

INTERCEPTIVE TREATMENT IN HYPODONTIA

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Abstract

The early treatment of nonskeletal orthodontic anomalies in early mixed dentition is intended to prevent the development of pronounced anomalies in the permanent dentition with the ultimate aim of reducing or even eliminating the need for later orthodontic treatment. Congenital missing teeth (tooth agenesis) is one of the most common developmental problems in children and hypodontia is the term most often applied to this situation.

The aim of the present paper is to report three cases of hypodontia and to review the literature regarding the etiology, the clinical implications and the management.

Key words: early treatment, interceptive therapy, malocclusion, hypodontia.

Introduction

One of the most significant and interesting aspects of orthodontics is certainly prevention and early treatment of malocclusions.

There has been a tendency over the years for us take an overall view of oral pathology in the child, bringing together paediatric dentistry and orthognathodontics to study the growth, psychological behaviour, oral habits, hereditary and congenital problems and the acquired problems of patients.

We tended to consider interceptive orthodontics as almost the exclusive domain of paediatric dentistry and thus a restricted field, born out by the greater part of our research, scientific papers and clinical practice.

Interceptive therapy should preferably be understood as early intervention, using simple means, and of brief duration, capable of totally or partially correcting a malocclusion or preventing it from becoming more serious.

The interceptive therapy should not be confused with prevention (prevention consists in not allowing a disease to start), since it carried out when a morphological anomaly is already present with the aim of reducing any disturbances to growth, function, aesthetics or, at times, to the emotional life of the child. There is often a strict correlation between these last two aspects, even the smallest children are able to feel needs in relation to their look.

However, interceptive therapy is an integral part of the overall orthodontic treatment, aiming to increase its effectiveness and reducing the treatment time.

To be able to deal with the questions of prevention and early treatment means above all having to be well acquainted with the etiopathogenesis, dental malocclusions and craniofacial dysmorfosis.

We have to be able to asses the patient in the first 3-5 years of life and see whether there is a good relationships

between the different anatomical components that make up his craniofacial architecture as well as their size, shape and the functional relationships existing between them. Also, we have to be able to intervene as early as possible, if required, to re-establish their balance and harmony to obtain a good and stable occlusion. It may be the growth and early orthodontic treatment may not be enough to improve the situation, in which case the planning treatment will be necessary.

During the first few years of life, greatest growth implements take place. In the first 3 years the child double in height and at the age of 4 the skull has reached 60% of its adult dimensions. At the time that many orthodontists start the treatment, around 12 years, 90% of facial growth is complete. At the age of 7-8 years, there is clearly a great benefit from the patient's point of view to be gained from receiving facial orthopaedic treatment. At this age, it is still possible to influence the remaining 30% growth to improve the result from an orthopaedic and occlusions related point of view [1].

Alongside the genetical factors, all the environmental factors with influence the etiology of dentofacial anomalies need to be considered with a view to long-term prevention action. These includes gingivitis and mucosal infections, oral habits, atypical swallowing, accidental or intentional trauma, early tooth loss and the congenital missing teeth.

Hypodontia and oligodontia are classified as isolated or nonsyndromic hypodontia/oligodontia and syndromic hypodontia/oligodontia or hypodontia/oligodontia associated with syndromes. Anodontia is an extreme case, denoting complete absence of teeth [2].

In the literature, the clinical studies on the prevalence of hypodontia in the primary dentition range from 0.08% to 1.55%. In the permanent dentition, prevalence has been reported to range from 2.3% to 11.3% depending on the population investigated.

It is generally accepted that, excluding third permanent molars, the second mandibular premolar is the most frequently missing permanent tooth representing 40% to 50% of the total number of developing missing teeth. Hypodontia affecting the maxillary lateral incisor is next in terms of frequency (25%), followed by the maxillary second premolar (20%) and the mandibular central incisor (6.5%) [3].

Different authors have different theories on the etiology of dental agenesis. The most cited causes of hypodontia are: evolution of the species, hereditary transmission, congenital diseases and diseases affecting the fetus, chromosomal syndromes and local causes. Two

mutated genes in human, MSX1 and PAX are known to cause agenesis of permanent teeth [4].

Early detection of this type of anomaly is indispensable for interpreting the complications and dysfunctions such as malposition of the teeth next to the agenetic site, with consequent midline deviation or resorption of the alveolar bone. Dysfunctions generated by extended hypodontia and especially if it concerns the frontal segment affecting patient's smile contributes to the psychological problems.

