

Prevalence of Palato Radicular Groove in Maxillary Lateral Incisors

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Abstract: Palate radicular grooves, also called Palato gingival grooves or radicular lingual grooves are developmental anomalies in which an infolding of the inner enamel epithelium and Hertwig's epithelial Root sheath create a groove that passes from the cingulum and extend varying distances apically on to The root. The purpose of this study was to determine the prevalence of palato gingival groove in maxillary lateral incisors. 100 patients of age ranged between 15-30 years.

Patients with missing or crowned lateral incisors were excluded from the study. All lateral incisors were carefully examined for the presence, extension of palato gingival groove. The prevalence of palato gingival groove was 20%. They were found to be 12.5% as coronal groove and 7.5% as an apical groove. Bilateralism was found to be 45%, 52% for coronal and 48% for apical grooves. It was concluded that prevalence of palate gingival groove is high.

Key words: Palato gingival groove (PGG), Maxillary lateral incisors

I. Introduction

The area of maxillary lateral incisor is an area of embryological hazards. A great number of major and minor malformations occur in this area, for instance cleft palate, the glubulomaxillary cyst and missing or supernummary and peg shaped lateral incisors. The dens in dente are also found more frequently in this area than anywhere else in the dentition. Another mild anomaly or variant occurring in this region is the Palatogingival groove.1 Palato gingival groove is also termed as palatal radicular groove, radicular anomaly, distolingual groove and radicular lingual groove. Majority of palato gingival grooves affect maxillary lateral incisors and may result from an infolding of the enamel organ and Hertwig's epithelial root sheath (HERS).2, 3 Developmental infoldings may result in defects that can provide a pathway for pulpal pathology.4 In such cases of malformations bacterial invasion and hence bacterial infection of the pulp is often the cause of pulpal inflammation or tooth loss. In 1958, Oehlers described for the first time a radicular invagination of an upper lateral incisor in a Chinese female. At this time, the idiom "groove" was not in common in the dental literature. Later Lee et al formulated the term "groove" when presenting a case report concerning palatal grooves in maxillary laterals.5 PGG is not a rare condition, mostly occurring on the palatal aspect of maxillary lateral incisors with no history of dental caries or trauma, but which makes the tooth non vital and causes loss of attachment. 6,7, 8

II. Methodology

This study was carried out on 100 adult patients (200 maxillary lateral incisors) of both genders aged 15-30 years. Any patient with crowned or missing maxillary lateral incisors was excluded from the study. Both right and left maxillary lateral incisors were carefully examined for the presence and extension of PGGs and the presence of caries in the grooves, using a mouth mirror and dental explorer. The groove extension was categorized into coronal grooves (coronal to cement enamel junction), and apical grooves (extended to the root, beyond the cement enamel junction).

III. Results

The prevalence of PGG was 20 %, 12.5 % for coronal groove and 7.5% for apical grooves. (Table 1)

Bilateralism of the PGGs was calculated and was found to be 45%, 52% for coronal groove and 48% for apical groove. (Table 2) In male patients the prevalence was 65% and in female patients was 35% regardless of the type of grooves.

IV. Discussion

Palato gingival grooves, also called palatoradicular grooves or radicular lingual grooves, are developmental anomalies in which an infolding of the inner enamel epithelium and Hertwig's epithelial root sheath create a groove that passes from the cingulum and extend varying distances apically on to the root. PGG is not a rare condition, mostly occurring on the palatal aspect of maxillary lateral incisors with no history of dental caries or trauma, but which makes the tooth non vital and causes loss of attachment.^{6, 7, 8} The predominance of PGG in the lateral incisor ^{9, 10} can be due to the undesirable position of the tooth during the growth of maxilla. While it is still a tooth germ, it becomes trapped between the central incisor, canine and first premolar, that are in a more advanced phase of dental development.

Many studies have been conducted evaluating the prevalence of PGGs. The prevalence of this study was almost equal to the study done by Albaricci et al ¹¹ and the study done by Abdulaziz Al Rasheed¹². The result of this study was high compared to the results reported by Kogan. He stained teeth with methylene blue inspected them microscopically and reported PGG in 5.6% in lateral incisors.¹⁰ This high difference could be attributed to different methodology used, as they conducted their research on extracted teeth.

The occurrence of coronal and apical groove in this study was not equal. The number of coronal grooves (12.5%) was almost twice to the number of apical groove (7.5%). This is different from what Evertt and Kramer¹³ reported and according to their study the prevalence of PGG was less than 2%, and only 0.5% extended to the apical area.

Gao et al ¹⁹⁸⁹¹⁴ found that the deepest part of the groove is usually in the cervical region by using scanning electron microscope. In the deepest groove, the remaining dentin thickness was only 360 micro meter. 1 to 3 accessory foramina, 15 micro meters to 200 micro meters in diameter, were found at the base or in the lateral wall of the groove in most teeth. Corresponding foramina were observed on the pulpal side and occurred above or below the level of the epithelial attachment.

The author speculates that bacterial penetration through these accessory canals is the primary etiological path of pulpal disease in teeth with simple form of PGGs. Bilateralism occurs in this study at moderate level. This may indicate that, during tooth development, the events that have occurred on one side did not occur on the other side when it is unilateral, which may cause this uneven distribution of the groove expression between the right and left sides.

V. Conclusion

Although the prevalence of palato gingival groove is only 10% in this study, we should have an eye to recognize them early and diagnose their extent, caries extension (if present) and pulpal involvement in order to prevent the patient from periodontal destruction.

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Ablence Of Palato Gingival Grooves

	Frequency (n=200)	Percentage %	Total
No Groove	160	80	80%
Coronal Groove	25	12.5	20%
Apical Groove	15	7.5	

Table 2: Bilateralism Of Palato Gingival Groove

Groove	Frequency	Bilateralism %	Total
Coronal (n=25)	13	52	45%
Apical (n=15)	5	48	