 2004; 10: 378-382.
2. Akhil Rajput, Sangeeta Talwar, Sarika Chaudhary, Ambica Khetarpal. Successful management of pulpo-periodontal lesion in maxillary lateral incisor with palatogingival groove using CBCT scan. *Indian Journal of Dental Research*. 2012; 23(3): 415-418.
3. Kogon SL. The prevalence, location and conformation of palato-radicular grooves in maxillary incisors. *J Periodontol* 1986; 57:231-4.
4. Shankar Ram, Uma Sudhakar, Pramod V, Radhika A. Palatogingival Grooves. *IJDA*, April-June 2010; 2(2): 229-233.
5. Hyun-Il Kim, Young-Shin Noh, Hoon-Sang Chang. The palato-gingival groove anatomical anomaly occurred in maxillary lateral incisors: case reports. *J Kor Acad Cons Dent* 2007; 32(6): 483-490,
6. Bhuvaneswari Birla Bose, Sabitha Sudarsan. Palatogingival Groove – An Added Dimension in the Etiology of Localised Periodontitis. *International Journal of Dental Sciences and Research*, 2013; 1 (1): 57.
7. Vijay Kumar, Ajay Logani, Naseem Shah. Intentional replantation: A viable alternative for management of palatogingival groove. *Saudi Endodontic Journal*. May-Aug 2013; 3(2): 90-94.
8. Krishna Kumar Gupta, Amitabh Srivastava, Sumedha Srivastava. Palatogingival groove – a silent killer: Treatment of an osseous defect due to it. *J Indian Soc Periodontol*. Apr-Jun 2011 ; 15(2): 169-172.

9. Meister F Jr, Keating K, Gerstein H, Mayer JC. Successful treatment of a radicular lingual groove: Case report. J Endod 1983; 9:561-4.