
EARLY ORTHODONTIC TREATMENT- MODERN CONCEPTS AND THERAPEUTIC ACHIEVEMENTS

Natasa Toseska-Spasova

University” Ss.Cyril and Methodius”, Faculty of dentistry, Department of orthodontics, Skopje,
Republic of North Macedonia, natasa.toseskaspasova@gmail.com

Natasha Stavreva

University” Ss.Cyril and Methodius”, Faculty of dentistry, Department of fixed prosthetics, Skopje,
Republic of North Macedonia, natashastavreva@yahoo.com

Biljana Dzipunova

University” Ss.Cyril and Methodius”, Faculty of dentistry, Department of orthodontics, Skopje,
Republic of North Macedonia, bibidzipun@yahoo.com

Abstract: Early orthodontic treatment that is performed while some primary teeth are still present is also called interceptive treatment. The main goal of an interceptive treatment is to intercept the developing problem so that it does not develop into a serious orthodontic anomaly. Eliminating the cause, guiding the growth of facial and jaw bones, and providing adequate space for incoming permanent teeth are important goals of early orthodontic treatment. The paper provides important information about the timing of starting orthodontic treatment, based on the two schools - the classical and the bioprogressive school. The timing of orthodontic treatment depends on a variety of interactive factors. Determining factors in deciding whether early intervention is at all beneficial for the case are: the nature of malocclusion, the patient's maturation level, estimated duration of treatment and required level of patient compliance. The article focuses on the benefits of early orthodontic treatment. Elimination of destructive environmental factors such as non-nutritive sucking habits or functional mandibular shifts that affect the normal growth and development of facial and dento-alveolar structures, are the most important benefits.

Advantages and disadvantages of early orthodontic treatment are analyzed and described in detail. The first examination of the child at the orthodontist should be performed when the orthodontic problem is first recognized, but no later than 7 years of age. Screening at this age enables the detection of potential orthodontic problems that are related to the growth of the jaws and the eruption of permanent teeth. Seven warning signs in 7 years olds are: protruding upper teeth, deep bite, under bite, open bite, too little or too much space for the teeth, deviation of linea mediana and cross bite.

Early recognition of orthodontic irregularities is precondition for correct diagnosis and adequate orthodontic treatment, which is a condition for achieving occlusal harmony, function and dentofacial aesthetics.

Keywords: Early orthodontic treatment, interceptive treatment

1. INTRODUCTION

Early orthodontic treatment that is performed while some primary teeth are still present is also called interceptive treatment. The main goal of an interceptive treatment is to intercept the developing problem so that it does not develop into a serious orthodontic anomaly. Eliminating the cause, guiding the growth of facial and jaw bones, and providing adequate space for incoming permanent teeth are important goals of early orthodontic treatment. (Noar J. 2014)

When is the right time to start orthodontic treatment? (Fleming P 2017)

It depends on many factors, such as: the morphogenesis and pathogenesis of craniofacial morphology, the growth and development of the dentoalveolar complex, orofacial functions and child psychology. In orthodontic science, there are two schools with different views regarding the beginning of orthodontic treatment- the classical and the bioprogressive school. (Mitchell L 2013)

According to the classical school, orthodontic treatment should not be initiated until the second permanent molars and all permanent premolars have erupted. It is best to start treatment when most of the growth is complete. The treatment should last for 2 to 3 years avoiding the need to compensate for unexpected variations in the growing components. (Proffit 2018).

The bioprogressive school favors early orthodontic treatment. The bioprogressive school believes that growth potential should be used in order to eliminate or model deviations from normal skeletal growth and development and disorders in the functional matrix. (associated with mouth breathing, atypical swallowing and bad habits) (Schneider 2022).

2. THE AIM

The aim of this systematic review was to obtain and publish data related to early orthodontic treatment, and modern concepts and therapeutic achievements

3. MATERIAL AND METHODS

Materials needed for this paper were obtained from literary publications and conclusions from scientific and clinical studies, by searching the modern scientific databases of PubMed, Google Scholar and Elsevier in the last 20 years.

