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Original article

Agenesis of Maxillary Premolars: A Mini-Review and Case Report

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Abstract

Agenesis of teeth is the most prevalent developmental dental anomaly in humans. Although congenital absence of third molars, mandibular second premolars and maxillary lateral incisors are most frequently observed in clinical practice, the simultaneous bilateral agenesis of all maxillary premolars in a non-syndromic patient is exceedingly rare. This report presents a case of a 20-year-old female patient presenting with bilateral agenesis of all four permanent maxillary premolars and, instead, the presence of retained deciduous maxillary second molars. Family and medical history excluded any underlying systemic syndromes.

Introduction

Dental agenesis is the most common dental anomaly in permanent dentition, which can be either full or partial anodontia [1,2]. The prevalence of dental anomalies varies depending on the population being studied. In particular, certain investigators in European and Middle Eastern countries found that congenitally missing teeth were the most prevalent anomaly among children [3,4,5,6,7]. In Saudi Arabia, a dental clinic-based study reported a prevalence of 25.39% [8]. Furthermore, a study of the Turkish population reported a prevalence of 5.56% [3], and hypodontia was the most prevalent anomaly. However, a study of the Nigerian population observed a prevalence of 17.52% for pediatric dental anomalies, with a prevalence of hypodontia of 1.3% [9]. The total lack of tooth development in the primary, permanent, or both dentitions is called anodontia. Partial anodontia is the absence and failure of development of one or more teeth. Partial hypodontia may be further categorised into oligodontia- the congenital absence of six or more teeth, excluding third molars- and hypodontia- the congenital absence of fewer than six teeth, excluding third molars [10,11]. Among all forms of tooth agenesis, hypodontia is the most common [12,13]. The overall prevalence of tooth agenesis in the Latvian population is slightly higher than in Europe, 9.3% and 7%, respectively [14,15]. With respect to the frequency of dental agenesis, excluding third molars, the most frequently affected teeth are the mandibular second premolars, followed by the maxillary lateral incisor and the maxillary second premolars [16]. In addition, unilateral agenesis has been reported to be more common than bilateral agenesis. There were no significant differences between genders [17]. In terms of numbers, most patients with dental agenesis (82.9%) were reported to be missing fewer than two teeth [18]. However, this case report presents a case of bilateral congenital absence of permanent maxillary first and second premolars and instead, the presence of retained deciduous second molars.

Case Report

A 20-year-old female patient reported to the dental clinics complex at the Department of Oral Medicine, Surgery and Pathology in the Faculty of Dentistry, Alasmarya Islamic University, with a chief complaint of bleeding during brushing of her teeth. Extraoral examination of this patient was normal. Family and medical evaluations excluded any underlying syndromic conditions. On intraoral examination, mild calculus was observed at the anterior lower incisors with gingival recession. Intraoral examination revealed the congenital absence of all four maxillary permanent premolars (teeth 14, 15, 24, 25) accompanied by asymptomatic retained primary maxillary molars. In addition, the lower right permanent lateral incisor (tooth 42) (Fig 1).



Figure 1. Intraoral clinical view showing bilateral maxillary agenesis of permanent premolars with retained deciduous second molars, and congenital absence of the mandibular right permanent lateral incisor.

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Radiological findings demonstrated the bilateral absence of the permanent maxillary first and second premolars (teeth 14,15,24,25) and the mandibular right permanent lateral incisor (tooth 42), confirming hypodontia (five congenitally missing teeth, excluding third molars) (Fig 2). Retained primary maxillary second molars were present with no infra-occlusion and no radicular resorption. These retained molars were in good condition with no carious lesions and no tooth mobility. Diagnosis: Bilateral agenesis of maxillary permanent first and second premolars with retained primary second maxillary molars.



Figure 2. Panoramic radiograph showing bilateral Agenesis of permanent maxillary premolars with retention of deciduous second molars.

Discussion

Tooth agenesis occurs as a non-syndromic, isolated trait o related to genetic syndromes [13,19]. A mutation in the MSX1 gene was found in a non-syndromic family with missing second premolars and mandibular central incisors [20]. Certain syndromes, such as ectodermal dysplasia, are presented with a large number of missing teeth [21]. Tooth agenesis also arises due to environmental factors, such as trauma, infection, or irradiation [22]. The developmental absence of a permanent successor tooth is the most common reason for retention of primary teeth; however, impaction, delayed eruption, or an abnormal eruption path can also be responsible. In a study, agenesia of the permanent successor was found to be the most frequently encountered reason for retained primary molars (3.8%), followed by ectopic eruption of the permanent successor (2.2%) and impaction of the permanent successor (1.8%) [23]. As presented, this case of retained primary molars is in the maxilla; however, a study from Nigeria reported the maxilla as having a higher representation of retained teeth than the mandible [9]. This study also stated that dental agenesis of the permanent tooth as the main cause of retained teeth, as observed in this case. Furthermore, a recent study documented the first-ever reported case of complete agenesis of all the premolars [24].

A notable aspect of this case report is the healthy condition of these retained primary molars, several years after they should have normally been shed. In addition, it does not show any bone loss compared to adjacent teeth, showing a good periodontal state as well. In adolescent patients, retained primary mandibular molars are reported to have a good prognosis [25]. In addition, a study conducted on an adult female patient in her fifties found that these retained primary molars were several decades past their expected exfoliation time. Moreover, no significant bone loss was observed, indicating a favourable periodontal status [26]. Consequences of persistence of primary teeth include tooth decay, root resorption of primary molars, periodontal diseases, bone resorption, tipping of permanent teeth, ankylosis and infracclusion of primary molars. Evidence suggests the most common consequence associated with retained primary teeth was tipping of the adjacent permanent teeth [23]. It may result from alveolar bone loss secondary to disuse atrophy. As bone loss progresses, adjacent teeth tip toward the defect area, increasing mesial and distal occlusal load on the infraoccluded tooth [18]. Treatment approaches have been proposed, which depend on the age of the patient, stage of root formation, site of primary teeth, and severity of tipping of neighbouring permanent teeth, so dentists can decide between long-term preservation of retained teeth versus timely extraction and orthodontic surgical treatment.

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Conclusion

Early radiographic assessment is essential for identifying uncommon patterns of premolar agenesis. Timely diagnosis enables clinicians to determine the prognosis of retained deciduous molars by monitoring root resorption and infraocclusion, guiding effective multidisciplinary care through conservative preservation, orthodontic management or future implant placement.

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