

Prevalence of Microdontia Among Patients Undergoing Orthodontic Treatment

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ABSTRACT

Objective: This study was carried out to determine the prevalence of microdontia among patients undergoing orthodontic treatment.

Materials and Methods: This was a cross-sectional study conducted at Sindh Institute of Oral Health Sciences, Jinnah Sindh Medical University (JSMU) from January-2020 to May-2020. Pre-treatment casts were taken of 140 subjects. The mesiodistal dimension of each tooth was recorded through the vernier caliper. Frequency and percentage were calculated for the presence of microdontia. The test applied was Pearson's Chi-square test to assess the relationship between microdontia and variables like age and gender. P-value <0.05 was taken as statistically significant. Data analysis was performed on SPSS version 22.

Results: A total of 140 subjects were selected *i.e.* 105 (75%) females and 35 (25%) males with the age range 13-30 years and mean age of 18.29 ± 3.88 years. 42(30%) subjects presented with microdontia. Out of 42, single tooth microdontia was found in 3 (7.1%), more than one tooth microdontia, and generalized microdontia was present in 36 (85.7%) and 3 (7.1%) respectively. Microdontia was found to be more common in the maxilla (n=42, 100%) than the mandible (n=14, 33.3%). It was found more common in females (n=37, 35.2%) as compared to males (n=5, 14.3%). Statistically significant relationship was found among gender and prevalence of microdontia (p=0.019) with a statistically insignificant relationship between age and presence of microdontia (p=0.228).

Conclusion: Microdontia was found to be a frequent dental anomaly, was more common in maxilla and females with a significant association with gender.

Keywords: *Microdontia, prevalence, orthodontic treatment.*

INTRODUCTION

Among orthodontic patients, dental anomalies are observed very commonly. An unusually high rate of dental anomalies was recorded in patients seeking orthodontic treatment. Therefore, its management is included in treatment planning by a thorough examination of pre-treatment records. Roslan *et al.* had found the prevalence of microdontia *i.e.* 1.08%. The rate is between 0.7 to 12.3% among orthodontic patients [1]. Fernanda *et al.* mentioned microdontia (30.1%) in Brazilian orthodontic patients [2]. Fekonja A revealed a microdontia prevalence of 2.5%, which is in agreement with the study by Yassin *et al.* [3, 4]. According to the above studies, the prevalence of microdontia ranges from 0.7 to 30.1%.

Disturbances during the first stage of tooth development can cause abnormalities in tooth shape, size and number. There may be some local or systemic factors responsible for such disturbances. These are esthetically and functionally challenging dental developmental disturbances in size, shape and number that develop before or after birth. Due to these systemic or localized factors, the primary or permanent dentition can be

affected. Tooth size anomalies can be classified as microdontia or macrodontia [3, 5, 6]. It has been reported that in the majority of the cases microdontia has some genetic basis *i.e.* it runs in the families but has also been identified spontaneously, with unknown the etiology.

The word microdontia suggests the tooth that is morphologically small in size than normal [7]. Microdontia can be classified into three categories *i.e.* single tooth microdontia: when only one tooth is smaller than the other teeth *e.g.* peg-shaped maxillary lateral incisor. Relative microdontia: when comparatively larger jaw contains normal teeth that appear small in a larger jaw. When all the teeth are smaller than usual it is termed as generalized microdontia but, it is a rare condition. The children undergoing chemotherapy or radiotherapy during tooth development has been reported with generalized microdontia. Other causes may include Fanconi's anemia and pituitary dwarfism. The association of microdontia with syndromes has also been reported *i.e.* Williams's syndrome, Rothmund-Thomson syndrome, Gorlin-Chaudhry-Moss syndrome, Ullrich-Turner syndrome, Orofaciodigital syndrome (type 3), Hallermann Streiff, and a variety of other syndromes.

The lateral incisors in the maxillary arch and the wisdom teeth are the most common teeth affected by microdontia,

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but any of the teeth can be affected. Maxillary permanent lateral incisors that are peg-shaped have prevalence *i.e.* about 1.8%. Females are frequently affected by maxillary peg-shaped laterals than males and are found more commonly in patients with cleft lip/palate most frequently presence of microdont lateral incisor on the cleft side and in Down's syndromic patients. There has also been some association reported between microdontia and hypodontia *i.e.* when the patient is microdont there are chances of presence of hypodontia too.

The patients reporting with microdontia have esthetic concerns mainly *i.e.* they have teeth that are smaller in size than the neighboring teeth or in comparison to other teeth, the presence of space between their teeth. But, the patient can report sometimes concerns regarding functions too that is entrapment of food between teeth due to spaces or malocclusion in microdont individuals [8].

The orthodontist should carefully examine the pre-treatment records because these anomalies can cause esthetic and functional compromise among the patient so that their management can be added in treatment planning [2].

The rationale of this study was to find out the frequency of microdontia among patients undergoing orthodontic treatment as the above-mentioned studies have variable results and a wide prevalence range *i.e.* from 0.7% to 30.1%, besides there is less evidence reported about the frequency of microdontia in our population. Therefore, its frequency should be identified to aid in early diagnosis and to find out different management options in treatment planning. The objective of the study was to determine the frequency of microdontia among patients undergoing orthodontic treatment.

