ABERRANT MAXILLARY FIRST MOLAR MIMICKING MANDIBULAR FIRST MOLAR – AN UNUSUAL CASE REPORT

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ABSTRACT: The tooth development involves a complex series of genetic interactions involving growth factors, transcription factors, signal receptors and diffusible morphogens that interact within independent signalling pathways. This report describes a case of occlusal dysmorphology and a root variance of maxillary right first molar which almost mimicked that of a rotated mandibular 1st molar. The cuspal variation of mesiodistal was same as that of 36. This kind of variation may be due to Genetic or Environmental factors or interplay of both. So there is a need for research to be done in this aspect in larger group.

Key words: Dysmorphology, cuspal variance, Bolk’s paramolar

INTRODUCTION

The formation of mammalian dentition is one of the most remarkable processes in development and provides a powerful model for studying the epithelial-mesenchymal interactions that control patterning and morphogenesis of variety of developmental processes. The tooth development involves a complex series of genetic interactions involving growth factors, transcription factors, signal receptors and diffusible morphogens that interact within independent signalling pathways. Around embryonic day E 11.5 till E 14.5 the tooth development shifts back and forth between epithelium and mesenchyme. The study of cusp size, number and location, occlusal pattern, root configuration, number and arrangement of teeth, and individual tooth measurements are useful dentoanthropologic structures.

As known the maxillary 1st molars (corner stone’s of dental arches) have large crown with four well developed cusps and one supplemental cusp (cusp or tubercle of carabelli) sometimes taking a well developed form as a 5th cusp. They have three roots (two buccal and one lingual/ palatal). The crowns have two buccal cusps and two lingual cusps; it normally erupts around 6 years of age. In anthropological studies, the morphological categories used to describe the occlusal surfaces of molars are based upon the topology developed by Gregory and Hellman and Hellman: 5-Y, 4-Y, +5 and + 4. The decisive factor for determining a Y or + fissure pattern is determined by the contact of the metaconid with the hypoconid. Y or + pattern is independent of the number of cusps. So, the groove pattern and cusp number are considered separately as their evolutionary changes are not well correlated phenotypically. Thus, it might be assumed that the fissure pattern is polygenic and its expression is a resolute by combinations of alleles at two or more loci.1, 4

Case Report

The present case reports a variation in the maxillary 1st molar with striking features of dysmorphology and mimicking a rotated mandibular 1st molar (36) both clinically and radiographically.

A patient aged 8years reported to the Department of Paedodontics and Preventive Dentistry, Narayana Dental College and Hospital, Nellore, Andhra Pradesh,India, with a chief complaint of proclined maxillary front teeth. Intraoral examination showed early mixed dentition; 11, 12, 53, 54, 55, 16, 21, 22, 63, 64, 65, 26 and 31, 32, 73, 34, 75, 36, 41, 42, 83, 84, 85, 46 with anterior crossbite in relation to 11 with deep bite and increased overjet with a class 1 molar relationship. On further examination occlusal dysmorphology of maxillary right first molar which almost mimicked that of a rotated mandibular 1st molar (36) (Fig.1). The question arises is it a cuspal variance? Or is that the enamel only is involved in the occlusal variation? Or else is it a case of transposition? The periapical radiograph revealed a maxillary first molar (16) resembling a rotated mandibular first molar (36) moreover two roots were observed (one mesial and one distal)(Fig.2) and it was confirmed, that it was not a cuspal variance- as the roots also showed variation; also not a transposition- as the remaining mandibular molars in place. Both maxillary and mandibular impressions were registered using rubber base (Express™XT Putty soft; 3M ESPE) silicon material for a better interpretation of the cuspal variation (Fig.3 & Fig.4)
So, it was concluded that it might be a genetic or environmental interplay that has lead to this kind of variance. For the single tooth crossbite (11) and increased overjet the patient was treated with orthodontic appliance therapy.

