

# Prevalence of Congenitally Missing Premolars in College of Dentistry, King Khalid University, Abha, Kingdom of Saudi Arabia: Can Early Treatment Make A Difference?

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## Abstract

**Introduction:** Congenitally missing teeth are those teeth whose tooth germ did not develop adequately to allow the disparity of the dental tissues. Inherited absence of mandibular second premolars has an impact on orthodontic patients. The orthodontist should make the proper treatment plan regarding management of the edentulous space. The purpose of this study was to determine the prevalence of congenitally missing premolar in children aged 6–14 years who attended the College of Dentistry, King Khalid University, Abha KSA using OPGS.

**Materials and Methods:** In this retrospective study, a total of 1100 panoramic radiographs (OPG'S) of children who attended dental clinics at College of Dentistry, King Khalid University, Abha, were viewed for congenitally missing premolar with age group of 6–14 years. Digital orthopantomogram was examined in a standard manner under good lighting conditions. Data were collected and embarked into spreadsheet (Excel 2013: Microsoft office) and analyzed.

**Results:** A total of 1100 OPG'S were viewed for congenitally missing premolar with age group of 6–14 years. The prevalence for congenitally missing premolar was seen more in girls (59.4%) than boys (40.6%). The frequency of most congenitally missing premolar was mandibular 2<sup>nd</sup> premolar followed by maxillary 2<sup>nd</sup> premolar in both girls and boys.

**Conclusion:** Congenitally missing premolars were seen more in girls than boys, and mandibular 2<sup>nd</sup> premolar was most common missing tooth followed by maxillary 2<sup>nd</sup> premolar. Some early decisions that the orthodontist makes for a patient whose inherited mandibular second premolars are missing can influence the dental health for a lifetime. Therefore, the accurate decision must be made at the appropriate time.

**Key words:** Congenitally missing teeth, Hypodontia, Premolars

## INTRODUCTION

The most frequent developmental and congenital dental anomaly is tooth agenesis. Congenitally missing teeth (CMT) refer to teeth whose germ did not develop adequately to allow the differentiation of the dental tissues.<sup>[1]</sup> The most dental abnormalities in tooth shape, number, and position

usually lead to problems in maxillary and mandibular arch length and occlusion, which can have an influence on orthodontic treatment.<sup>[2]</sup> CMT compose the most common developmental anomaly of the human dentition, mostly arising in about 25% of the population.<sup>[3]</sup> Excluding third molars, the prevalence of tooth agenesis is approximately 4.3–7.8%. Among this, mandibular 2<sup>nd</sup> premolar is the most commonly missing teeth followed by maxillary lateral incisors and then maxillary 2<sup>nd</sup> premolar.<sup>[3]</sup> The etiology is usually attributed to MUTATION of some genes (PAX9 AND MSX1), besides to some etiological events in the prenatal and postnatal periods.<sup>[4]</sup> Epidemiological studies display less prevalence of agenesis in the black race when estimated with the white race, while Asians showed increased tooth agenesis compared to whites.<sup>[5]</sup> On basis

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of sexual differences, the prevalence of tooth agenesis in women was more affected than men.<sup>[5]</sup>

Congenitally absence of premolars affects many orthodontic patients. Early diagnosis of premolar agenesis is hindered by delayed calcification. By the age of 8 years, the dental follicle or germ should be visible on X-ray, but this may not be the case until around 11 years of age. Failure to detect an unerupted premolar may lead to unnecessary space loss, crowding, or collapse in the dental arch. Hence, it's the orthodontist who has to take the proper decision at the correct time regarding management of the edentulous space.<sup>[6]</sup>

The purpose of this study was to determine the prevalence of congenitally missing premolar in children aged 6–14 years who attended the College of Dentistry, King Khalid University, Abha KSA using OPGS and yes, early treatment can make a difference.