MATERIALS AND METHODS

This was a cross-sectional study carried out at Sindh Institute of Oral Health Sciences, (JSMU) from January-2020 to May-2020. Non-probability consecutive sampling technique was used to enroll study participants. By using the WHO sample size calculator for a single population taking reported prevalence as 15.2% [3], confidence level 95%, margin of error 6% sample size of the study was calculated as 138. We rounded it off to the nearest ten and enrolled 140 patients. The pre-treatment casts of 140 patients undergoing orthodontic treatment were taken and the mesiodistal dimension of each tooth was recorded with the help of Vernier caliper. The inclusion criteria were that both genders were included, the patients presenting with malaligned teeth and undergoing orthodontic treatment were also included. Exclusion criteria were previous orthodontic treatment, any syndrome, and cleft lip and palate. Ethical approval

was taken from the Institutional Review Board of Jinnah Sindh Medical University. This study was conducted on the patients' pre-treatment casts which were taken with written informed consent before commencing orthodontic treatment.

STATISTICAL ANALYSIS

SPSS version 22 was used to enter the data and its analysis. For age, mean and the standard deviation were calculated. For qualitative variables, frequency and percentage were calculated as for microdontia, gender, maxilla, or mandible. A Chi-square test was applied to assess the association of age and gender with microdontia. P-value <0.05 was kept as statistically significant.

RESULTS

A total of 140 subjects were selected *i.e.* 105 (75%) females and 35 (25%) males with the age range 13-30 years and mean age 18.29 ± 3.88 . Out of 140 subjects, 42 subjects presented with microdontia *i.e.* the prevalence was 30% (Fig. 1). Out of 42, single tooth microdontia was found in 3 (7.1%), more than one tooth microdontia and generalized microdontia was present in 36 (85.7%) and 3 (7.1%) respectively (Fig. 2). All 42 (100%) patients had microdontia in their maxilla while there were 14 (33.3%) who had microdontia in their mandible. The relation between age and the presence of microdontia was found to be statistically insignificant ($p=0.228$). There was a significant association between the gender of the patient and the presence of microdontia ($p=0.019$). Microdontia was more common in females ($n=37$, 35.2%) as compared to males ($n=5$, 14.3%) (Table 1).

Table 1: Presence of microdontia, association with age and gender.

Study Variables	Microdontia Frequency (%)	Normal Frequency (%)	p-value
Age			
≤20 years	29 (27.4)	77 (72.6)	0.228
>20 years	13 (38.2)	21 (61.8)	
Gender			
Male	5(14.3%)	30(85.7%)	0.019
Female	37(35.2%)	68(64.8%)	

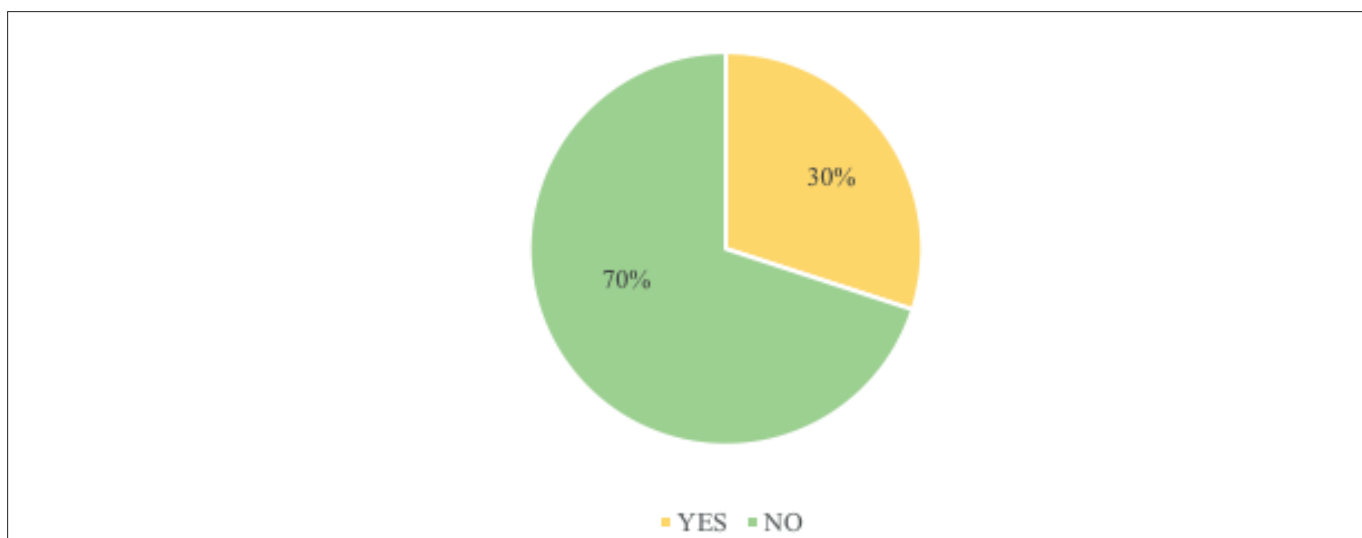


Fig. (1): Prevalence of microdontia, 30% of the patients had microdontia while it was absent in 70% of the patients.