In case of reduced hypodontia, especially of the teeth in the frontal region, early detection of teeth involved by the reduction process offers optimal conditions for closing the spaces through controlled mesial migration of the teeth.

E. Ionescu sustains the idea that, in hypodontia, every time it is possible to close the spaces through supervising and directing the natural process of eruption of permanent teeth, this version is to be preferred to other therapeutic solutions [5].

Hypodontia, be it reduced or extended, imposes emergency therapeutic intervention, in conditions as biological as possible, to stimulate the growth process adequate to the age specificity [6].

One of the main characteristics of the treatment is the duration, that may vary from case to case, although it is mostly short, have low costs, and it is extremely effective.

A great cooperation in all treatment phases from both, the young patient and the parents, can be easily required.

One of the most important things to have is the knowledge of the growth process and ability to predict growth patterns.

Aim and objectives

The purpose of this article is to describe the need for early examination and diagnosis of hypodontia in growing children and the necessity of the interceptive therapy in this malocclusion. Interdisciplinary teamwork between the pediatric dentist, orthodontist, and restorative dentist is very important when analyzing factors related to individual patients and establishing overall treatment plans.

Case reports

Case report 1

An 8-year-old male patient was reported for dental treatments. On clinical examination, retained deciduous mandibular both central incisors with no mobility were found (Figure 1). Suspecting permanent lower central incisors hypodontia, an orthopantomography was taken and confirmed the provisional diagnosis (Figure 2).



Figure 1. Clinical aspect.



Figure 2. Radiological aspect.

Both permanent lateral incisors were abnormally angulated with crown deviating laterally and roots deviating medially. Along with agenesis of centrals, horizontal impaction of right canine was also evident on the radiograph (Figure 2). As the deciduous centrals were still firm without evidence of root resorption, no extractions was done at present. In this case the indication for space closure was reduced. If we would closed the space, the Class I cuspid relation would be lost due to a drifting of the cuspids to the lateral incisors positions, with the consequence of a group disocclusion.

Treatment was aimed at maintaining the primary incisors, with a view to their later replacement with a mix of

implants and resin-bonded bridges planned to restore missing teeth and aesthetics.

Case report 2

A 7-year-old male patient reported to the orthodontist complaining of spacing in the lower anterior teeth. Intraoral examination showed the absence of first permanent mandibular central incisor (Figure 3). Radiographic examination revealed congenital agenesis of permanent right mandibular central incisor, but also, maxillary lateral incisors hypodontia (Figure 4).



Figure 3. Clinical aspect.



Figure 4. Radiological aspect.

For the maxillary lateral incisors the choice of closing the space involves mesial movement of the entire segment on the same side of agenesis, from canine to last molar. Thus, in this case, extraction of primary lateral incisors should be performed as urgently as possible in order to interrupt the dental arch and to allow the tangential forces to facilitate the generalized migration to the mesial of teeth. The attitude in relation with the primary canine will be determined by the mesial-distal report between its root and the crown of the permanent canine. When the primary canine is in a mesial position in relation to the permanent one, extraction will be performed sooner. The cuspid will take the place in the arch of the lateral incisors. Because the agenesis is bilateral, closure of the spaces usually poses less aesthetic problems as correct orthodontic treatment maintains the symmetry of the teeth in the upper arch.

In the lower arch extraction of the primary central incisor is indicated, as early as possible, followed by moving both permanent lateral incisors with orthodontic devices. After performing the extractions, mesial migrations of the teeth will be directed in close correlation with choosing the appropriate moment for extraction of the primary canine. Choosing this moment depends on the reciprocal reports between the primary canine and its successor, reports detected radiologically. Extraction of the primary canine can be correlated in time with a therapy of orthodontic closure

of the first permanent canine. From this point of view, the favorable moment is towards the end of the period of active treatment or at the beginning of stabilizing the results, since there is a tendency of generalized mesialisation, stimulated by the action of the orthodontic device, which propagates at distance at the level of the dental arch. The treatment is easier by the limited distal dimensions of the lower incisors and by the natural tendency to crowding in this area.

