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PALATO GINGIVAL GROOVE;

FREQUENCY OF PALATO GINGIVAL GROOVE IN MAXILLARY LATERAL INCISORS.

Asad Mahmood[1], Mustafa Sajid[2], Muhammad Jamil[3], Muhammad Waheed Tahir[4]

1. BDS, MSc (UK)
Assistant Professor & Head
Department of Oral Biology,
Lahore Medical and Dental College
Lahore.
2. BDS, FCPS
Assistant Professor
Department of Operative Dentistry
Multan Medical and Dental College
Multan, Pakistan.
3. BDS MSC (Bristol) FDSRCS
Edinburgh
Associate Professor
Department of Operative Dentistry
Multan Medical and Dental College
Multan.
4. BDS, FCPS
Assistant Professor
Department of Oral & Maxillofacial
Surgery
Allama Iqbal Medical College/
Jinnah Hospital Lahore, Pakistan.

Correspondence Address:
Dr. Asad Mahmood
House No 661A-1 Township Lahore.
asad661@hotmail.com

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ABSTRACT… Introduction: The palatogingival groove (PGG) is an anomaly which considered as a developmental defect. In 1908, this anomaly was first of all described by Black. According to him this palatogingival groove starts just beneath the cingulum and travels towards the apex from cementoenamel junction. Palatogingival groove presents variation in depth and length along the root. **Objectives:** To determine frequency of palatogingival groove in maxillary lateral incisors, as early diagnosis can prevent the development of caries and periodontitis. **Study Design:** Cross sectional study **Setting:** Department, Ibn-e-Sina Hospital Multan. **Period:** Six months from Jan to June 2017. **Material & Method:** In patients oral cavity both right and left side were inspected and the groove extension was assorted into, coronal grooves (coronal to cement enamel junction), and apical grooves (extended to the root, beyond the cement enamel junction). **Results:** The PGG prevalence rate in the population has been reported to be between 2.8% and 8.5%. **Conclusion:** The frequency of palatogingival groove was 9%. Bilateralism of the PGGs was calculated and was found to be 62.2%. 30% caries was present in all cases. Palatogingival groove can cause marginal periodontitis, pulpal necrosis and apical periodontitis. Early diagnosis can prevent the development of caries and periodontitis.

Key words: Bilateralism, Caries, Palatogingival Groove (PGG), Periodontitis.

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INTRODUCTION

The palatogingival groove (PGG) is an anomaly which considered as a developmental defect. In 1908, this anomaly was first of all described by Black. According to him this palatogingival groove starts just beneath the cingulum and travels towards the apex from cementoenamel junction. Palatogingival groove presents variation in depth and length along the root.[1] There are some other names by which this groove is also recognized like disto-lingual groove, corono-radicular groove, radicular lingual groove, the radicular groove, palato-radicular and facial radicular groove. Its etiology has not clearly been identified, but researchers believe that the most accepted reason behind this anomaly is the self-folding of enamel organ and epithelial sheath of hertwig. Some clinicians believe that groove as a variant of dens invaginatus (DI). But some researchers believe an altered gene mechanism, a key reason behind this PGG.[2]

Some studies have shown that this anomaly develops when the main root trunk tries to form another root.[2] The prevalence of PGG lies between 2.8% and 8.5%.[1] According to some researchers localized periodontitis may develop by this groove, which may be accompanied or unaccompanied with pulpal pathosis. Complexity, depth and extent of the groove determines the final outcome of periodontitis and pulpal vitality.[3] According to its position on tooth this palatogingival groove has been classified into mesial, distal and central patterns. Patients having PGG, presents with the clinical symptoms of intermittent dull pain, discharge of pus and tooth mobility. But on taking history and clinical examination evidence of trauma or caries does not exist. Pulp vitality shows negative results. Clinical presentation of palatogingival groove is funnel shaped hollow grooves. Sometime plaque and calculus also gets accumulated in this groove and act as secondary source of periodontitis.[4]

Based on the depth and length, PGG can be categorized into three types according to it: Type I, in which the groove is short (not exceeding the cervical third of the root) and superficial; Type II, in this the length groove is more (beyond the cervical third of the root) but again it is superficial; and Type III, in which the groove is long (beyond the cervical third of the root) and deep, and may relate to a complex system of root canals.[5]

Both clinical and radiographic findings present the knowledge of tooth anatomy and the etiology on which a perfect diagnosis can be established.[1,3] The most pronouncing clinical features of PGG are localized periodontitis accompanied by pain on percussion and presence of groove on the lingual aspect of tooth with discharge of pus. Negative results are achieved by the electric and thermal tests. Pear shaped radiolucency on coronal region was detected by the periapical radiograph and a radiolucent "para pulpal" line superimposing over the root canal. Radiograph revealed the apical periodontal ligament widening. A combined perio-endo lesion is diagnosed on the basis of clinical finding and radiograph.[3,6]

Rationale of study is that by the early diagnosis of this palatogingival groove (PGG), periodontitis can be prevented and the risk of development caries in lateral incisors is prevented as it becomes difficult to treat at their later stages.

This type of study had never done before in this region of country.

