

THE FREQUENCY OF PEG-SHAPED MAXILLARY PERMANENT LATERAL INCISORS AMONG ORTHODONTIC PATIENTS OF TWO HEALTH DISTRICTS OF PUNJAB, PAKISTAN

Shabbir Hussain¹, Muhammad Azeem², Rabia Awan², Awais Ahmed³, Sadia Afif³, Usman Shakoor³₁

Assistant Professor, Orthodontics, de Montmorency college of dentistry Lahore, Pakistan

² Assistant Professor, Orthodontics, Faisalabad Medical University, Pakistan.

³ Postgraduate trainee, de Montmorency college of dentistry Lahore, Pakistan.

ABSTRACT

Objective: To determine the frequency of peg-shaped maxillary lateral incisors among orthodontic patients of two health districts of Punjab, Pakistan.

Materials And Methods: This cross-sectional study was conceived at Faisalabad Medical University and de' Montmorency College of Dentistry, Pakistan. Duration of study was from December 2016 to October 2017. Non-probability consecutive sampling technique was used. Three hundred untreated patients were included as per selection criteria. Patients with cleft lip and palate or having any craniofacial malformations were excluded. Method of clinical examination was used to find the presence of peg maxillary laterals by measuring its mesiodistal dimension with standardised digital vernier callipers, and panoramic radiographs were used to confirm the presence and size of maxillary lateral incisors.

Results: Six percent (N=18) subjects were found to be having peg-shaped maxillary lateral incisors out of 300 selected patients. Among the patients with peg laterals, unilateral-type was more common as compared to the bilateral one. Peg laterals were more common in females as compared to males.

Conclusion: Frequency of peg-shaped maxillary lateral incisors was found to be 6% among orthodontic patients of two health districts of Punjab, Pakistan.

Keywords: Maxillary lateral incisors; Peg Laterals; Frequency.

INTRODUCTION

The term "peg lateral" usually refers to a dental anomaly in which upper lateral incisors are abnormally small in mesiodistal dimensions and are more 'pointed' compared to their usual more rectangular appearance.¹ The average mesio-distal dimension of maxillary lateral incisor is 6.5 millimetres, which is about 2 millimetres narrower mesio-distally and 2 millimetres shorter cervical-incisally than the central incisor.^{2,3}

There are various theories regarding aetiology of peg-shaped maxillary lateral incisors (PL), but there is no consensus in the literature about the exact aetiology. There is a strong association of genetic factors in the occurrence of PL.^{4,5} Granat, and Chapelle⁶ proposed that with evolution, teeth dimensions got reduced and became more conic. Brook⁷ also proposed a multifactorial theory regarding aetiology of peg-shaped maxillary lateral incisors and found a general trend that more severe the hypodontia, the smaller the size of the teeth formed.⁸

The prevalence of PLs is not constant and varies population to population due to genetic influences. Prevalence rates of PLs have been reported to a range from 0.6% to 9.9%^{4,9,10} in various populations.

Correspondence:

Dr Muhammad Azeem

BDS, FCPS. Assistant Professor, Orthodontic Department, FAISALABAD MEDICAL UNIVERSITY, Pakistan.

Cell: 03458409007

Email dental.concepts@hotmail.com

Altug-Atac and Erdem¹¹ studied 3043 orthodontic patients and found that 48 patients had PLs. In a study by Kazanci et al.¹² found the prevalence of PLs 2.12%. Thus the prevalence of PLs in different populations has been reported, but there are very few studies regarding frequency of peg-shaped maxillary lateral incisors in Pakistani population.

Andrews in 1972 proposed six keys for achieving ideal occlusion: Correct molar relationship, correct tip and tipping, lack of rotations, tight contact points, and optimal occlusal plane. Bennett and McLaughlin later added the 7th key of correct tooth size mass. Any mismatch in tooth mass ratios will result in failure to achieve Andrew's six keys of occlusion, thus failing to achieve normal overjet, overbite, levelling, alignment and occlusion at the completion of orthodontic therapy. Similarly, anomalies in maxillary lateral size can cause various orthodontic, aesthetic and functional implications. If untreated, PLs can lead to disturbances in arch length, disturbances in anterior guided occlusion and can also cause psychological problems.¹³⁻¹⁷

The objective of current study was to investigate the frequency of peg-shaped maxillary lateral incisors along orthodontic patients of two health districts of Punjab, Pakistan.

MATERIAL AND METHODS

The present study was conducted from December 2016 to October 2017 after institutional approval at the Department of Orthodontics, de'Montmorency College of Dentistry, and Faisalabad Medical University. Method of clinical examination was used to find the presence of peg maxillary laterals by measuring its mesiodistal dimension with standardised digital vernier callipers, and panoramic radiographs were used to confirm the presence and size of maxillary lateral incisors. Peg-shaped maxillary lateral incisors were evaluated as conical shape crown or the mesiodistal width less than the cervical width.

