Bilateral maxillary canines agenesis: a case report and a literature review

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**ABSTRACT.** Background. Agenesis of permanent canines is an uncommon condition that affects human teeth. In fact, canine is the most variable positioned tooth, it can be found palatally or facially displaced or ectopically erupted from the dental arch. On the contrary, canine agenesis is a rare finding in Caucasian populations, but it may be relatively more common in Asian groups. This dental anomaly is firstly influenced by genetic, and less often by systemic and environmental factors. Generally, it can occur in association with other dental disturbances or as a solitary anomaly. Prevalence of agenesis permanent teeth varies between 4.5% and 7.4% in general Caucasian populations. Aim The purpose of this report is to discuss the aetiology, prevalence, diagnosis and clinical implications of canine agenesis. Case report This paper reports an unusual case of bilateral, congenitally missing canines in a healthy 10 year old Italian male.

**KEYWORDS:** Agenesis, Aplasia, Canines, Caucasian, Maxillary.

Introduction

Congenitally missing teeth (CMT) is an anomaly characterised by the lack of one or more teeth. It may result in dental malposition, periodontal damage, lack of maxillary and mandibular bone height development, aesthetic and functional consequences. This anomaly is relatively common in permanent dentition for some teeth (third molar, premolars and lateral incisors). The prevalence of hypodontia varies according to evolutive [Anderson et al., 1975], local [Stafne and Gibilisco, 1975; Kindelan et al., 1998] systemic [Sperber et al., 1963] and genetic factors [Arte et al., 1996; Goldenberg, 2000]. Recent reports have shown that in the Caucasian population the prevalence of hypodontia in permanent dentition (third molar excluded) is about 4.5-7.4%, and the most commonly missing tooth is the mandibular second premolar [Backman and Wahlin, 2001; Nordgarden et al., 2002]. Permanent dentition hypodontia can occur as a solitary anomaly or in association with head and neck syndromes [Schalk, van der Weide et al., 1993]. Often in this latter case several teeth are missing, including the canine, although with a lower frequency. On the other hand, congenitally missing permanent teeth involving maxillary canine, in nonsyndromic patient, are rare. In fact very few reports have been found in literature [Robertson, 1962; Lum and Lim, 1976; Leong et Calache, 1999; Cho et al., 2004] that deal mostly with maxillary canine agenesis.

This case report describes a bilateral canine agenesis in an Italian boy. A literature review has been carried out and clinical implications discussed.

Case report

A 10 year old Italian boy was referred to the Orthodontic Clinic of the University of Catania (Italy) for orthodontic treatment. He was in good health with no history of maxillary trauma nor any kind of syndrome. The clinical examination included recording teeth and their morphology. He presented the following teeth (fig. 1):

- on the upper right side, central and lateral permanent incisors, deciduous canine, deciduous molars, and first permanent molar;
- on the left upper side, central permanent incisor, deciduous lateral incisor, canine and molars, first permanent molar;
- on the lower left side, central and lateral permanent
- incisors, deciduous canine, deciduous molars, and first permanent molar;  
- on the lower right side, central and lateral permanent incisors, deciduous canine, first permanent premolar, deciduous second molar and first permanent molar.

His chief complaint was the agenesis of bilateral maxillary canines associated with monolateral absence of the left lateral incisor. The clinical history ruled out any possibility of the missing canines having been extracted or the patient having undergone dental trauma that could have caused alteration or deviation of the correspondent dental germs. The persistence of the deciduous maxillary and mandibular canines could be detected both clinically and radiographically (fig. 1, 2).

The upper deciduous canines and the left lateral incisor displayed no initial process of radicular resorption (fig. 2) in contrast to the lower elements that were reabsorbed due to permanent teeth eruption. The medical and dental family history was not contributory for this kind of teeth agenesis.

One and a half year later this case was visited again: the primary maxillary canines and lateral incisor showed a slight degree of resorption, less than half of the initial radicular length (fig. 3).