MATERIAL AND METHOD

A study was designed and 500 adult patients were examined (1000 maxillary lateral incisors) which includes both genders aged 20-45 years, recruited from Operative Department, Ibn-e-Sina Hospital Multan. In the patient's oral cavity, both left and right maxillary lateral incisors were inspected carefully to detect any groove along with its extension and if the groove is present then to detect either any carious activity going on in this grooves or not, by using a mouth mirror and dental explorer. The groove extension was assorted into, coronal grooves (coronal to cement enamel junction), and apical grooves (extended to the root, beyond the cement enamel junction). Teeth were dried and under efficient light condition, caries presence was examined with the help of dental explorer tip over the grooves looking for stickiness, avoiding apically directed forces. Patients with one or both missing lateral incisors were excluded from the study. Patients with impacted lateral incisors should not be considered for this study and patients with retained deciduous lateral incisors were also excluded from the study.

RESULTS

The frequency of palatogingival groove was found to be 9 %, out of the percentage for coronal groove was found to be more as its 5.2% while apical grooves was only 3.8%. (Table-I). In male patient's frequency of palatogingival groove was 54.4% and in female patient's frequency was 44.6% regardless of type. Bilateralism of the PGGs was calculated and was found to be 62.2%; 65.3% for coronal groove and 55.2% for apical groove (Table-II). Prevalence of caries in palatogingival groove was found to be 30%; but here a bit on lesser extent for coronal groove (28.8%) as compared to apical groove which was 31.8%. (Table-III).

	No.	Percentage%	Total
No Groove	910	91	91%
Coronal Groove	52	5.2	9%
Apical groove	38	3.8	

Table-I. Frequency of palato gingival grooves

	Frequency	Bilateralism%	Total
Coronal groove (n=52)	34	65.3	62.2%
Apical groove (n=38)	21	55.2	

Table-II. Bilateralism of palato gingival groove

	Frequency	Caries%	Total
Coronal groove (n=52)	15	28.8	30%
Apical groove (n=38)	12	31.5	

Table-III. Prevalence of caries in palato gingival groove

DISCUSSION

Palatogingival groove is a morphological variation

which affects maxillary incisor teeth with a rate of affliction seen to be higher in lateral incisors (4.4-5.6%) compared to central incisors (0.28-3.4%). This groove basically represent itself as a variation in tooth's crown structure, but is clinically significant because it succors as an ideal port for plaque accumulation, and later on the microorganisms from where focal periodontitis can initiate. More than 50% of the palatogingival grooves are seen to extend beyond the cemento-enamel junction onto the root surface. Amongst these grooves traversing the root, 43% have shown to extend apically <5 mm in distance, 47% between 6 and 10 mm and 10% have shown extension beyond 10 mm. Based on the invagination of the groove towards the pulp cavity, these have been termed as shallow/flat (<1 mm), deep (>1 mm) and a closed tube. Severity and complexity of the pathology developing secondary to the groove is greatly dictated by its depth, extent, and tortuousness.[7]

Shallow grooves are less likely to cause severe destruction as they are superficial and do not communicate with the pulp and represent only a minor in folding of the Hertwig's epithelial root sheath. On the other hand, complicated deep grooves communicate with the pulp cavity either laterally or apically owing to their severe depth and extent on the root. They have more role in developing complex endo-perio lesions, have guarded prognosis, and management in most cases demands an interdisciplinary approach.[8]

The prognosis of the palatogingival groove depends on its depth, extent, and complexity. Various therapeutic options are recommended, such as the granulation tissue curettage[9], restoration of the palatogingival groove at the coronal aspect, endodontic treatment as primary or secondary lesion, and surgery procedures.[10] The surgery procedures involve additional root resection, radiculoplasty, GTR, and bone grafting. The radiculoplasty is basically involves to remove groove of the root surface, and to change the wrinkled root form to the relatively flat and smooth normal root morphology with the help of hand curettes and rotary burs.[13] Whether or not to handle the groove was a controversial issue. Numerous cases recommended grinding and flattening the groove[11,12], but others believed that only a flap procedure with removal of the granulation tissue, careful scaling, and root planning instead of odontoplasty were necessary to achieve new attachment.[9]

Prevalence of palatogingival groove is 9% which infect is almost comparable with the study of Eanes, who correlated the morphologic features of radicular groove with palatogingival groove. According to Eanes the prevalence of palatogingival groove was 8.5%.[14]

In this study bilateral palatogingival groove is present only in 62.2% cases which shows that all the cases don't have bilateral palatogingival groove. This shows that at the time of tooth development, the events that took place at one side did not took up on the other side of the arch.

Between 2.8–8.5%, prevalence rate of palatogingival groove, has been reported by various studies. The incidence in Chinese people revealed a higher percentage of 18%, with an important racial link.[7] This study also stated that prevalence of palatogingival groove is 9%. Caries prevalence in this study is 30%; out of which 28.8% in coronal groove and 31.5% in apical grooves indicating that groove may facilitate plaque growth by providing surface areas sheltered from cleaning efforts as well as host defense mechanism. It's not mandatory that every PGG has to develop carious lesion.

Result of my study is also comparable with the study of Bangesh who stated that prevalence of palatogingival groove was 6.75% and 3.25% in coronal and apical region respectively.[15] But sample size of Bangesh study is far less than that of my study.

CONCLUSION

Prevalence of palatogingival groove is 9%. The presence of palatogingival groove can be a causative factor for marginal periodontitis, pulpal necrosis and apical periodontitis. Early diagnosis can prevent the development of caries and periodontitis.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Asad Mahmood	Conceiving & designing study, Manuscript writing.	
2	Mustafa Sajid	Data collection, Analysis and interpretation of data.	
3	Muhammad Jamil	Proof reading and editing.	
4	M. Waheed Tahir	Title and data analysis.	