Original Article

Agenesis and Malformation of Maxillary Lateral Incisors in Orthodontic Patients. A Study

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Abstract

Objective: The purpose of this study was to determine the prevalence of agenesis and malformation of maxillary lateral incisors in orthodontic patients.
Study design: Cross sectional study.
Place and Duration of Study: Department of Orthodontics, Faculty of dentistry, the University of Lahore, Pakistan; from January 2007 to march 2010.
Patients and Methods: The data (history sheets, dental casts and panoramic radiographs) of 230 patients (36.5% males, 63.5% females; mean age: 16.4 years) were randomly selected from orthodontic patient's record. Congenital absence, size and shape of maxillary lateral incisors was noted. Patients with cleft lip and palate, ectodermal dysplasia or having any syndrome were excluded from the study.
Results: The prevalence of small size lateral incisors was 5.6%. The prevalence of peg lateral was 1.3% and agenesis of maxillary lateral incisors was found in 2.17% of the patients.
Conclusion: The prevalence of small maxillary lateral incisors is high as compared to other lateral incisor anomalies.

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Key words: Prevalence, maxillary lateral incisors, malformation.

Introduction

Congenitally missing teeth are those teeth whose germ did not develop sufficiently to allow differentiation of dental tissues.[1] Aberrations in tooth morphology resulting from late disturbances during the differentiation process most commonly result in size variation.[2-6]

According to Moyers[1] there are five principal known causes of congenital absence of teeth. Heredity, ectodermal dyslasia, conditions such as rickets, syphilis and expression of evolutionary changes in the dentition. Some authorities believe that, in the future, man will have neither third molars nor maxillary lateral incisors just as we seen already to have lost fourth molars. The sequence of most commonly missing teeth after third molars are mandibular second premolars, maxillary lateral incisors and maxillary second premolars.[7]

One should not forget the relationship between congenital absence of teeth and generalized tooth size diminution. When one tooth is not developing it is important to measure all of the other teeth to ascertain any genetic field effects on general tooth size.

The most distal tooth within each group displays the greatest variability in size is the most apt to be congenitally missing and is most frequently abnormal in shape.

The average mesiodistal width of maxillary lateral

incisor is 6.5mm. Maxillary lateral incisor is usually about 2mm narrower mesiodistally and 2mm shorter cervicoincisally than that of the central incisor, although the root is usually as long, if not somewhat longer than that of the central incisor.

Maxillary lateral incisor vary in form more than any other tooth in the mouth except the third molars.[8] If the variation is too great, it is considered a developmental anomaly. A commen situation is to find maxillary lateral incisors with nondescript, pointed form; such teeth are called peg-shaped laterals.

When the mesiodistal width of lateral is much smaller as compared to average width and it is not of typical pointed peg form, then called it as small lateral incisors. They pose an esthetic problem just like peg laterals.

Several genetic and syndromic conditions[9-10] are known to the risk of hypodontia but congenitally missing teeth commonly are encountered in healthy apparently normal people.[11-12]

Patients and Methods

Pretreatment panoramic radiographs, history sheets and dental casts of 230 orthodontic patients between the chronological ages of 10 and 32 years (mean age 16.6 years) were examined. Sample included 84 males with a mean age of 15.9 years and 146 females with a mean age of 16.9 years (Fig. 1).

Subjects were drawn from the department of orthodontics, faculty of dentistry, the University of Lahore, Pakistan. Panoramic radiographs were used to confirm the presence or absence of lateral incisors. 10 years of age was chosen as the lower limit because the late forming 3rd molars starts crown mineralization at about 9 years of age. The size of maxillary lateral incisor was assessed in panoramic radiograph, which was later on confirmed by dental casts. Dental cast were especially used to differentiate between small size lateral incisors and the peg laterals which was difficult to asses on panoramic radiograph only. Dental history sheets were reliable for documenting extractions, avulsions and to rule out the presence of any systemic or metabolic disease.

The prevalence of maxillary lateral incisors was calculated by tooth absence, tooth size, shape and sex. The statistical analysis was performed with software SPSS 16.0.

Results

The prevalence of congenitally missing lateral incisors was 2.17%. Five patients presented with congenitally missing lateral incisors. Bilateral to unilateral ratio is 2:3. Lateral incisors were missing predominantly from left side. Female to male ratio is 4:1 (Fig. 2, Table 1).