4. RESULTS AND DISCUSSION

Early orthodontic treatment provides a complete or partial correction of many initial discrepancies or at least a reduction of their growing capacity, in order to achieve a positive impact on the growth, function, aesthetics and psychological state of children. (Artese F 2019)

Parameters associated with the success of early orthodontic treatment are: the chronological, mental and emotional maturity of the patient; the intensity, frequency and duration of oral habits (Farooq et al 2014); parental support; (Aldweesh AH et al 2022), compliance with clinical instructions; the craniofacial configuration; the variations in craniofacial growth; accompanying systemic diseases; the accuracy of the diagnosis and the adequacy of the treatment.

The ideal age for the first initial visit to an orthodontist is seven years. At the age of seven, the first permanent molars and permanent incisors have already erupted. There are seven warning signs in 7 year olds: protruding upper teeth, deep bite, under bite, open bite, too little or too much space for the teeth, deviation of linea mediana and cross bite. (Schneider-Moser 2022).

Screening at this age allows detection of potential orthodontic problems that are related to the growth of the jaws and the eruption of permanent teeth. It also shows the necessity of treatment and when is the best time for treatment.

The goal of early orthodontic treatment is to correct transversal, sagittal and vertical irregularities, in order to ensure normal growth and development, to prevent the existence of bad habits (pacifier, finger, lip, tongue thrust) and to prevent orofacial dysfunctions (mouth breathing, atypical swallowing, postural problems). (Staley 2011)

According to Garde J, et al. (2014), problems that require early orthodontic treatment are: bad habits - thumb sucking, lip sucking, pacifier, tongue thrusting, reduction of the lumen of the respiratory space, as a result of adenoid vegetations, obstruction of nasal breathing - mouth breathing and snoring. (B Singh, A Bhatnagar 2017). Shalish M et al. (2013) found that reverse incisor gingival recession at the frontal teeth, hypoplasia of the middle third of the face, extremely narrow upper arch, crowding, ectopic eruption of the first permanent molar and canine are other problems that require early orthodontic treatment. Protrusion of the permanent frontal teeth, cross bite, ankylosis of primary molars, soft tissue obstruction during tooth eruption, fibrous lingual frenulum, children with cleft palate, bruxism and speech problems are also orthodontic problems where early orthodontic treatment is needed (B Singh, A Bhatnagar 2017)

Clinical trials should include: (Alhammadi MS et al 2018)

- assessment of overall oral health
- facial analyzes to determine growth pattern
- functional analyzes to determine the presence of harmful habits and/or occlusal dysfunctions

Diagnostic procedures include: (Mitchell L 2013)

- extraoral and intraoral photographs
- orthodontic dental models for occlusal assessment
- orthopantomographic images to assess dental maturity, eruption problems, size and presence of unerupted teeth, dental anomalies
- cephalometric analysis to determine dental and skeletal ratios

Types of treatment (Nielsen IL 2017)

- Modification of functions, without an appliance, through myofunctional therapy or occlusal equilibration.
- Orthopedic treatment of the maxilla or mandible.
- Treatment with simple removable or fixed appliances.

Appliances and methods (Wood W 2016).

- Finger sucking weaning devices
- Habit breakers for tongue thrusting
- Space maintainers
- Quad helix
- Head gear

- Delaire face mask
- Selective grinding of teeth
- Exercise with a spatula
- Inclined plane
- Chin cup,
- Oral screen,
- Myotherapy
- Myofunctional therapy with trainers (Alsawaf DH 2022)
- Serial tooth extraction

The benefits of early orthodontic treatment are: correction of harmful habit, reduction or elimination of abnormal swallowing and speech problems and reduced risk of trauma to protruding frontal teeth.(Artese F.2019). Possibility to direct the growth of the jaws, guiding the future permanent teeth into the correct position, and providing sufficient space are also benefits. Reduced need for extraction of permanent teeth, reduced or eliminated need for maxillofacial surgery, possibility to minimize the need for further extensive and more expensive treatment and increasing children's self-confidence are other benefits of early orthodontic treatment. (Madurantakam P 2019)

5. CONCLUSIONS

The dentists should recognize, differentiate, triage and manage dentofacial irregularities. Early recognition of orthodontic irregularities is precondition for correct diagnosis and adequate orthodontic treatment, which is a condition for achieving occlusal harmony, function and dentofacial aesthetics.