Inclusion criteria were fully erupted permanent dentition except for wisdom, the absence of any craniofacial syndromes, the absence of cleft lip and palate while exclusion criteria were history of orofacial trauma, previous orthodontic or restorative treatment, the absence of any dental pathos while patients with cleft lip and palate or having any craniofacial malformations. The mean age, gender

distribution was calculated. The frequency of PLs among the selected sample was calculated in the form of percentages. The data were analysed in SPSS 21.0.

RESULTS

Twenty radiographs were randomly selected to evaluate and assess the accuracy of a single evaluator. The measurements were then repeated 14 days later and found out to be reliable. Data was found to be having good reliability and repeatability.

The mean age of the patients was 19.21 ± 4.81 years, with a minimum age of 14 and maximum of 25 years. In a sample of selected 300 patients, the frequency of PLs was found out to be 6% (N 9), the frequency of PLs was found to be more common in females and unilateral type being more common. (Table 1 & 2).

Table-1: Gender Distribution (N 18)

Parameter	Frequency
Peg lateral Patients	6%
Males having Peg lateral	25%
Females having Peg lateral	75%

Table-2: Unilateral Vs bilateral peg laterals. (N 18)

Parameter	Frequency
Peg lateral Patients	6%
Unilateral type	75%
Bilateral type	25%

DISCUSSION

The objective of the current study was to investigate the frequency of peg-shaped maxillary lateral incisors in an orthodontic population, visiting Faisalabad medical university and de'Montmorency college of dentistry, Pakistan. The current study revealed a frequency of peg-shaped lateral incisor to be 6%. The prevalence rates are comparable to other studies by Afzal et al.,¹⁹ Amin et al.,²⁰ Al-Humayani,²¹ and to the rates for black (1.5%) and white (1.3%) people.

The frequency rates were higher than as reported by Clayton (0.3%) in U.S population, by Thilander and Myrberg (0.6%) in Swedish school children, 0.7% of Icelandic population, but lower than as reported by Salama and Abdel-Megid (9%) in Saudi Arabia, and by Celikoglu²² (20.2%) in a Turkish population. The results are near similar to the one reported by Baccetti²³ (4.7%). These differences may also be attributed to genetic differences and sample size variations.

The current study showed that peg laterals were more common in females as compared to males. This is similar to the results of two meta-analyses, where the conclusion was that women are 1.35-1.37 times more likely on risk than men to have peg-laterals.^{24,25} Present study showed that unilateral peg was more common as compared to bilateral one. Our results are not by the results of studies showing that bilateral peg-shaped teeth are more common,^{11,26} but in agreement to the studies where unilateral peg-laterals were more common than bilateral ones.^{27,28}

There are various methods of calculating mesiodistal width of teeth: eyeballing, quick check of the laterals, CBCT, digital 3D methods, dividers and ruler (nearest to 0.5mm) and vernier callipers (nearest 0.1mm).²⁹ We adopted the method of vernier callipers in present study which in accordance with literature is the most accurate and reproducible method.³⁰

In this study our aim was to find the frequency of peg laterals in Pakistani population, in upcoming studies, we will focus on finding an association of peg laterals with other dental anomalies in Pakistani population with larger sample size and longer study duration.

CONCLUSION:

Frequency of peg-shaped maxillary lateral incisors was found to be 6% among orthodontic patients of two health districts of Punjab, Pakistan.