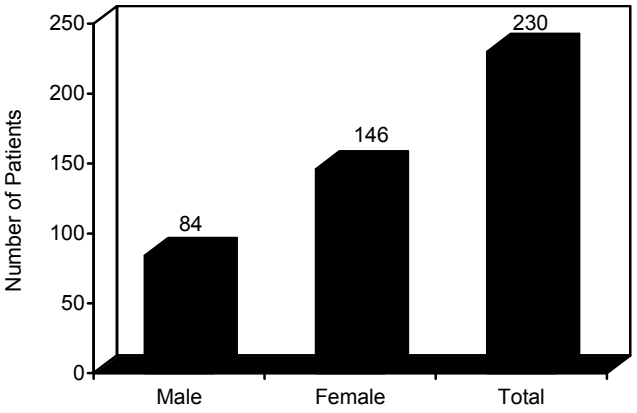

Fig. 1: Gender distribution.

The prevalence of small size lateral incisors were 5.6%. Female to male ratio is 7:6. Thirteen patients presented with small size lateral incisors. Eleven patients had bilaterally small and 2 patients with small lateral on left side only. In 11, bilaterally small laterals, 6 were males (54%) and 5 were females (45%) (Fig 2, Table 1).

Prevalence of peg laterals was 1.3%. Female to male ratio is 3:0. In 3 patients with peg laterals, two had bilateral and one had peg shaped lateral on left side only (Fig. 2, Table 1).

Comparison table of the percentage distribution between the present study carried out in Pakistan and similar studies done in other parts of Saudi Arabia is presented in Table 2.

Discussion

The frequencies of hypodontia and dental anomalies of permanent teeth vary from country to country and among races.[13]

Hypodontia (excluding third molars) is relatively commen finding in different populations. Its frequency varies from 2.3% to 8%.[14,15]

Maxillary lateral incisors were the second most commonly congenitally absent teeth as reported by

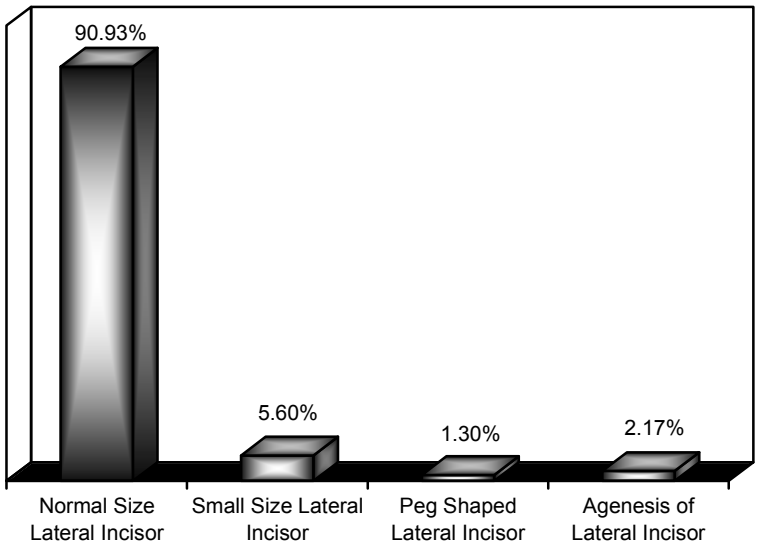

Fig. 2: Percentage distribution of normal, small laterals, peg shaped lateral and agenesis of maxillary lateral incisors for 230 orthodontic patients.

Table 1: Frequencies of maxillary lateral incisor agenesis, small size lateral incisors and peg shaped laterals by sex and side (right and left).

	F:M ratio*	BL:UL** ratio	Right side	Left side
Maxillary lateral incisor agenesis	4:1	2:3	3	0
Small lateral incisors	7:6	11:2	2	0
Peg lateral incisors	3:0	2:1	1	0

* Female: male
**Bilateral:Unilateral

Table 2: Percentage distribution of studies on agenesis, small laterals and peg shaped maxillary lateral incisors in Saudi Arabia and Pakistani population.