**Discussion**

The permanent maxillary canine, on its long eruptive pathway, may often be affected by anomalies. It is perhaps the most variably positioned tooth in human dentition. It may be frequently displaced in the dental arch either facially or palatally or, less often, deflected mechanically and may undergo subsequent ectopic drift resulting in transposition. On the contrary, canine agenesis is a very rare condition. It has been reported mainly in the Chinese population: Cho et al. (2004) described the radiographic findings in 32 Chinese children with congenitally missing permanent teeth regarding only maxillary canines. Of the 32 cases, only 9 were “bilateral”. However in the Caucasian population it is a very rare kind of agenesis and, except for a few published studies, this condition is not clinically known. One of these studies reported only five cases of congenitally missing permanent teeth.

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**Fig. 1** - Intraoral view of patient’s teeth. a) front view; b) lateral right view; c) lateral left view. Arrows show the deciduous canines.

**Fig. 2** - Orthopantomography shows aplasia of maxillary canines bilaterally (arrows) and left lateral incisor. No initial resorption can be detected.

**Fig. 3** - Twenty months later orthopantomographic x-ray shows that root resorption of maxillary bilateral canines had started.
involving maxillary canines among 13,459 white American children (0.037%), whereas two of such cases were found out of 1481 black children (0.14%) in the same study [Muller et al., 1970]. The aetiology of nonsyndromic canine agenesis in permanent dentition is not well clarified. Surely some variation in population, continents and among races may play a fundamental role in the development of canine aplasia.

The main cause of tooth agenesis has a genetic origin. It seems to be an autosomal dominant model with incomplete penetrance and variable expressivity [Pirinen and Arte, 2004]. Moreover, an autosomal recessive model inheritance is also possible [Pirinen et al., 2001]. Sex-linked inheritance patterns and a polygenic multifactorial model of inheritance have also been suggested [Suarez and Spence, 1974; Chosak et al., 1975; Brook, 1984; Peck et al., 1993]. Other causes that may arrest canine tooth development are environmental factors that operate in the dental region, such as fracture, surgical jaw procedures and extraction of the preceding primary tooth [Grahnen, 1956]. Permanent dentition hypodontia is often characterised by retention of deciduous teeth beyond the age at which they are normally shed. Generally the canine teeth (apart from age) are more likely to show little or no resorption [Haselden et al., 2001].

This case report supports the genetic theories about canine agenesis, which is a congenital disorder able to cause functional and aesthetic problems, altering the development of an ideal occlusion, in fact this tooth guides the jaw during lateral movements creating a distance between dental arches. Tooth development is under strict genetic control; it has become evident that gene networks regulate the development of teeth as in other vertebrate organs. Mutations in these genes, during morphogenesis processes, have been identified in humans as causes of dental defects, mainly hypodontia. Clinical and radiographic diagnosis of tooth agenesis in permanent dentition should be made after the age of 6 excluding the third molar [Pirinen and Thesleff, 1995].

**Conclusion**

Congenitally missing permanent canines require a specific treatment planning. The ability to predict the morbidity of retained deciduous teeth, without permanent successors would be of considerable value in treatment planning. In this type of therapy many factors must be considered, the preferences and compliance of the patient, the condition of deciduous elements, the number of missing teeth, the patient’s occlusion, alignment and facial biotype [Barbería et al., 1988]. The first therapeutic choice can be the extraction of primary teeth accompanied by orthodontic space closure and premolar coronoplasty. The second one is retaining the deciduous teeth until the end of the growth. The advantage of this treatment is that deciduous teeth preserve the alveolar bone tissue until the full growth has been reached. This provides maximum potential for implant-prosthetic treatment without bone grafting in favour of an excellent aesthetic and functional behaviour.

**References**


Lum YM, Lim ST. Four cases of congenitally missing permanent cuspids. Singapore Dental Journal 1976; 2: 49-51.


