Original Article

PREVALENCE OF CONGENITALLY MISSING MAXILLARY LATERAL INCISOR AND PEG LATERALS IN A LOCAL ORTHODONTIC POPULATION

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ABSTRACT

Objective: *The study was conducted to investigate the prevalence of maxillary lateral incisor agenesis and variation in its size in an orthodontic population and to relate its frequency with different skeletal malocclusions and gender.*

Material and Methods: *Sample consisted of 361 patients, of which 193 were female and 168 were male with the age range12-35 years. Panoramic radiographs were used to diagnose the agenesis of maxillary lateral incisor (LI) and dental casts for presence of peg laterals, <ANB was measured from lateral cephalograms.*

Results: *Thirty four (9.42%) patients were found to have agenesis of maxillary lateral incisor, of which 44.12% were female and 55.88% were male. Patient having peg laterals were 5.26%. Among the different skeletal classifications, patients with skeletal class I malocclusion had bilaterally missing LI (52.94%), patients with class II malocclusion had equal frequency of bilateral and left unilateral missing LI (38.46%) and skeletal class III patients had a greater frequency of right unilateral missing LI (75.00%). The highest incidence was of presence of bilateral peg laterals (52.63%) in both female and male patients (50.00% and 54.55% respectively).*

Conclusions: *Bilateral agenesis of LI with skeletal class I malocclusion is more common and occurs predominantly among male population.*

Key words: *Congenitally missing, Lateral Incisors, Orthodontics, Peg laterals*

INTRODUCTION

Dental agenesis is the absence of formation of one or more teeth[1] and is the most common anomaly of the human dentition[2,3,4-6]. Many studies have been carried out on the frequency of dental agenesis in different populations and the data provided so far for tooth agenesis in either genders varies between 0.3 per cent and 11.3 per cent, excluding the third molars[7-9].

In Orthodontics, hypodontia due to agenesis of certain teeth greatly affects a patient's function and aesthetics[10,11]. Although any tooth can be susceptible to agenesis, lateral incisors and second premolars show a great probability of agenesis[12]. The sequence of most commonly missing among these are mandibular second premolars, maxillary lateral incisors and maxillary second premolars[13]. Bailit[14] suggested that when a third molar is absent, agenesis of the remaining teeth becomes 13 times more likely.

Tooth agenesis is frequently associated with microdontia, delayed dental development, and some discrete tooth ectopias[15-17]. Some studies suggest that anomalies such as peg-shaped incisors, taurodontism, transposed teeth and supernumerary teeth may occur in subjects with tooth agenesis[18-22]. The most distal tooth within each group displays the greatest variability in size and is most apt to be congenitally missing and most frequently abnormal in shape[13].

After the third molar, maxillary lateral incisor varies the most in form than any other tooth in the mouth[23], and is also the second most frequently missing tooth after the third molars[3,9,24-27]. If the variation is too great, it is considered a developmental anomaly[13].

The average mesio-distal width of maxillary lateral incisor is 6.5mm. It is usually about 2mm narrower

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mesio-distally and 2mm shorter cervico-incisally than the central incisor[13]. A common situation is to find maxillary lateral incisors with nondescript, pointed form. Such teeth are called "Peg-shaped Laterals" or "Peg Laterals"[13]. When the mesiodistal width of lateral is much smaller as compared to average width and it is not of typical pointed peg form, then it is simply called as "Small Lateral Incisors". They too pose an esthetic problem like peg laterals[13].

Tooth agenesis is a congenital abnormality and genetics play a fundamental role in its etiology[28]. 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[29,30]. Molecular genetics have shown mutations in MSX1, PAX9, and AXIN2 in families with multiple dental agenesis[28,31,32]. Additionally, mutations in many other genes have been identified in syndromes and congenital abnormalities in which tooth agenesis is a regular feature[31]. According to Moyers there are five principal known causes of congenital absence of teeth. Heredity, ectodermal dysplasia conditions such as rickets, syphilis and expression of evolutionary changes in the dentiton[33].

Early recognition of a tooth agenesis is helpful in order to provide adequate treatment and prevent a developing malocclusion[34]. Orthodontic treatment may involve closure of excess space or opening a space in the arch for a prosthetic replacement or implant[9].

There is remarkably little information in the literature on the prevalence of other dental anomalies and the skeletal pattern associated with maxillary lateral incisors in an orthodontic population[35]. The aim of this study was to investigate the prevalence of maxillary lateral incisor (MLI) agenesis and variation in its size in an orthodontic patient population and to find out its frequency in combination with different skeletal malocclusions and gender.

METHODS AND MATERIALS

This retrospective cross sectional study was conducted on 361 patients in the Department of Orthodontics, Khyber College of Dentistry Peshawar. First of all written permission from institutional ethical committee was obtained.

Panoramic radiographs were used to diagnose the presence of unilateral / bilateral of maxillary lateral incisors (LI) and dental casts for presence of Peg laterals. Histories were taken and demographic variable such as gender and age were determined. To determine antero-posterior relationship of jaws <ANB was measured from lateral cephalograms. Patients with cleft lip and palate or any syndrome were excluded from the study.

RESULTS

In the sample of 361 patients, 34 (9.42%) patients were found to have agenesis of maxillary lateral incisors and 19 (5.26%) had Peg laterals. Of patients with agenesis, 44.12% were female and 55.88% were male with a male to female ratio is 1.27:1. Distribution of missing laterals according to gender distribution showed that 44.12% had bilateral expression, 23.53% had right unilateral and 32.35% had left unilateral expression. The details of this distribution are given in Table-1.

