



Identification of the Ideal Age to Begin Orthodontic Treatment in Patients with Occlusal Problems

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Article History	Abstract
Received: 06 May 2023 Revised: 55 August 2023 Accepted: 31 August 2023	<i>Now a days, orthodontic treatment has become one of the favorites of aesthetics, although it provides benefits beyond planned. However, controversy has arisen as to the age at which orthodontic treatment should be started, that is, an ideal age, to avoid a second treatment due to various dental factors. Therefore, in this study, we investigated through a literature review about these factors that could affect the treatment, such as malocclusion and tooth movements and that could lead to the repetition of the same in the future, and we also studied the impact (benefits and contraindications) that would cause its early application. Thus, concluding that there is no generalized ideal age, but rather that this will depend on the severity of the patient's occlusion (guided by the classification proposed by Angle), giving way to possible different ages depending on the particularity of the case.</i>
CC License CC-BY-NC-SA 4.0	Keywords: Malocclusion, Dentition, Orthodontics, Dental occlusion

1. Introduction

Currently there is a greater possibility of costing and access to orthodontic treatments, so it is common to see in adolescents the use of orthodontics, in addition to the fact that they have innovated thanks to the improvements of their materials, precision techniques and their supports (vertical position or their construction), allowing the treatment to be more effective (1). But beyond looking for aesthetic solutions, orthodontic treatment is responsible for rectifying the different types of malocclusions that exist, which could be caused by genetic, hereditary factors and even bad habits of childhood. (2), these are considered a disorder but not a disease and its early detection is considered beneficial for the patient since it would avoid its aggravation and other functional, psychosocial and economic consequences, the same that can be classified by the form of condition, in addition to this there is also dental crowding that is usually more common in the anterior teeth (increase in size in permanent dentition or lack of spaces because the jaws do not have been developed) (3) (4). The present research

will focus on the analysis of what would be the ideal age to start orthodontic treatment, since in several cases those who come to the consultation or even family or friends, have had to perform this treatment a second time. Therefore, a literature review will be carried out and the reasons and factors by which after treatment could be affected will be studied.

2. Materials And Methods

The present bibliographic, descriptive, comparative study; It is based on the search for scientific information that helps determine if there is an ideal age to start orthodontic treatment in patients with occlusal problems. For which, first, the search of the specific literature was carried out in databases: Google Scholar, Scopus, Elsevier, PubMed, using as keywords for the search. Orthodontic treatment, occlusal problems, ideal age for orthodontic treatment. A time range of a decade 2010 to 2020 was used and 46 articles were selected, then through the inclusion and exclusion method, duplicate articles and articles that did not contain information that could help determine the ideal age to start an orthodontic treatment were excluded, in such a way that 38 articles were considered, analyzed and discussed in this review.

3. Results and Discussion

The Dental occlusion It is the relationship that the teeth have with each other at rest, although it is determined by inherent factors (size, shape and chronology of eruption), as well as by the shape of the dental arches and craniofacial growth pattern. Its variation is the result of genetic and environmental factors that determine the occlusal relationship, the critical stages in which malocclusion may occur are: a) in the three years of age, by total root development of second molars; b) between five and six years, due to the outbreak of the new dentition (permanent) and growth of the arches (can initiate dental crowding); c) from nine to thirteen years by the forces of canine eruption, which in case of crowding can produce the displacement of the pieces (1)(5).

The relationship between bad habits, mouth breathing and malocclusion are important factors to consider for the prevention and early treatment of craniofacial growth disorders (6)(7); Although it is still controversial whether poor habits and mouth breathing play a role in the pathogenesis of malocclusion, they will be of great importance for prognosis and will need to be eliminated to ensure an adequate physiological growth function environment. (8).

Environmental factors, eating habits (consumption of soft foods with reduced chewing capacity), non-nutritive sucking, pacifier sucking, finger sucking and early weaning, are considered the potential precursors of malocclusions. Sucking of the pacifier, bottle and especially finger sucking often leads to protrusion of the upper incisors and anterior jaw, atypical swallowing, front opening bite and posterior crossbite. (7); while the posterior bite is caused by the lowering of the tongue caused by sucking, lack of thrust of the tongue in the upper jaw and increased activity of the cheek muscles, which leads to changes in the pressure of the upper arch muscle. Importantly, craniofacial growth has typical facial features and dentition: elongated face, contraction of the upper dental arch, arch of the upper jaw, gummy smile, Class II and Class III malocclusion (9)(10).



Image 1. Malocclusions according to Angle

The **Angle classification** (Table 1.) is the most used method to evaluate the occlusal relationship that exists between permanent teeth, in this we find three categories: Class I, II and III malocclusion,

dividing and subdividing the last two into recognizable subgroups, covering a single category to Class I (despite being the most prevalent alteration in dental occlusion), in addition to being more frequent than the other classes. (5)(11).