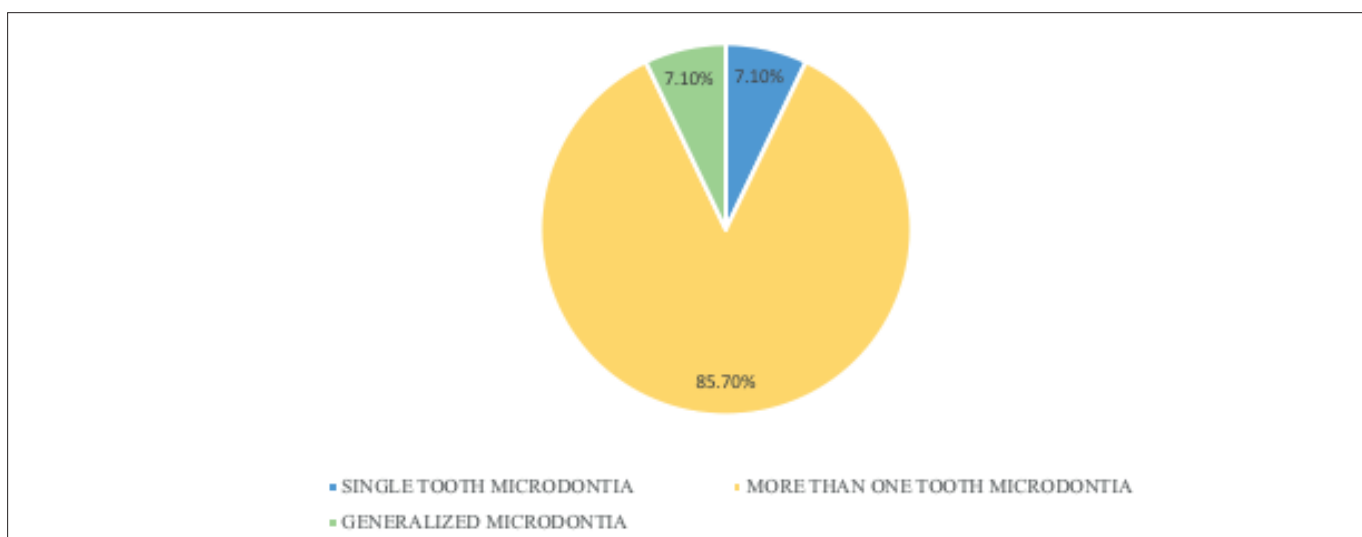


Fig. (2): Presence of microdontia, 7.1% of patients have single tooth microdontia while generalized microdontia and microdontia of more than one tooth were found in 7.1% and 85.7% patients respectively.

DISCUSSION

Multiple studies have been carried out on dental anomalies but the study regarding this dental anomaly's prevalence is lacking among patients undergoing orthodontic treatment in our population. Therefore, we have done this study to identify the prevalence of a single dental anomaly *i.e.* microdontia in our target population as a huge number of patients reporting the orthodontists has microdont tooth. A study had found the prevalence of microdontia *i.e.* 1.08% [1], another study reported the prevalence of microdontia *i.e.* 30.1%, and is more common in females [2]. Peg shaped maxillary lateral incisor prevalence *i.e.* 1.8% was found in a study and is more common in females [8]. The reported prevalence of microdontia *i.e.* 2.5 % and more common in females

were found also [3]. The prevalence was reported to be 3.08% in another study [5].

In other studies, the prevalence of microdontia was found to be in the range of 0.54%-12.5% [4, 9-20]. The lateral incisor in the maxilla was the most commonly affected tooth *i.e.* in the range of 0.6%-38.8% [21-24]. Peg shaped lateral incisor prevalence was found to be 0.1%-0.77% [25-27].

In our investigation, 30% of the patient-reported with the presence of microdontia. 7.1% of the patients reported with single tooth microdontia and 7.1% with generalized microdontia. 85.7% of patients had microdontia of more than one but less than all teeth microdontia. Among patients who reported with microdontia, 100% was present in the maxilla and 33.3% in the mandible with a

female predominance. The relationship between the presence of microdontia and age was found to be statistically insignificant. The gender and microdontia presence showed a statistically significant relationship.

Our study result supports the previous investigations *i.e.* microdontia prevalence *i.e.* 30% in our population which lies between the range reported in previous studies, more common in maxilla and females.

CONCLUSION

The results of the present study showed that microdontia was found to be a frequent dental anomaly among patients undergoing orthodontic treatment. Maxilla was affected more than the mandible. Patients reported with microdontia were mostly females indicating that it was more common in females than a male with, no influence of age. By identifying the frequency of this dental anomaly and its early detection alternative treatment modalities can be planned and done to restore the esthetics and function and to avoid any further dental complications in the future.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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