REFERENCES

- Aldweesh, A.H., Ben Gassem, A.A., AlShehri, B.M., AlTowaijri, A.A., & Albarakati, S.F.(2022). Parents' awareness of early orthodontic consultation: A cross-sectional study. *Int J Environ Res Public Health*,19:1800.
- Alhammadi, M.S., Halboub, E., & Salah Fayed, M. (2018).Global distribution of malocclusion traits: A systematic review. *Dental Press Journal of Orthodontics*. 23(6):40.e1-40.e10.
- Alsawaf, D.H., Almasarani, S.G., Hajeer, M.Y., & Rajeh, N. (2022). The effectiveness of the early orthodontic correction of functional unilateral posterior crossbite in the mixed dentition period: A systematic review and meta-analysis. *Prog Orthod* ;23:1-20.
- Alwadei, S.H., Ali Hattan, A., Faqihi, K., Alhawiayan, A., Alwadei, F., & Alwadei, A. (2023). Prevalence of malocclusion and orthodontic treatment needs among Saudi primary school male children aged 6–12 years: A cross-sectional study. *J Int Oral Health* ;15:106-12
- Artese, F. (2019). A broader look at Interceptive Orthodontics: what can we offer. *Dental Press J Orthod.*;24(5):7–8.
- Singh, B., & Bhatnagar, A. (2017). *Oral Habits*, Lap Lambert, Academic Publishing.
- Farooq, A., Batra, M., Gupta, M., & Sudeep, C.B. (2014). Oral habits and their implications, *Child Oral Health Care*, October.
- Fleming, P. (2017).Timing orthodontic treatment: Early or late? *Aust Dent J*;62:11-9.
- Garde, J., Suryavanshi, R.K., Jawale, B.A., Deshmukh, V., Dadhe, D.P., et al.(2014). An epidemiological study to know the prevalence of deleterious oral habits among 6 to 12 year old children. *Journal of International Oral Health*,6: 39.
- Madurantakam, P. (2019). Does orthodontic treatment in early adolescence positively influence psychosocial wellbeing in adulthood? *Evid Based Dent*;20:107-8.
- Mitchell, L. (2013). *An Introduction to Orthodontics* , 4th Edition; Oxford university press
- Moshkelgosha, V., Kazemi, M., Pakshir, H., & Safari, R. (2017). Parental knowledge and attitude towards early orthodontic treatment for their primary school children. *Iran J Orthodont*;12:e7377
- Nielsen, I.L. (2017). Is early treatment with functional appliances worth the effort? A discussion of the pros and cons of early interceptive treatment. *Taiwan J Orthod* ;29:2
- Noar, J. (2014). *Interceptive Orthodontics: A Practical Guide to Occlusal Management* 1st Edition,; Wiley-Blackwell.
- Proffit, W.R., Fields, H.W., Larson, B., & Sarver, D.M. (2018).*Contemporary Orthodontics-E-Book*. Mosby, Missouri, USA: Elsevier Health Sciences.
- Schneider-Moser, U.E.M., & Moser, L. (2022).Very early orthodontic treatment: when, why and how?*Dental Press J Orthod*.10;27(2). doi: 10.1590/2177-6709.27.2.e22spe2.

- Shalish, M., Gal, A., Brin, I., Zini, A., & Ben-Bassat, Y. (2013). Prevalence of dental features that indicate a need for early orthodontic treatment. *Eur J Orthod.*;35(4):454–459.
- Staley, R.N., & Reske, N.T. (2011). *Essentials of Orthodontics: Diagnosis and Treatment*, Wiley-Blackwell.
- Wood, W., & Neal, D. T. (2016). Healthy through habit: Interventions for initiating and maintaining health behavior change. *Behavioral Science and Policy*, 2(1), pp. 71–83.