

## FREQUENCY OF CONGENITAL PALATOGINGIVAL GROOVE IN MAXILLARY LATERAL INCISORS IN PESHAWAR, KHYBER PAKHTUNKHWA

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### ABSTRACT

**Objective:** *The purpose of this study is to determine the frequency of congenital palatogingival grooves in Maxillary lateral incisors in the outpatients of Peshawar Dental College.*

**Materials & Methods:** *This is a descriptive cross-sectional study in which a total of 142 patients (65 males and 77 females) above 9 year age, visiting outpatient department of Peshawar Dental College and hospital, fulfilling the inclusion criteria were included in the study. The data so collected were analyzed by using SPSS version 20.*

**Results:** *The frequency of palato-gingival groove in upper lateral incisor was 21.1%*

**Conclusion:** *Further study is needed by using Cone Beam Computed Tomography (CBCT) to enhance the accuracy of the required results and signify the importance of the groove.*

**Keywords:** *Palatogingival, Groove, Maxillary Lateral Incisors, Congenital, Cone Beam Computed Tomography,*

### INTRODUCTION

The palato-gingival groove is a developmental groove which is present on the palatal surface of maxillary incisors,<sup>1</sup> can provide the area for food stagnation that can lead to carious lesion and periodontal problems like gingivitis, periodontal pocket formation and periodontitis. It was first described by Black in 1908, it is considered as a congenital anomaly of shape, which occurs in gastrulation period of embryonic life<sup>2</sup> alternatively, it is an ectopic anomaly.<sup>3</sup> They are commonly found in maxillary lateral incisors.<sup>4,5</sup> The groove is located in the central fossa and can extend distoapically, from where it crosses the cingulum and can extend apically with various lengths.<sup>6</sup> However most of the palatogingival grooves terminate on the cingulum.<sup>7</sup> The palatogingival grooves are classified on the basis of organization of developmental tissue.

The exact etiology is not yet known but it is assumed that morphogenesis of dental root is formed by cervical loop and Hertwig epithelial root sheath, as it moves towards the root apex.<sup>3</sup> A disturbance in the developing maxilla will impoverish the lateral incisor tooth germ of adequate space to develop, thus the palatogingival groove may occur as a result of tooth germ folding.<sup>3,8</sup> Some workers consider that this anomaly can be a hint of incomplete attempt for supernumerary root formation.<sup>9</sup> The detection of these grooves is difficult in dental radiographs because it is superimposed by pulp cavity.<sup>10</sup>

The anatomical variations of dental roots can be associated with development of periodontal disease.<sup>11,12,13</sup> These are associated with poorer periodontal health, such as plaque, bleeding and deeper periodontal pockets.<sup>14</sup> The presence of palatoradicular groove is associated with a poor periodontal treatment outcome.<sup>14,15,16</sup> The incidence of palatogingival groove was found in 9.5% of Brazilian population,<sup>17</sup> while in Lahore, Pakistan palatogingival groove was observed in 10.3% of the cases.<sup>18</sup> Some of the studies did not find any difference regarding gender. In a

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study done on Mongolian and Indo-European stock, male to female ratio of 3:1 was observed.<sup>7</sup>

We hypothesized that palatogingival groove is related to carious lesions, gingivitis, periodontal pocket formation and periodontitis. No study has yet been done to determine exact incidence of palatogingival groove in Khyber Pukhtunkhwa province of Pakistan. The aim of the present study is to collect data for frequency regarding this congenital anomaly in our local population of Peshawar, Khyber Pakhtunkhwa.

The objective of this study was to determine the frequency of palatogingival grooves in Maxillary lateral incisors in the outpatients of Peshawar Dental College, along with their associated complications.

**MATERIALS AND METHODS**

This is a descriptive cross-sectional study in which a total of 142 subjects of both gender (65 males and 77 females) above 9 year age, of Peshawar population from Peshawar Dental College and Hospital, warsak road, were screened. Patients with missing or extracted maxillary lateral incisors, direct or indirect restoration ( fillings and crown) in maxillary lateral incisors or any other congenital disease (peg shape lateral incisors) were excluded from the study.

Patients, visiting outpatient department of Peshawar Dental College and hospital, fulfilling the inclusion criteria were included in the study. All the standard research protocols were followed. Written informed consent was taken from the patient or the guardian after explaining benefits and risks of the study and the procedure.

The patient’s maxillary lateral incisors (left and right) were examined thoroughly under proper illumination. The data were collected by a special designed proforma by considering the frequency of palate-gingival groove, age and gender.

The data so collected were analyzed by using SPSS version 20. Frequencies and percentages were calculated for categorical variables like palato-gingival groove and gender. Chi-square test was used to compare the frequencies of variables between genders

**RESULTS**

A total of 142 patients; of which 65(45.8%) males and 77 (54.2%) females were included in the

study. The age range was 10 to 60 years with mean age of 34.65±11.47 years. Age group distribution showed that maximum number(48) of patients were in the 21-30 years age group . The individual percentages and frequencies are shown in Fig 1 and table 1.

The frequency of palato-gingival groove in upper lateral incisor was 21.1% (Table 2). Of total 142 sample

**Table 1: Age Distribution of Patients**

Age (yrs)	Frequency	Percent
9-20	16	11.3
21-30	48	33.8
31-40	34	23.9
41-50	34	23.9
51-60	10	7.0
Total	142	100.0

**Table 2: Frequency of palato-Gingival Groove**

	Frequency	Percent
Present	30	21.1
Absent	112	78.9
Total	142	100.0

**DISCUSSION**

In our study the frequency of palato-gingival groove in upper lateral incisor was 21.1%. Only 2.82% had subgingivally located palatogingival groove while 18.3% had supra-gingival location of palatogingival groove in the whole sample in the present study. Of total 42.8% had centrally located palatogingival groove. Of total 31 patients with PPG present 77.4% have supragingival location while 22.58% have subgingival PGG present.