Authors	year	city	No. of Subjects	Subject Age	% Agenesis of MLI***	% Peg Shaped MLI	% Small Size MLI
Al-emran	1990	Riyadh	500	13 – 14 yrs	0.6%	4%	–
Salama et al	1994	Riyadh	1300	5 – 10 yrs	2.6%	0.7%	–
Al-humayani	2003	Jeddah	1500	11 – 19 yrs	0.7%	2%	–
Amin F. present study	2010	Lahore (Pakistan)	230	10 – 32 yrs	2.17%	1.3%	5.6%

*** Maxillary lateral incisor

several authors.[14,16-20] Agenesis of maxillary lateral incisors was 2.17% in the present study and it is in accordance with another study of Salama et al.[21]

Maxillary lateral incisors agenesis was comparatively low as 0.6% and 0.7% in studies of Al- Emran[22] and Al-Humayani F.[23] Both these studies were conducted on general population instead of orthodontic patients and it might be one of the cause of low prevalence rate of maxillary incisors agenesis. Another study reported high percentage which was conducted on orthodontic patients and specifically on class III and class II division 1 malocclusion. Agenesis of upper lateral incisors was observed in eleven patients (5.5%) in class III and four patients (1.9%) in class II div 1 malocclusions.[24]

Uni- and bilateral agenesis was observed equally

in both groups of class III and class II div 1 malocclusion while studies referring to population groups report higher bilateral occurance,[25] on the right[26] or left side.[27] In specific malocclusions, such as class II div 2, higher bilateral incidence was reported.[28]

Al-Emran et al studied the prevalence of hypodontia and peg shaped maxillary lateral incisors in 500 male students within the age range 13 – 14 years in Saudi Arabia. The agenesis of maxillary lateral incisors was reported as 0.6% and peg lateral incisor was observed in 4% of the sample.[22]

Salama and Abdul-Majeed conducted a study on the prevalence of hypodontia and peg shaped maxillary lateral incisors in 1300 Saudi Arabia male students within the age range of 5 – 10 years. The prevalence of hypodontia was 2.6% and agenesis of deciduous maxillary lateral incisor was present in 9% and peg shaped lateral incisor was found in 0.7% of the total sample size.[21]

Al-Hummayani F carried out a study to determine the prevalence of congenital absence and malformation of maxillary lateral incisors in 1500 Saudi Arabian female students with an age range of 11 – 19 years. The findings indicated that agenesis of maxillary lateral incisors were present in 0.7% and peg shaped lateral incisors were observed in 2% of the sample.[23]

Female to male ratio could't be assessed in above studies which were conducted in Saudi Arabia because either they are carried out on males [21,22] or females [23] only.

In the present study, females showed a slight high predilection than males. Female to male ratio was 4:1 in maxillary lateral incisor agenesis, 7:6 in small size lateral incisors and 3:0 in peg shaped lateral incisors. Table 1.

Very little material is available on internet and in other related orthodontic journals about the prevalence of undersized or small size lateral incisors and very interestingly, it was noted in this study that the prevalence of small size lateral incisors was much high as compared to agenesis and peg shaped lateral incisors.

The prevalence of small size lateral incisors was 5.6% in the present study. The ratio of bilateral to unilateral was 85% : 15%. The unilateral small size incisors were mostly present on left side only. The female to male ratio is 3: 2.

Baccetti T,[29] conducted a study to reveal pattern of associations among seven types of dental anomalies (aplasia of second premolar, small size of maxillary lateral incisors, infraocclusion of primary molars, enamel hypoplasia, ectopic eruption of first molars, supernumarary teeth, small maxillary lateral incisors and palatal displacement of maxillary canines) in an untreated orthodontic population. It was observed that the group with small size of maxillary lateral incisors and the group with infra-occlusion of primary molars showed a significant association with all other examined types of dental anomalies except for supernumerary teeth.

This study showed that the prevalence of small size lateral incisors was comparatively high as compared to other types of maxillary lateral inciror anomalies such as agenesis and peg shaped lateral incisors. The association of agenesis and peg shaped anomalies of lateral incisors to other intraoral anomalies had been shown in several studies[24,29,30] and few of the studies had shown association of small size lateral incisors with palatal displacement of canine and infra occlusion of primary molars.[29,30] Further studies are needed in this field to find out a strong association of small size lateral incisors with other dental anomalies.

Conclusion

- Maxillary lateral incisors agenesis was high in orthodontic patients and comparatively low in general population.
- In orthodontic patients, class III malocclusion showed much higher prevalence of maxillary lateral incisor agenesis as compared to other malocclusions.
- Maxillary lateral incisor agenesis, small size and peg shaped lateral incisors were found most frequently in females as compared to males.
- Bilateral to unilateral ratio of maxillary lateral incisor agenesis and peg shaped lateral incisors was almost equal.
- Bilateral occurrence of small size lateral incisors was predominantly high.
- This study showed high left side occurrence of maxillary lateral incisor agenesis, small size and peg shaped lateral incisors.
- Right side occurrence of agenesis and malformations of maxillary lateral incisor was insignificant.

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