

Familial Mesiodens: A study of 28 patients

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Abstract

Introduction: The most commonly encountered tooth among the supernumeraries is the mesiodens. A genetic cause has often been revealed, suggested by the familial pattern. **Objectives:** To analyze the variability of this supernumerary tooth as shown in the clinical cases. We want to investigate the transmission pattern through family members. **Methods:** The study was based on 28 patients aged between 8 and 23 years. We delineated three groups of patients, according to the dimensions, position on the dental arch and shape of the mesiodens: 1). Conical, not alligned (erupted towards the palat); 2). Conical, well alligned and without occlusal interference. 3). Rudimentary shape supernumerary tooth. Radiographic and clinical examinations were used to establish the diagnosis. Family tree documentation has also been recorded. **Results:** The cases we analyzed were concerning both temporary and permanent dentition. Mesiodens was observed as unique numeric dental anomaly or associated with other mesiodens or even anodontia. Usually, unique mesiodens runs among family members. The clinical form of supernumerary manifestation is variable in different members and different generations, indicating various patterns of character transmission within families. **Conclusions:** Unique or multiple, the mesiodens is an extra tooth that interferes with normal temporary and permanent dentition. Although in a few cases it may appear as a *de novo* mutation, usually its presence is due to variable expressivity and locus heterogeneity within a family. Clinical diagnosis, family screening and genetic advice are recommended in order to prevent, anticipate and treat the complications produced by the presence of supernumerary teeth.

Key words: Mesiodens, Mode of Inheritance, Supernumerary Tooth, Genetics.

Introduction

Supernumerary teeth are defined as any tooth in addition to the normal 32 teeth in the secondary dentition or the 20 teeth in the primary dentition [1]. The prevalence of supernumerary teeth was reported to vary between 0.1-3.8% [2]. Permanent dentition is more frequently affected [3].

The mesiodens - especially unique mesiodens - is the most commonly encountered supernumerary. tooth in medical practice [4]. Its name is linked to its particular tendency to hold a position as mesial as possible on the dental arch. In Caucasian populations, the prevalence of the mesiodens varies from 0.15 % - 1.9 % [5]. Sex ratio is favorable to males (2M : 1F) [6]. In most cases, the

mesiodens erupts around the age of 6-7 years, so it is difficult to say to which denture it belongs.

The causes of the formation of this supernumerary tooth are still a subject of debate. There are several theories that attempt to explain the emergence of the mesiodens, including the theory of genetic determinism [7, 8]. The arguments of this theory are: concordance of the numeric defect in monozygotic twins, family aggregation (inherited tendency to develop supernumerary teeth in the same family and the greater frequency of supernumerary among first-degree relatives of an affected individual compared to the general population) and supernumerary association with genetic syndromes. The type of genetic determinism of the isolated mesiodens can be monogenic or polygenic [3].

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If a pattern of Mendelian transmission is observed in the succession of generations [5, 9] it can be concluded that the mesiodens is caused by a single gene mutation [10]. If the dental defect does not comply with a clear pattern of transmission, suggesting a complex inheritance, the character is determined by the interaction and the dynamic combination of several unrelated genes (polygenic) and environmental factors during the process of odontogenesis [3, 11].

Gene interaction leads to the predisposition for dental abnormalities and genetic predisposition expression depends on environmental factors, like the moment (prenatal and postnatal), duration and intensity of their action [12, 13, 14]. However, to date no specific gene mutations have been identified in the development of non-syndromic mesiodens [15, 16].

Results

The mesiodens was observed both in the primary dentition (3 cases) and in the permanent dentition (25 cases). All cases studied had a unique mesiodens on the upper jaw. Except for one case in which the supernumerary tooth remained embedded in an inverted position, in all other cases the mesiodens erupted. There was an eruption moment variation even among first-degree relatives of the patients. The eruption of the mesiodens preceded the central incisors eruption (11 cases), simultaneously with the central incisors (7 cases) or following the eruption central incisors (10 cases).

Case 1: 6 years old patient, male



Fig. 1: Conical, unique mesiodens, erupted in temporary dentition.