### MATERIALS AND METHODS

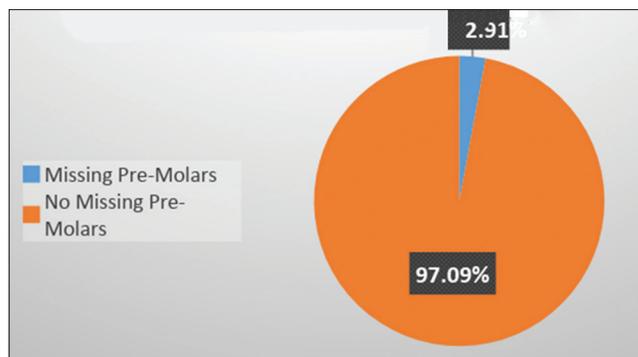
In this retrospective study, a total of 1100 panoramic radiographs (OPG'S) of children who attended dental clinics at COD, KKU, Abha were viewed for congenitally missing premolar with age group of 6–14 years. Digital orthopantomogram was examined in a standard manner under good lighting conditions, standard screen brightness, and resolution. A tooth was considered congenitally missing when the absence of crown mineralization was ruled out from the OPG'S. Data were collected and entered into spreadsheet (Excel 2013: Microsoft office) and analyzed.

### RESULTS

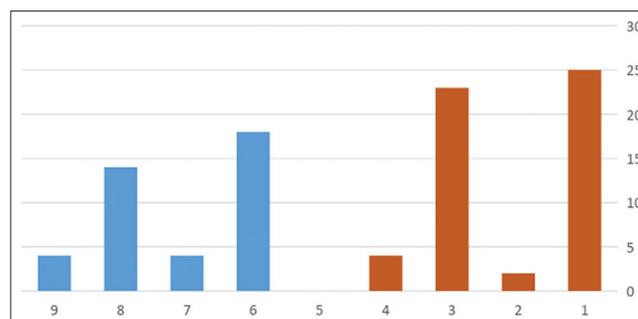
A total of 1100 OPG'S were viewed for congenitally missing premolar with age group of 6–14 years. Of these 32 (2.91%), OPG's had congenitally missing premolar as shown in Graph 1. Of these 19 were girls and 13 were boys. The prevalence for congenitally missing premolar was seen more in girls (59.4%) than boys (40.6%) as shown in Table 1. The occurrence of a total number of congenitally missing premolar was 94 in both the gender (Boys - 40 and Girls - 54). The frequency of most CMT was mandibular 2<sup>nd</sup> premolar followed by maxillary 2<sup>nd</sup> premolar in both girls and boys as shown in Table 2. Graph 2 also shows the occurrence of congenitally missing premolar by type and gender.

### DISCUSSION

Developmental dental anomalies are frequently observed during routine dental examinations.<sup>[7]</sup> When anomalies



Graph 1: Prevalence of missing pre-molars among the study subjects



Graph 2: Occurrence of missing pre-molars by type and gender

Table 1: Number of subjects with missing premolars by gender

Gender	Frequency (%)
Girls	19 (59.4)
Boys	13 (40.6)
Total	32 (100)

Table 2: Occurrence of missing pre-molars by type and gender

Gender	Tooth	Total	Frequency (%)
Girls	Lower 2 <sup>nd</sup> pre-molar	54	25 (46)
	Lower 1 <sup>st</sup> pre-molar		2 (4)
	Upper 2 <sup>nd</sup> pre-molar		23 (43)
Boys	Upper 1 <sup>st</sup> pre-molar		4 (7)
	Lower 2 <sup>nd</sup> pre-molar	40	18 (45)
	Lower 1 <sup>st</sup> pre-molar		4 (10)
	Upper 2 <sup>nd</sup> pre-molar		14 (35)
	Upper 1 <sup>st</sup> pre-molar		4 (10)
	Total	94	

in tooth number, shape, and position are seen, it leads to problems in maxillary and mandibular arch length and occlusion, and thus has an effect on orthodontic treatment planning. The etiology of these conditions is mostly related to certain genes besides to etiological events occurring in the prenatal and postnatal periods.<sup>[1]</sup> Early identification of a treatable anomaly is important in planning comprehensive management of the young child.