<i>CONDITION</i>	<i>DESCRIPTION</i>
Normal occlusion	There is an occlusion between the mesio-vestibular cusp and the mesio-vestibular sulcus of the first molars (upper and lower)
Malocclusion Class I	There is a normal occlusion, but with alterations in the anterior teeth.
Malocclusion Class II	The occlusion between the first molars is either mesio-vestibular (upper) sulcus with the disto-vestibular cusp (lower) or even more distal.
Malocclusion Class III	The usual occlusion of the first lower molar will be mesial with the upper one.

Table 1. Classification of Angle according to the type of dental occlusion (5). It describes the occlusal relationship taking into account the tooth of the first permanent molar and the different types or alterations they may have, giving rise to malocclusions. Later Dewey-Anderson, expanded the classification of Angle (table 2), being the most used today, who classified them into five different types, which seems to solve this need, since there is a great variability according to age, gender, socioeconomic level and geographical area (12).

<i>Malocclusion</i>	<i>Subclassification</i>	<i>Description</i>
Class I: Molar Ratio Normoclusion or Class I, Canine Ratio Class I	<i>Type 1</i>	Crowding
	<i>Type 2</i>	Spacing, protrusion incisors.
	<i>Type 3</i>	Butt incisors or anterior crossbite
	<i>Type 4</i>	Posterior crossbite
	<i>Type 5</i>	Premature loss
	<i>Biprotrusion</i>	Dental biprotrusion
	<i>Normoclusion</i>	Primary molar ratio plane of straight terminal or soft mesial step, ratio, primary canine Class I
Class II: Molar ratio Class II, canine ratio Class II	<i>Division 1</i>	Protruded upper incisors
	<i>Division 2</i>	Demolished upper central incisors
	<i>Distoclusion</i>	Primary molar ratio distal step, primary canine ratio Class II
Class II: Molar ratio Class III, canine ratio Class III	<i>Type 1</i>	Butt incisors
	<i>Type 2</i>	Normal overjet with lower incisor retrusion
	<i>Type 3</i>	Anterior crossbite
	<i>Mesioclusion</i>	Primary molar ratio mesial step, primary canine ratio Class III

Table 2. Classification of malocclusions according to Dewey-Anderson (12). It describes the characteristics of malocclusions, but based on the Dewey-Anderson classification, which is a more in-depth study compared to the Angle classification, it is composed of the type of malocclusion, the subclassification of each and its characteristic.

It is said that with age the probability of experiencing some alteration in the occlusion will increase; A clear example is that between 6 – 7 years there is no greater difference, however, at 13 there is a greater risk of malocclusion (three times more); Regarding gender, there is contradictory evidence that this variable has some kind of influence on the development of dental occlusion, however, a higher frequency has been observed in women (2).

Tooth movements

Dental anatomy describes that there are 3 different types of dentition throughout life, and that they are formed since we are in the uterus, known as primary dentition (also called decidua, "milk" or temporary), mixed dentition and permanent dentition (13). The dental eruption is the result of physiological events in which factors such as genetics and culture influence, it is important to know the guide age of the outbreak of each tooth and thus facilitate the recognition of problems that may delay these processes (14).

The temporal dentition is the first to appear, characterized by the eruption of the left lower central incisor, this being the first tooth within the oral cavity between an age of 6 – 7 months, sequential to this will erupt the right lower central incisor to give way to the eruption of both upper central incisors, After these will erupt lateral incisors, first molars, canines and second molars completing the deciduous dentition with 20 teeth at an age of approximately 3 years, however these processes can be affected by periods of time between 5 – 10 months (13). The second dentition begins at age 6, when the first permanent tooth being the first lower and upper molar erupt, thus initiating the molting of 20 deciduous teeth to 32 permanent teeth, starting with the lower and upper central incisors, then both lateral incisors (14)(15), following these the first premolars and second premolars, these being new within the oral cavity, the canines are the last to be changed and the second molars are those that will put an end to this denture characterized by having temporary and permanent teeth (16) (17), in order to give rise to the definitive dentition, which begins at an approximate age of 13 years and will last the rest of our lives, however, it also presents the outbreak of the third molars (16 – 21 years) commonly known as "wisdom teeth" (18), erupted in the back of the jaws behind the second molars so that through their growth many of the times they will be poorly positioned that is, they can present a dental retention, which will slightly push the interproximal molars (second molar) thus causing a dental crowding, these cases of retention occur mostly in the jaw (19) In order to complete the 32 teeth mentioned above, although in many cases these are extracted, since today having such a soft diet we do not need these molars (20)

It is important to note that in case a tooth is missing its antagonist (the one that has contact in chewing), it will look for the relationship with some other dental organ so it will begin to sprout until it finds a communication (it occurs both in upper and lower teeth) (21)(22). Tooth movements can present certain pathologies such as tooth retention, given by a blockage in the process of the eruption and occurs commonly in canines and premolars, ectopia referred to the outbreak in the wrong space, other pathologies that we can mention is the appearance of caries given by host factors (13).