Fig. 2. Panoramic radiograph showing the presence of Mesiodens before the eruption of central incisors

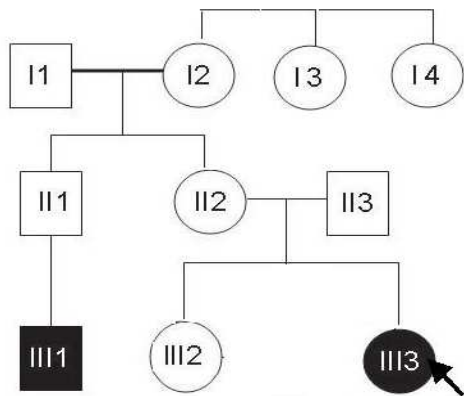


Fig 3: Family tree of the patients III3 family: III3 exhibit conical mesiodens

Case 2: 21 year old patient, male



Fig 4: Supernumerary tooth in permanent dentition, aligned and without occlusal interferences.



Fig 5: Unique, conical shape mesiodens Its presence well arch on the maxilla does not lead to any malposition

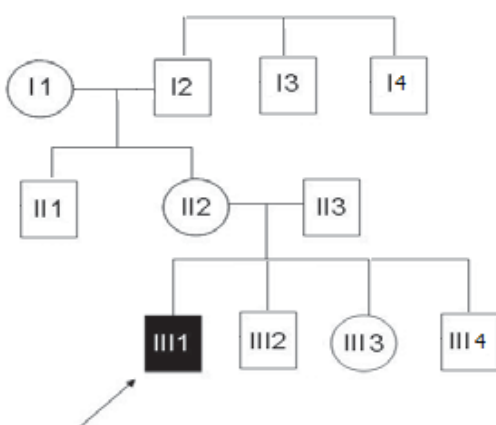


Fig 6: The family tree: I1 presents a unique, palatal, conical, small size mesiodens; III1 presents a conical, unique, aligned mesiodens.



Fig 7: Mesiodens in permanent dentition and as a result, the median line is deviated to the right.



Fig 8: X-ray shows a space between the central lower incisors

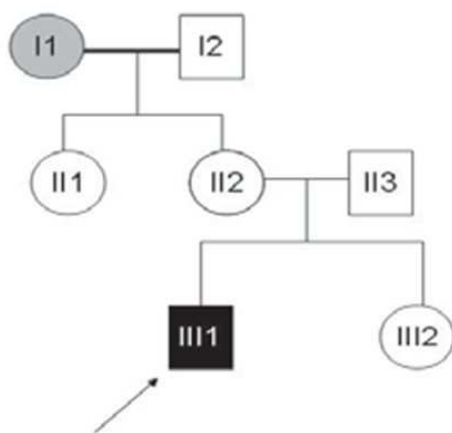


Fig 9: Family tree. Patient's grandmother had also a maxillary mesiodens.

Discussion

Among patients diagnosed with supernumerary teeth only those who had mesiodens were selected for study. The mesiodens was observed both sporadically and within families. When we are interpreting the test results must take into account that the number of individuals in each patients group was small, that it is a selective study, characterized by subjectivity in terms of the composition of the lots. For this reason, in case of study on representative samples, in retrospective type investigations, results may vary.

In all cases investigated, the mesiodens emerged as numerical dental anomalies in several members of a family. It was observed that in six cases autosomal-dominant model with the full penetrance and variable expressivity applies perfectly [15]. In two other cases, the inheritance pattern was autosomal dominant with incomplete penetrance [2]. It was found that mesiodens occurs more frequently in male than in female patient cases (19 males and 15 females). It could not be established a relationship between the male gender and

the emergence of any preferential dental phenotype, or between sex-related mesiodens distribution and X linked inheritance pattern [2,5,16].

Identifying risk individuals in the family of a patient with mesiodens is important because the supernumerary tooth behaves like a foreign element. Usually, the presence of mesiodens prevents the migration to the center line and getting the contact point between the central incisors. The severity of the disorder depends on the time of eruption. Early eruption, before the permanent central incisors, causes delay of the eruption or eruption in a vestibular or rotated position. When the eruption of the mesiodens is simultaneous with the eruption of central incisors, it leads to distalized eruption or incisor rotation up to 180 degrees, as an expression of lack of space, with crowding chain results [6].

Conclusions

The mesiodens is a genetically determined development abnormality. In the investigated cases there was a trend of non-syndromic mesiodens inheritance within the family. In families with affected member pre-symptomatic family screening can be indicated. Thus, it can prevent the complications of the presence of mesiodens on the dental arch.

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Permission of Ethical committee: Yes

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