

A Literature Review About Craniofacial Abnormalities in Jeddah, Saudi Arabia

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Abstract

Aim: This article intends to describe the characteristics of craniofacial abnormalities to facilitate their management in the dental office.

Methods: A review of literature was made limited to articles published between 2015 and 2016. The article is based on clinical experience with a patient group.

Discussion: Abnormal craniofacial structures are a result of changes in the genetics and environmental factors. The examples seen routinely in dental clinics. Therefore, the development of the therapies for craniofacial pathological conditions depend very much on thorough and detailed knowledge about the molecular and cellular processes which are involved in the head formation.

Conclusions: When planning the dental treatment of patients with craniofacial abnormalities, dental practitioners should always consider their general health, to achieve a holistic and interdisciplinary approach.

Keywords: Craniofacial abnormalities; Pediatric dentistry

Introduction

A craniofacial syndrome is characterized by morphological and developmental deviations in the cranial tissue components, including teeth [1]. It is difficult to determine whether the deviation has developed at a primary location that subsequently causes secondary alterations or whether there are general deviations in many structures and at many locations. Lately, focus has specifically been given to pathogenesis and genotype. A complete study of craniofacial syndromes would involve not only the dental approach, but also several medical, psychological, and neurological clinical and theoretical approaches. We have discovered that a lot of cases were due to pathological causes [2].

Most of the craniofacial syndromes, the genotype is known and in some it is unknown. Even though the genotype is known in a craniofacial syndrome, it is not understood why that particular genotype causes the malformations observed. A known genotype deviation can manifest itself in the cranium by many different phenotypic expressions, from severe to minor affection. How and why the genotype affects the cranial development and why it affects the cranial components differently are far from explained in full.

In our study, we've focused on craniofacial syndromes in which abnormal traits in the dentition are associated symptoms. Such abnormal traits could be deviations in tooth number (agenesis, super numerarity), tooth morphology (size, dimensions, crown invaginations, and abnormal shapes of crowns and roots), tooth eruption (delayed eruption, ankylosis), and resorption (crowns and roots). Occurrence

of these dental deviations is classified and exemplified in the following. With regards to tooth morphology, large teeth have been reported in KBG syndrome where macrodontic incisors have been described [3]. Craniofacial studies are currently focused especially on genotypes of different syndromes [4-6].

Research is also devoted to phenotypic descriptions of craniofacial syndromes [7-8].

From the therapeutic point of view, interest has specifically been given to the use of dental implants.

Optimal treatment in multidisciplinary teams is also given some focus [9].

The goal for future research on craniofacial syndromes must be to understand the connection between symptoms in the dentition and other symptoms in the craniofacial area.

Results

The most common craniofacial features observed in children are: small nose, low nasal bridge, narrow, short, deep and high palate, bifid uvula, underdeveloped jaw, cleft lip, incomplete lip closure, hypotonic lips, fissured tongue, inaccurate and slow tongue movement and changes in temporary and permanent tooth eruption [10,11].

Brachycephaly can be found [12,13] and the base of the skull, the frontal bone and the paranasal sinus are significantly small, leading to a decrease in the size of the sella turcica. There's a flattening of the cranial base as a result of vertical hypoplasia of the structures of the skull [14].

Tongue gives the impression of being abnormally large on account of muscle weakness and of an anterior and low position in the mouth (relative macroglossia) [15].

As DS patients are mouth breathers, exhibit open bite and their orofacial muscles are hypotonic, there's an incomplete closure of the lips [16]. It causes an imbalance in orofacial development which leads to malocclusion [17] and craniofacial malformations such as the hypoplasia of the midface [18].

Due to the presence of a protruding tongue and a muscular hypotonicity, these children have oral-motor problems (seen during swallowing, chewing and sucking) [17-18]. Hypotonicity is associated with ligament laxity, easily visible throughout the body. It induces hyperflexible joints, which can compromise the periodontal ligaments. Excess of saliva on the labial commissure is also related to the muscle hypotonicity and can lead to irritation, cracking (angular cheilitis), aphthous ulcers and infectious conditions like candidiasis.

Discussion

The most known advantage of dental analyses compared to all other analyses performed on human tissue is that deviations in the hard tissue persist and remain stable during the developmental course. As dental tissues, do not reorganize, they are easy to analyze and use in analyses of fields. Therefore, a dental approach to craniofacial syndromes by analysis of developmental fields contributes to an understanding of the pathogenesis of craniofacial syndromes.

There are arguments in favour for using aetiology and pathogenesis as the core issue, also there are states that there are arguments to make the patient's phenotype decide the syndrome definition.

Another problem that should be solved in the craniofacial analysis is the genetics behind the craniofacial fields. Is there a signaling gradient involved in the cranial pattern formation, such as suggested in limb development. From an embryological and pathological point

of view, it can be presumed that the notochord activates the neural crest cells to migration and that different genes are responsible for the different locations of neural crest cells at the neural tube. This adds another aspect to craniofacial development and syndromology and calls for scientific attention in the future.

Conclusion

A detailed knowledge of the genetic processes is involved in the formation of craniofacial structures. The development of novel clinical therapies for craniofacial abnormalities, such as clefts and tooth agenesis, depend very much on genetic information.

Therefore, it can be concluded that intense research in the field of developmental biology could be directed toward providing clinical benefits to such mutant individuals thus providing them maximum functional and esthetic benefits.

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