

# **Periodontic – endodontic lesion of a maxillary lateral incisor with palatoradicular groove as a contributing factor of periodontitis - A case report**

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## **Abstract:**

Background: A 46 year old Indian male came to our clinic for the treatment of localized periodontitis. On examination patient had recurrent swelling on the labial aspect of the right maxillary lateral incisor and intraoral sinus formation since 15 days. Palatoradicular groove(PRG) is a common tooth anomaly that can act as a contributing factors in the development of periodontitis. He was diagnosed as having a necrotic pulp in right maxillary lateral incisor.

Method: A endodontic treatment was performed in right maxillary lateral incisor. Open flap debridement combined with odontoplasty and bone grafting successfully treated periodontic-endodontic lesion with a deep palatoradicular groove.

Result: Healing was uneventful. After the active therapy which resulted in successful endodontic treatment, periodontal open flap debridement, odontoplasty, regenerative technique and maintainable probing depths, the patient was placed on a 3 month recall programme.

Conclusion: Periodontic – endodontic lesion with a palatoradicular groove as a contributing factor for periodontitis is the most important diagnostic and therapeutic challenges faced by periodontists. The finding of this case report is confirming the role of PRG as a local contributing factor in localized

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### **Introduction:**

Periodontitis is primarily a bacteria induced inflammatory disease but local factors can facilitate the accumulation of bacteria and it may contribute to the progression of the disease. Factors such as tooth anomaly and restorative and endodontic consideration have been linked to gingival inflammation and attachment and tooth loss.<sup>1,2</sup>

The palatoradicular groove is a developmental anomaly, when present act as a site for plaque accumulation, often associated with localized periodontitis and a pulpal necrosis.<sup>3</sup> Defects involving both pulpal and periodontal disease have caused confusion and controversy in dentistry.<sup>4,5</sup>

Pulpal inflammation and infections that extend into the periodontal space may present signs consistent with periodontitis. Likewise, destructive periodontitis that extends to the periapical regions may lead to pulpal pathoses and symptoms not typically found with periodontitis.<sup>6</sup>

The current periodontal disease classification endorsed by the American Academy of Periodontology(AAP) recognizes tooth aberration as a one of the contributing factor.<sup>7</sup> Maxillary incisor anomalies are common. In case of tooth malformation, bacterial invasion and infection are often the cause of pulpal inflammation and tooth loss.

Maxillary incisor can present with a number of major and minor embryonic malformations, most anomalous tooth developments are genetically determined.<sup>9</sup> Palatoradicular grooves, which have also been termed radicular lingual groove, distolabial grooves, palatogingival grooves and radicular palatal grooves, are developmental anomalies that represent an infolding of the enamel organ and the epithelial sheath of Hertwig.<sup>10</sup> Usually these grooves start coronal to the cingulum and

continue for varying distance and directions along the root. Mild grooves terminate at the cemento-enamel junction, whereas moderate grooves continue apically along the root surface.<sup>11,12</sup> The PRG is a developmental anomaly in which an infolding of the inner enamel epithelium and Hertwig's epithelial root sheath create a groove, that passes from the cingulum of maxillary incisors apically onto the root. PRG can create periodontal and pulpal pathology, but they may be difficult to identify as an etiological factor. At a morphological level, PRGs are characterized by reduced dentine thickness and an increased cement layer, with a simultaneous modification of the odontoblasts. At a histological level, irregular dentine cement junctions have typically identified. As there is no epithelial closure, it is possible for microbes to settle in the groove. Depending on the morphology of the PRG, localized periodontitis may develop accompanied by pathosis. In case of deep PRG, a retrograde pulpitis may occur as a result of the so called endodontic-periodontic lesion.<sup>13</sup>

The finding of this report also substantiated that the PRG is a local contributing factor to periodontal disease. The groove on this tooth allow plaque to accumulate and spread up to the root surface with resultant localized deep pocket formation with sinus on the labial surface. The radiograph shows an associated deep bone defect with periapical lesion.

### **Case report:**

A 46 year old Indian male came to our clinic with chief complain of recurrent swelling, pus discharge and recurrent episodes of dull pain associated with right maxillary lateral incisor. His medical history was reviewed using a questionnaire and verbal confirmation. His medical and dental history was non-contributory. His chief complaint was, "swelling and pus discharge from the gums of the right side of the upper front teeth".