These anomalies develop before the eruption of the teeth and are often familial. However, since their effects may commence with the eruption of either or both primary and permanent dentitions and persist throughout life, some of the undesirable effects should be preventable. Functional, esthetic and occlusal disharmony may be recognized sufficiently early to demand interprofessional consultation and treatment in specific cases.<sup>[7]</sup> CMT constitute the most common developmental anomaly of the human dentition, occurring in approximately 25% of the population.<sup>[1]</sup>

In this retrospective study, a total of 1100 panoramic radiographs (OPG'S) of children who attended dental clinics at COD, KKV, Abha were viewed for congenitally missing premolar with age group of 6–14 years. Digital orthopantomogram was examined in a standard manner under good lighting conditions, standard screen brightness, and resolution. Of these 32 (2.91%), OPG's had congenitally missing premolar. Of these 19 were girls and 13 were boys. The prevalence for congenitally missing premolar was seen more in girls (59.4%) than boys (40.6%) as in Table 1. A total number of 94 congenitally missing premolar were seen (Boys - 40 and Girls -54). The frequency of most congenitally missing premolar was mandibular 2<sup>nd</sup> premolar followed by maxillary 2<sup>nd</sup> premolar in both girls and boys as shown in Table 2 and is similar to the results of many previous studies.

The orthodontist should decide properly regarding management of the edentulous space. These spaces can be closed or left open. If space will be left open for further restoration, for correct orthodontic treatment one should create the correct amount of space and to leave the alveolar ridge in an ideal condition for future restoration. If space will be closed, the clinician must avoid any disastrous adjustments to the occlusion and the facial profile. Some prior decisions that the orthodontist makes for a patient whose inherited mandibular second premolars are missing will affect his or her dental health for a lifetime. Therefore, the correct decision must be made at the appropriate time.<sup>[6]</sup>

The clinical inference is must because the early diagnosis of a given dental anomaly can alert the clinician regarding the dental anomalies in the same patient or family, permitting early diagnosis, and timely orthodontic management.<sup>[1]</sup> As in the present study, most frequently CMT were 2<sup>nd</sup> premolars, so early treatment can really make a difference by following Dr. Kennedy's general concept. Dr. Kennedy reported four main principles in managing missing second premolar cases: Establish the correct amount of space, preserve the occlusal table,

preserve the alveolar ridge set up treatment in such a way that the incisors will be in the correct positions at the end of treatment.<sup>[8]</sup>

In prevalent terms, patients with minimal crowding, deep overbites, retrusive incisors, decreased lower facial height, and flat mandibular plane angles are typically best managed by nonextraction. In such cases, provided there is sufficient root support and absence of infraocclusion, retain the primary second molars for as long as possible. Patients with greater amounts of crowding molar or midline asymmetries, protrusive tendencies, minimal overbites or anterior open bites, and increased anterior facial height are frequently best managed with extractions and space closure. In such cases, one is likely to remove the retained primary molar. If you plan to retain the molar, look for the quality of occlusion and alveolar bone so as to have the best environment for the final restoration. If one wishes to close the edentulous space, be sure the incisors remain in good position to provide good facial balance.<sup>[8]</sup>

## CONCLUSION

Congenitally missing premolars were seen more in girls than boys, and mandibular 2<sup>nd</sup> premolar was most common missing tooth followed by maxillary 2<sup>nd</sup> premolar. Careful observation and appropriate investigations are required to diagnose the condition for proper treatment.<sup>[9]</sup> Hence, early diagnosis and treatment of congenitally missing premolar can reduce the complications related with agenesis of the premolar. Early decisions that the orthodontist makes for a patient whose mandibular second premolars are congenitally missing will affect his or her dental health for a lifetime. Therefore, the correct decision must be made at the appropriate time.

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