REFERENCES

- Hayat MB, Azeem M, Shah SH, UR Rehman SA. Prevalence of peg laterals in orthodontic patients having palatally displaced canines. *Pakistan Oral & Dental Journal*. 2017 Mar 31;37(1).
- Delli K, Livas C, Bornstein MM. Lateral incisor agenesis, canine impaction and characteristics of supernumerary teeth in a South European male population. *European Journal of Dentistry*. 2013;7(3):278-283.
- Yılmaz HH, Türkkahraman H, Sayın MÖ. Prevalence of tooth transpositions and associated dental anomalies in a Turkish population. *Dentomaxillofacial Radiology*. 2014 Feb 13.
- Witkop CJ, Reynolds JF. Agenesis of succedaneous teeth: an expression of the homozygous state of the gene for the pegged or missing maxillary lateral incisor trait. *American journal of medical genetics*. 1987 Feb 1;26(2):431-6.
- Alvesalo L, Portin P. The inheritance pattern of missing, peg-shaped, and strongly mesio-distally reduced upper lateral incisors. *Acta Odontologica Scandinavica*. 1969 Jan 1;27(6):563-75.
- Granat J, Chapelle P. Dental agenesis, hypergenesis and evolution. *Actualités odonto-stomatologiques*. 1988 Mar(161):31.
- Brook AH. A unifying aetiological explanation for anomalies of human tooth number and size. *Archives of Oral Biology*. 1984 Jan 1;29(5):373-8.
- Brook AH, Elcock C, Al-Sharood MH, McKeown HF, Khalaf K, Smith RN. Further studies of a model for the aetiology of anomalies of tooth number and size in humans. *Connective tissue research*. 2002 Jan 1;43(2-3):289-95.
- Arte S, Nieminen P, Pirinen S, Thesleff I, Peltonen L. Gender effect in hypodontia: exclusion of EGF, EGFR and PGF-3 as candidate genes. *J Dent Res* 1996;75:1346-52.
- Dahlberg AA, Epling PJ, Brown JA. Analysis of the shovel-shaped incisor trait. *Am J Phys Anthropol* 1956;14:386.
- Altug-Atac AT, Erdem D. Prevalence and distribution of dental anomalies in orthodontic patients. *Am J Orthod Dentofacial Orthop* 2007;131:510-4.
- Kazanci F, Celikoglu M, Miloglu O, Ceylan I, Kamak H. Frequency and distribution of developmental anomalies in the permanent teeth of a Turkish orthodontic patient population. *J Dent Sci* 2011;6:82-9
- Shah SS, Rasool G, ul Hassan F, Alam T. Prevalence of peg lateral incisors in subjects having impacted/displaced canines. *Pakistan Orthodontic Journal*. 2016;8(1):31-4.
- Bassiouny DS, Afify AR, Baeshen HA, Birkhed D, Zawawi KH. Prevalence of maxillary lateral incisor agenesis and associated skeletal characteristics in an orthodontic patient population. *Acta Odontologica Scandinavica*. 2016 Aug 17;74(6):456-9.
- Karatas M, Akdag MS, Celikoglu M. Investigation of the peg-shaped maxillary lateral incisors in a Turkish orthodontic subpopulation. *Journal of Orthodontic Research*. 2014 Sep 1;2(3):125.
- Santa-Maria FD, Mariath LM, Poziomczyk CS, Maahs MA, Rosa RF, Zen PR, Schüller-Faccini L, Kiszewski AE. Dental anomalies in 14 patients with IP: clinical and radiological analysis and review. *Clinical Oral Investigations*. 2016 Oct 20:1-8.
- Romano N, Souza-Flamini LE, Mendonça IL, Silva RG, Cruz-Filho AM. Geminated Maxillary Lateral Incisor with Two Root Canals. *Case Reports in Dentistry*. 2016 Dec 29;2016.
- Langlais RP, Langland OE, Nortje CJ. Development and acquired abnormalities of the teeth and jaws. *Diagnostic Imaging of the Jaws*. USA: Lea & Febiger; 1995. p. 103-62.

19. Afzal F, Rasool G, Bashir S, Afzal S, Gul H. Prevalence of congenitally missing maxillary lateral incisor and peg laterals in a local orthodontic population. *JKCD* 2015, 5: 2.
20. Amin F, Asif J, Akber S. Prevalence of peg laterals and small size lateral incisors in orthodontic patients- A study. *Pakistan Oral & Dental Journal*. 2011 Jun 1;31(1).
21. Al-Humayani F. Agenesis and malformation of maxillary lateral incisors in Saudi Arabian female students. *Egyptian dental journal* 2005; 51: 1-6.
22. Baccetti T. A controlled study of associated dental anomalies. *Angle Orthod*. 1998; 68: 267-74.
23. Celikoglu M, Kamak H, Yildirim H, Ceylan I. Investigation of the maxillary lateral incisor agenesis and associated dental anomalies in an orthodontic patient population.
24. Hua F, He H, Ngan P, Bouzid W. Prevalence of peg-shaped maxillary permanent lateral incisors: A meta-analysis. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2013 Jul 31;144(1):97-109.
25. Polder BJ, Van't Hof MA, Van der Linden FP, Kuijpers-Jagtman AM. A meta-analysis of the prevalence of dental agenesis of permanent teeth. *Community dentistry and oral epidemiology*. 2004 Jun 1;32(3):217-26.
26. Shah RM, Boyd MA, Vakil TF. Studies of permanent tooth anomalies in 7,886 Canadian individuals. II: congenitally missing, supernumerary and peg teeth. *Dental journal*. 1978 Jun;44(6):265-8.
27. Thongudomporn, U. and Freer, T.J. Prevalence of dental anomalies in orthodontic patients. *Aust Dent J*. 1998; 43: 395–398
28. Dwijendra KS, Parikh V, George SS, Kukkunuru GT, Chowdary GN. Association of Dental Anomalies with Different Types of Malocclusions in Pretreatment Orthodontic Patients. *Journal of international oral health: JIOH*. 2015 Jun;7(6):61.
29. Celikoglu M, Nur M, Kilkis D, Sezgin OS, Bayram M. Mesiodistal tooth dimensions and anterior and overall Bolton ratios evaluated by cone beam computed tomography. *Australian orthodontic journal*. 2013 Nov;29(2):153.
30. Shellhart WC, Lange DW, Kluemper GT, Hicks EP, Kaplan AL. Reliability of the Bolton tooth-size analysis when applied to crowded dentitions. *The Angle Orthodontist*. 1995 Oct;65(5):327-34.