A comprehensive periodontal examination was completed including extraoral, intraoral and

radiographic evaluations.

On clinical examination, supragingival plaque formation was present on the palatal aspect of right maxillary lateral incisor and intraoral sinus formation figure 1 was seen on the labial surface of right maxillary lateral incisor. In that area, the surrounding palatal gingiva appeared bluish red and edematous, rolled out gingival margins and deep periodontal pocket 10mm localized at the palatal surface of tooth in relation to palatoradicular groove. Also right maxillary lateral incisor had a necrotic pulp. Vitality test was negative in right maxillary lateral incisor.

Initial periodontal treatment consisting of oral hygiene instructions and localised scaling and rootplaning on right maxillary lateral incisor was completed and then endodontic therapy – root canal treatment was completed in right maxillary lateral incisor. But the deep periodontal pocket and intraoral sinus was still present. As a result, surgical intervention of right maxillary lateral incisor was recommended to eradicate this underlying problem.

After the full thickness mucoperiosteal flap was reflected labially and palatally under local anaesthesia, a angular bony defect which surround the distal and palatal side of the right maxillary lateral incisor( figure 3, 4, 5) and extend upto the middle half of the root was found in relation to palatoradicular groove of right maxillary lateral incisor. The surgical site and sinus floor was thoroughly debrided. Further root planing was performed and odontoplasty (figure 6) was carried out to eliminate the PRG completely. The site was grafted with a bioactive ceramics, Perioglas. (figure 7, 8) The flaps were approximated and sutured. (figure 9, 10) The sutures were removed after a week. Healing was uneventful. The patient was placed on a 3 month periodontal maintenance recall programme.



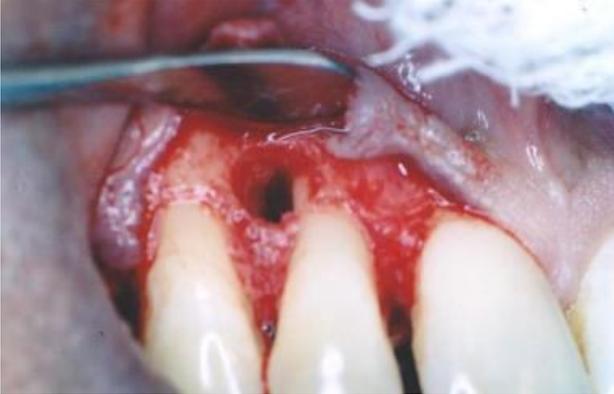
**Figure 1: Pre-operative view showing intraoral sinus formation labially in relation to right maxillary lateral incisor**



**Figure 2: Pre-operative palatal view**



**Figure 3: Reflection of the flap – a labial view**



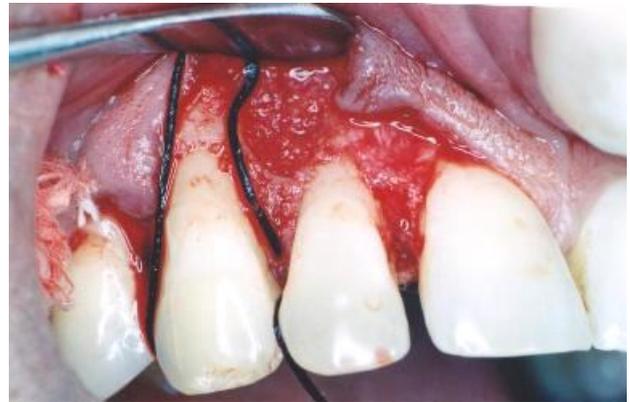
**Figure 4: Debridement of defect – A labial view**



**Figure 7: Presuturing with placement of graft**



**Figure 5: Reflection of flap and debridement of defect – a palatal view**



**Figure 8: Placement of graft – labial view**



**Figure 6: Odontoplasty for elimination of palatoradicular groove**



**Figure 9: Sutures in place – labial view**



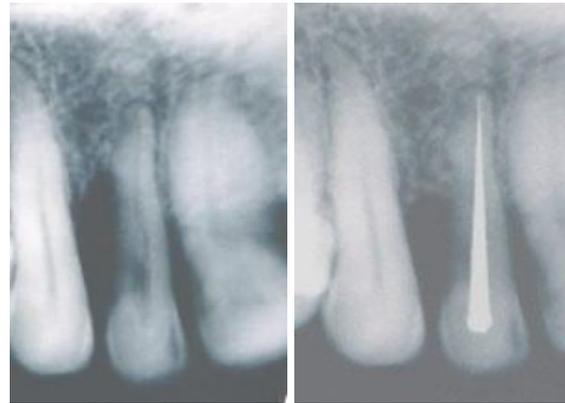
**Figure 10: Sutures in place – palatal view**