Case report 3

A 10-year-old male patient was reported for dental treatments. Intraoral examination revealed mixed dentition with class III molar relation. Radiographic examination confirmed that 4 teeth, excluding third molars, were developmentally missing teeth: 15, 27, 37 and 47. Significant external root resorption was found in the retained primary teeth 55, so we decided to extract it and to open the space during the orthodontic treatment. The necessity of the orthodontic treatment was extreme because the second permanent molars were missing, as this would lead to a notable shortening of the hemiarch. In the left hemiarches, the therapy will be directed at positioning the third molar in the place of the second molar. But, where both the second and third molars are missing the treatment will be more difficult.



Figure 5. Clinical aspect.



Figure 6. Radiological aspect.

Discussions and conclusions

Early diagnosis in case of hypodontia does not always imply an immediate orthodontic treatment; however, prevention of caries or appropriate treatment of the existent ones should be a priority. This priority resides in the fact that, in certain situations, the therapeutic solution is to preserve the primary teeth on the dental arch. Moreover, considering that the teeth represent secondary osteogenetic growth centers, under the circumstances of their numeric reduction, the state of health of the existent ones should be ensured, including of those in the primary dentition, in order to contribute to the formation of maxillary bones.

Agenesis of the anterior segment is generally prejudicial to the smile. In these cases, the primary aesthetic reasons guide therapy must not be overlooked particularly the cuspid guide where the space closure with mesial movement of the cuspid in to the missing lateral incisors space is considered.

A missing tooth in the lateral segment often causes a distal movement of the mesially located teeth. This has generally negative repercussions in the anterior segment due to mid line deviation towards the side of the agenesis.

The third molar is the tooth with the highest incidence of agenesis. If the tooth is missing no treatment is indicated. Problems may arise when both second and third molar are missing, as this may lead to a notable shortening of the hemiarch and overeruption of the antagonists.

In case of numeric dental modifications, hypodontia being one of them, one of the therapeutic conditions is the extraction of primary teeth.

In some cases the purpose of orthodontic treatment is to maintain space for a prosthetic replacement.

Pediatric dentists and orthodontists very frequently encounter patients with hypodontia. Because patients with hypodontia have other dental anomalies associated, it is necessary that they be supervised closely from an early age.

It is very important to make clinical and radiographic examination in every patient with a retained deciduous teeth or abnormal spacing, for early diagnosis and early intervention of hypodontia. If radiographic investigation is not carried out before exfoliation of the second primary molar, any diagnosis must necessarily be clinical and, as such, should be rather on the late side. Early diagnosis of hypodontia may allow a more favorable prognosis and minimal functional, aesthetical and psychological complications. Its importance cannot be over-emphasized. Thus it is the general dentist's responsibility and ability to identify hypodontia patients for early referral to receive multidisciplinary treatment before any complications can occur.

Interceptive orthodontic treatment is part of an overall orthodontic treatment plan. The aim of the treatment is not always to achieve complete correction. It is (at times) sufficient to obtain a partial result while establishing the prerequisites for normal growth.

Treatment plan must be made based on growth potential, eruption pattern, tooth position, and tooth health. In addition, excellent communication with patients and parents is necessary, as the treatment duration for patients with hypodontia may extend over many years.

The orthodontists should increase the interdisciplinary collaboration between them and the paediatric dentists, the orofacial surgeons, the paediatricians, the otolaryngologists, the psychologists and the speech therapists.

References

1. Capriglio D., Levrini A., Lanteri C., Capriglio A., Levrini L. Interceptive orthodontics, Edizioni Martina Bologna, Bologna: 3-4 (2002).
2. Arte S, Pirinen S. Hypodontia. Orphanet encyclopedic, www.orpha.net/data/GB/UK-hypodontia.pdf. 2007; 1-7.
3. Larmour CJ, Mossey PA, Thind BS, Forgie AH, Stirrups DR. – Hypodontia - a retrospective review of prevalence

- and etiology. Part 1. Quintessence Int; 36(4): 263–70 (2005).
4. Vastardis H. The genetics of human tooth agenesis: new discoveries for understanding dental anomalies. Am J Orthod Dentofacial Orthop; 117: 650-656 (2000).
5. Ionescu E. Anomaliile Dentare. Cartea Universitara, Bucuresti: 33-39 (2005).
6. Bratu E., Glavan F. Practica pedodontica. 3rd edition, Orizonturi Universitare, Timisoara: 295 (2005).

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