![Fig. 1. Intraoral picture showing dysmorphology of right maxillary first molar.](image1)

![Fig. 2. Intraoral periapical radiograph revealing root variation also with two roots one mesial and one distal resembling that of mandibular molar.](image2)

**Discussion**

Teeth, living or dead, primary or permanent, have much to contribute in the study of ecology, paleontology, functional morphology, and systematic as they are good and durable, source of characters for phylogenetic analysis. These characters include the surface features of tooth crowns, most notably cusps and crests, structural details of enamel, and measures of size and shape. These dental characters often appear discrete and heritable, and they have different degrees of expression. Teeth are most commonly used in phylogeny and ecological adaptation studies. Does a dental character really possess the properties of being discrete and heritable, having biologically meaningful character states, and can they really change character states independently from each other? Lieberman stated that these properties are considered important for a reliable character in reconstructing phylogenies. Can developmental criteria can be used to define reliable dental characters? In other words, this report explores whether one should worry about development when considering dietary causality for evolution of new tooth cusps or when choosing dental characters for phylogenetic studies. The radiograph was to evaluate if it’s only the morphological variance or its mimicking the mandibular molar as such. The occlusal surface of the molar (16) showed 5 cusps with Y-fissure pattern as evident when traced with a lead pencil (Fig: 4). These methods when combined together can have advantages of accurate recording; proper identification of teeth and it might ensure racial or sexual identification. Hellman classified the mandibular molars based on the occlusal pattern and the number of cusps and Loh stated that the distobuccal cusp or hypoconulid is the most variable and is the evolutionary advanced type.

Both primary and permanent dentitions of human teeth show variations and changes in morphological structures which may be found on the crown either in the form of anomalous cusps, or in an increased number of roots, which in some instances are associated with an anomalous cusp. Of all variations the simplest morphological formation is that which has only the enamel without the participation of dentin and pulp called ruga adamantinea- protostylid as the very product of the cingulum! all those formations of cusps found on the mesolingual side of the upper molars show considerable variation / variations related to cusp of carabelli, but in the present case all the three components that is enamel, dentin, and pulp showed variation.

The size of the tubercle itself varies; where it passes from a very large formation composed of dentin and enamel into an enamel crease (wrinkle ruga). It is generally considered that the tip of Carabelli’s cusp is lower than the four remaining cusps. On contrary authors have cited in some cases where Carabelli’s cusp comes at the level of the hypocone into full occlusion. Such epicone, can be the product of the tooth itself, i.e., a new formation on the protocone itself, and is known as protuberantio apulpalis. In cases when such tuberculuni has a small cavity which corresponds to the pulp chamber, then a formation supradentalis has to be contended with, which may even have a root. Here in present case also all cusps are placed at the same level. As we have observed for the present case, due to the extra cusp the tooth becomes mesiodistally widened which was equal to mesiodistal width of 36. These variations might be related to the cingulum and probably the result of interplay of many genes.

The cusp might influence on the radix formation, however, is of an entirely different direction. All types of Carabelli formations on the upper and lower molars, with pulp and possibly with root develop from the extra dental lamina as formato paradentalis (Bolk’s paramolar) which might have happened in the present case. But again the tooth doesn’t have an extra root rather it has two that is strikingly same as mandibular molar teeth. As stated by
Gilbert et al. (1996) genetics was found to be a powerful paradigm for explaining the evolution of characters.19

The study of dental morphological characteristics and odontometry is important in anthropological research as it can provide information on the phylogenetic relationship between species, as well as variations and diversities within a population.20 Furthermore, knowing common variations in dental anatomy and morphology about each individual tooth can help in performing some dental treatments such as restorative, endodontic and orthodontic treatments.7

**Fig. 3.** Showing maxillary and mandibular casts with cusp patterns.

**Fig. 4.** Maxillary molar on the cast with cusp patterns resembling that of reversed left mandibular first molar and with Y fissure pattern.

**CONCLUSION**

It is concluded that not only there is increase in mesiodistal width of 16 the variation was also evident in relation to the root form. The hypotheses can be drawn as this kind of variation may be as due to interplay between Genetic and Environmental factors. So, there is a need for extensive research for these kinds of variations in the teeth and which might be helpful in dentoanthropologic study of a larger group or community or populations.

**References**


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