**Figure 11: Postoperative after 1 month – labial view**



**Figure 12: Postoperative after 1 month palatal view**



**Figure 13 preoperative radiograph**

**Figure 14 postoperative radiograph**

### **Discussion:**

Palatoradicular grooves in maxillary incisors in some cases may require endodontic treatment if there is a pulpal involvement.<sup>14,15</sup>

The PRG is a morphological developmental anomaly of maxillary incisors. The palatal groove originates in the region of cingulum, extending towards and most frequently ending up at the CEJ. These groove usually being in the central fossa cross the cingulum and directs down the root.<sup>16</sup>

PRG s, found primarily on maxillary incisors, are observed in 8.5% of individuals and are associated with increased plaque accumulation, clinical attachment and bone loss.<sup>1</sup>

PRG is mostly found in maxillary lateral incisors and have been implicated as an initiating factor in localized gingivitis and periodontitis. Focal loss of periodontal attachment associated with these grooves, some of which may extend to the apical third of the root could result in a hopeless prognosis for tooth retention. Although the extension of enamel in the groove has been suggested as a possible factor in the progression of localized periodontal disease.<sup>17</sup>

Pecora et al studied the incidence of radicular grooves in maxillary incisors. Radicular grooves were present in 3.9% of the patient. Most of them were presented on palatal surface of maxillary lateral incisors 3%.

Maxillary central incisors showed an incidence of 0.9% of radicular grooves.<sup>18</sup>

Albaricci et al studied the prevalence and different morphological conditions of the PRGs in 376 maxillary lateral and central incisors.<sup>20</sup> Prevalence in the lateral incisors was 11.1% with higher prevalence in the proximal localization (62.8%), origination was from the central fossa (57.1%) prominence was in the oblique trajectory (62.8%). Of all these teeth, only 8.6% of PRG reached the root apex, while 97.1% were considered to be flat (<1mm).<sup>2</sup>

Periodontitis associated with endodontic lesions are among the most important diagnostic and therapeutic challenges faced by periodontist.<sup>4</sup> Simon et al's<sup>5,19</sup> 15 classification system distinguishes pulpal-periodontal problems into the five categories : 1. Primary endodontic lesions. 2. Primary endodontic lesions with secondary periodontal involvement. 3. Primary periodontal lesions. 4. Primary periodontal lesions with secondary endodontic involvement. 5. "true" combined lesions.

Periodontal complications due to PRGs are relatively rare. Diagnosis of a pulpal and periodontal lesion represents a dilemma if PRG is the etiological factor. This is because a radicular groove can act like a "funnel", leading microbial plaque accumulation and leads gingivitis, localized periodontitis and even pulpal necrosis.<sup>3</sup> Accessory canals connecting to the pulp in the depth of grooves could lead to bacterial ingress to the pulp space.<sup>11</sup> Pulp involvement could result due to the introduction of bacterial toxins via channels that excised between the root canal system and the groove.<sup>12</sup> However, conventional endodontic treatment alone will not be effective, because the bacterial etiology is residing extra -radicularly, as a self-sustaining lesion.<sup>12</sup> Successful treatment of PRG depends on the ability to eradicate inflammatory irritants, by eliminating the groove.<sup>8</sup> Radiculoplasty is recommended to eliminate the groove, which often harbours bacteria and debris leading to a local inflammatory reaction.<sup>22</sup>

## Conclusions:

Conservation of teeth is the main criteria of today's practice. There should be knowledge of different tooth anomalies, their significance in etiopathogenesis of periodontal disease. A proper diagnosis of lesions affected by both periodontal and pulpal disease is essential for the successful treatment of these complex lesions. It is important to recognize the role of deep palatoradicular groove as a contributing anatomical factor in the progression if localized periodontic-endodontic lesions.

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