Albaricci MF.<sup>18</sup> carried out an in-vitro study on prevalence and features of palato radicular groove. The sample size was 376 maxillary incisors. The examiner self-examined the presence of groove, its location, origin, extension of the groove and its depth using magnification glass. . The examiner found prevalence of (11.1%), with proximal location in (62.8%), origin of the groove from central fossa were in (57.1%), apical extension of PRG to the apex in (8.6%). Thus, with the presence of PRGs, the periodontal involvement becomes more severe and in few cases can reach to the pulp cavity causing pulp exposure.

The results Albaricci MF.<sup>18</sup> are similar to the current results except in the present study no extension measurement was done, only supragingival and subgingival location was evaluated. The prevalence of PGG in our study is greater than Albaricci MF.<sup>18</sup> study, the reason for this may be the smaller sample size, genetic, ethnic variations and the study was conducted on extracted teeth.

Withers JA.<sup>16</sup> determined the prevalence of the PGG in 531 maxillary incisors and reported that the prevalence of the palato-gingival grooves in the 531 individuals examined was 8.5%. Most of the palato-gingival grooves (93.8%) were in maxillary lateral incisor teeth. The low prevalence of PGG in Withers JA study may be due to smaller sample in the current study, genetic and ethnic variations.

Iqbal N et al.<sup>19</sup> in a study conducted on population of Lahore, Pakistan reported (10%) of presence of palato-gingival groove which includes (6.7%) of coronal groove and (3.25%) of apical extension of the groove. The differences in results may be due to ethnic and genetic factors.

Eighteen patients (12.7%) had carious lesion in the palatogingival groove in the current study. Iqbal N et al.<sup>19</sup> reported caries prevalence was 18.5% in total; 31% for coronal groove and 69% for apical groove. These are similar to our results.

## CONCLUSION

Further study must be conducted by using Cone Beam Computed Tomography (CBCT) to enhance the accuracy of the required results and signify the importance of the groove, and its prevention by pits and fissure sealants.

## REFERENCES

- Fuller JL, Denehy GE, Schulein TM. Concise Dental Anatomy and Morphology. 5th ed. New Delhi: Arya Publications; 2010
- Black GV (1908). Operative dentistry: pathology of the hard tissues of teeth. Medico-Dental Publ: Chicago.
- JP Ennes, VS Lara. Comparative morphological analysis of the root development groove with the palatogingival groove. Oral Dis.2004 Nov;10(6):378-82.
- Pindborg JJ (1970). Pathology of the dental hard tissues. W.B. Saunders: Philadelphia.
- Pkora JD, Cruz Filho AM. Study of the incidence of radicular grooves in maxillary incisors. Braz Dent J 1992;3:11-16.
- Everett FG, Kramer GM. The disto-lingual groove in the maxillary lateral incisors: a periodontal hazard. J Periodontol 1972;43:352-61.
- Kogon SL. The prevalence, location and conformation of palate-radicular groove in maxillary incisors. J Periodontol 1986;57:231-34.
- Atkinson SR. The permanent maxillary lateral incisor. Am J Orthodontol 1943;29:685-98.
- Goon WWY, Carpenter WM, Brace NM, Ahlfeld RJ. Complex facial radicular groove in a maxillary lateral incisor. J Endodon 1991;17:244-48.
- Estrela C, Pereira HL, Pe'cora JD. Radicular grooves in maxillary lateral incisor: case report. Br Dent J 1995;6: 143-46.
- Hou GL, Tsay CC. Clinical significance of tooth morphology correlated with periodontal disease-i. Kaohsiung J Med Sci 1997;13:200-12.
- Leknes KN, Lie T, Selvig KA. Root grooves: a risk factor in periodontal attachment loss. J Periodontol 1994;65:859-63.
- Pustiglioni FE, Romito GA. Influencia das concavidades radiculares nas perdas clínicas de inserção, detectadas no exame clínico periodontal inicial. Rev Odontolol Univ Sa'o Paulo 1999;13:373-81.
- Al-Rasheed A. relationship between palato-radicular groove and periodontal health in maxillary lateral incisors. PODJ 2011;31(1):154-57
- Bacic M, Karakas Z, Kaiac Z, Sutalo J. The association between palatal grooves in upper incisors and periodontal complications. J Periodontol 1990;61:197-99.
- Whithers JA, Brunsvold MA, Killoy WJ, Rahe AJ. The relationship of palato-gingival grooves to localised periodontal disease. J Periodontol 1981;52:41-44.
- Storrer CM, Sanchez PL, Romito GA, Pustiglioni FE. Morphometric study of length and grooves of maxillary lateral incisor roots. Arch Oral Biol 2006;51: 649-54.
- Iqbal N, Tirmazi S.M,Majeed H.A,Munir M.B.Prevalence of palatogingival groove in maxillary lateral incisors.PODJ 2011;31(2):424-26
- Albaricci MF, de Toledo BE, Zuza EP, Gomes DA, Rosetti EP. Prevalence and features of palato-radicular grooves: an in-vitro study. J Int Acad Periodontol 2008; 10(1): 2-5.
- Iqbal N, Tirmazi S.M,Majeed H.A,Munir M.B.Prevalence of palatogingival groove in maxillary lateral incisors.PODJ 2011;31(2):424-26