Early treatment of malocclusions

Early treatment is initially planned to last as short as possible, after which a "hold-in" period is very essential. This may involve continued use of a removable maxillary appliance and a night harness, although there is a risk of "relapse" of the correction achieved. If lingual arches have been used to maintain arch length, they are often preserved during this period to ensure that there is no mesial displacement of the molars as the deciduous molars exfoliate. It is also believed that the lingual arch will help maintain the alignment of the lower incisors. (23).

- *Class I malocclusion.* Typical class I treatment may involve the use of fixed appliances only when the permanent incisors and first molars have erupted. Bands are placed on the first molars to correct the skeletal discrepancy and achieve a class I molar ratio. A functional appliance can be used at this early stage (23).
- *Class II malocclusion.* There is a higher incidence of incisal trauma in an adolescent phase than in children, so it is important to provide early orthodontic treatment for children with prominent upper front teeth as this is more effective in reducing the incidence of incisal trauma (24)(25).
- *Treatment for Dental crowding* It will depend on the severity of the problem. According to Little et al., it may involve follow-up to develop and correct malocclusion; In cases of severe crowding (9 mm) may require therapy in which tooth extractions are performed, often the first permanent premolars (26), in order to create a space and allow the correct alignment and leveling of the teeth in the basal bone (27).
- *Class II type I.* Prescribed treatment involves providing a single course of comprehensive care for a child in early adolescence with delayed or permanent mixed dentition; treatment consists of placing the Twin Block functional apparatus as soon as possible, usually when the second deciduous molars are about to erupt (28), expecting to achieve a decrease of 1.5-2 mm of overjet per visit, this treatment usually lasts between 9 and 12 months. At the end, there should be an overbite and a protrusion of 0 mm, a sagittal over-correction of the buccal segments and bilateral open bites, so that the use of fixed appliances should continue. (29) (30).

- *Class III malocclusion.* The timing of early treatment is critical for successful results (32), within which you can use devices such as the traction mask, chin cup, the FR-3 device of Frankel, the bionator Twin-block inverse, removable mandibular retractor, the double piece corrector, the Class III elastics and the mandibular harness, to correct a maxillary retrognathia (33)(34).
- *Cross malocclusion.* It has been suggested that failure to treat it may lead to attrition damage; gingival recession and loss of alveolar bone support in the lower incisor, in addition to preventing adverse growth and restoring proper muscle balance (35)(36); improve maxillary lip posture and facial appearance if corrected in mixed dentition (37).

The results obtained in this bibliographic review, regarding the ideal age to start orthodontic treatment, show that it depends on different factors, the first is the types of malocclusion, they give rise to certain aberrant habits in childhood, the first classification on this is the one proposed by Angle, it is divided into three classes (I, II and III) (5), in addition to Perez et al., emphasizes that class I is the most prevalent since this class presents dental crowding, which is common to see in the population; however, years later Dewey-Anderson expanded the aforementioned classification into five types, including the analysis of what type of dentition it can occur. (11).

The second dependent factor is the dental movements since thanks to these there can be a lack of space thus causing crowding or dental retention, according to Brecher EA et al., this process is presented in the same way for all without distinction (13), however Ayala C., et al showed that there is a slight difference between the female and male gender as presented in table number 3, with the outbreak being first in women but only for a few months (15). On the other hand, the effects that could cause the early application of the treatment were also analyzed, regardless of the type of malocclusion that may occur, since each one demonstrates a different complexity, as exposed Kaygisiz E. et al, Chabre et al, Al-Mozany et al, so different types of orthodontic and guided devices will be used by stage (childhood or adolescence) or dentition (mixed late or early permanent) (23)(28)(32)(38)..

Finally we can say that there is no ideal age to start dental treatment since we would be talking generally, but despite this if ages can be mentioned but for each type in which it can be applied, that is, in the case of mild malocclusions that only present crowding could start between 16 – 18 years (with extractions if it is the case), And in the event that they present any affectation in the functionality or chewing and not only to aesthetics it would be recommended to start between 12-13 years since all the teeth have been moved (permanent dentition).

4. Conclusion

After having completed the literature review on the subject we can say that there is no established age to start orthodontic treatment in general, since there are different types of malocclusions such as class I, II and III, each with its complications, however, some are more serious than others, since, They are not only related to the aesthetic part, but also to the functional part; That is why in cases where there is no major complication (only correction for aesthetics) the treatment can wait, but in cases of open type bite, its early correction would improve later for the patient, that is, everything depends on the severity of the case.

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