Among the different skeletal classifications, patients with skeletal class I malocclusion had a greater tendency for bilaterally missing LI (52.94%) while patients with class II malocclusion had equal frequency of bilateral and left unilateral missing LI (38.46%). The details are given in Table-2.

Among the patients with Peg laterals, the highest incidence was of presence of bilateral Peg laterals (52.63%) followed by left (26.32%) and right in 21.05% of patient. Both female and male patients had highest frequency of having bilateral Peg laterals (50.00% and 54.55% respectively). Distribution of peg laterals and gender distribution is given in Table-3.

Patients with skeletal class II were found to have

TABLE-1: Distribution of missing laterals in both genders.

Gender	Both		Left		Right		Total	
	n	%	n	%	n	%	n	%
Female	6	40.00	6	40.00	3	20.00	15	100
Male	9	47.37	5	26.32	5	26.32	19	100
Total	15	44.12	11	32.35	8	23.53	34	100

TABLE-2: Distribution of missing laterals in different skeletal classes.

Class	Both		Left		Right		Total	
	n	%	n	%	n	%	n	%
I	9	52.94	6	35.29	2	11.76	17	100
II	5	38.46	5	38.46	3	23.08	13	100
III	1	25	0	0.00	3	75	4	100
Total	15	44.12	11	32.35	8	23.53	34	100

TABLE-3: Distribution of Peg laterals in both genders.

Gender	Both		Left		Right		Total	
	n	%	n	%	n	%	n	%
Female	4	50.00	3	37.50	1	12.50	8	100
Male	6	54.55	2	18.18	3	27.27	11	100
Total	10	52.63	5	26.32	4	21.05	19	100

TABLE-4: Distribution of Peg laterals in different skeletal classes.

Class	Bilateral		Left		Right		Total	
	n	%	n	%	n	%	n	%
I	6	75.00	2	25.00	0	0.00	8	100
II	3	3.33	3	3.33	3	3.33	9	100
III	1	50.00	0	0.00	1	50.00	2	100
Total	10	52.63	5	26.32	4	21.05	19	100

the most frequent presence of Peg laterals (47.37%) followed in frequency by class I (42.11%) and class III (10.53%). Skeletal class I patients had more frequency of having bilateral Peg laterals present (75.00%) as compared to class II and III. The detail of this distribution is given in Table-4.

DISCUSSION

Agenesis of maxillary lateral incisor was found to be 9.4% in the present study which is much higher than that found in another study (2.7%) by Amin et al[36]. Al-Humayani[37] conducted a study on Saudi Arabian population and found the percentage to be much lesser (0.7%) than the present study. The results of Celikoglu[35] also concluded a lower percentage (2.4%) than the present study. The reason may be racial differences. In the present study, male patients were found to have higher percentage (55.9%) than females (44.1%) for agenesis of maxillary LI. This result is in contradiction with other studies that reported a higher percentage for female patients than males[36]. Another study[35] also reported a higher percentage of missing maxillary LI in females (2.9%) than males (1.8%).

Among the different malocclusion classes, the present study concluded a higher percentage (50.0%) for agenesis of LI in skeletal class I malocclusion, which is in accordance with other studies[35,38]. But a study carried out by Amin[36] reported a higher percentage of missing LI in skeletal class III, which is in contradiction to the results of the present study.

The frequency for bilaterally missing LI was found to be more (44.1%) in the present study than unilaterally missing LI. This is in accordance with other studies that also reported higher percentages (51.6%39 and 55.3%35) for bilaterally missing than unilateral missing LI. Between the unilateral left and right, the present study concluded unilateral left side missing LI to have higher frequency (32.4%) than the right side (23.5%). While other studies reported right side to have more frequency (71.4%35 and 27.7%39) of missing LI.

The frequency of Peg laterals in the present study was found to be 5.3%, which is higher than that reported by Al-Humayani[37] (2%) and by Amin[36,13] (1.3%). Baccetti[40] reported a somewhat similar percentage (4.7%). However, another study by Celikoglu[35] reported a much higher percentage (20.2%) for the frequency of Peg laterals in a Turkish population. This difference may also be attributed to genetic variations.

Results of our study showed that the frequency was found to be more in males (57.9%) than in females (42.1%), which is opposite to the results reported by other studies[13,35] that concluded females to have more frequency of peg laterals than in males. Another study[41] reported no significant different between both genders. Differences in the study sample and socio-demographic variable may affect such results.

In the present study it was found that the bilateral Peg laterals had a higher frequency (52.6%) than unilateral, which is in accordance with the results of the study by Amin[13]. A study by Ucheonye[42] on Nigerian population reported a higher frequency (66.7%) for unilateral right side Peg laterals than left side or bilateral (both 33.3%). Celikoglu[35] on Turkish population found that unilateral Peg laterals had a higher frequency than bilateral (ratio 19/0).

CONCLUSIONS

It is concluded from the present study that:

1. Bilateral agenesis of LI was more common than unilateral agenesis.
2. Male patients were more affected by LI agenesis.
3. Patients with skeletal class I malocclusion had higher frequency of bilateral missing LI.
4. Bilateral peg laterals were more common than unilateral.
5. Peg laterals were seen more frequent in skeletal class II patients compared to other categories.

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