



REVIEW ARTICLE

TOO EARLY OR TOO LATE? SELECTION OF TIME OF ONSET OF ORTHODONTIC TREATMENT

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ABSTRACT

There are two phases in orthodontics that most clinicians undertake: phase I which is the preventive phase and phase II which is the interceptive phase of orthodontics. Mixed dentition period serves to be the ideal period in carrying out treatments owing to the reason that the involved dental phase comprises of the permanent incisors and molars in the mouth along with the remaining deciduous teeth. During this period, skeletal development tends to be the main focus as compared to dental correction. The clinician always takes a closer look into the growth patterns of the individual before choosing a treatment approach as bone growth can be both advantageous and disadvantageous in treatment outcomes. The main problems faced in orthodontics seem to revolve around realigning crowded teeth and improving class II malocclusion, so does early initiation of treatment bring an end to this problem? In this article an overview of all the treatment variables and outcomes are weighed to find a solution to the addressed issue, it will also provide information on whether early diagnosis of such conditions affecting normal development can reduce chances of malocclusion.

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INTRODUCTION

The issue of early versus late treatment in orthodontics still appears to be controversial in literature (Cozza *et al.*, 2005; Lopes Filho *et al.*, 2015; Woon and Thiruvengkatachari, 2017). The timing of treatment in most orthodontic cases depends on the type of malocclusion, treatment response and choice of practitioner. Often, preventive orthodontics is the action taken to preserve and protect the occlusion at a given time whereas interceptive orthodontics deals with the action to intercept an existing malocclusion in the mixed dentition phase (Karaiskos *et al.*, 2005; Xeniotou-Voutsina, 1988). The phrase, "timing is everything", serves great purpose in orthodontic and suggests that all patients could be benefitted from an early treatment.

Treatment Phases

Phase I is a one phase treatment done when the patient has all the teeth in place, whereas Phase II is the multistep orthodontic procedure that is done at an early stage and is later completed once all the permanent teeth have fully erupted. The two phase treatment generally comprises of three parts:

- **Stage 1:** conducted between 7-11 years, jaw adjustments and tooth alignment is done in this stage
- **Resting stage:** stage between the first and second in which full eruption of teeth takes place
- **Stage 2:** teeth are fully erupted and full braces are used to provide a healthy smile

Timing of Treatment

Early mixed dentition serves as the ideal time to commence phase I treatment as the upper lateral incisors have erupted (Xeniotou-Voutsina, 1988). And although an orthodontist can modify the smile at any time, it always seems to be appropriate to begin the treatment that ensures the shortest time period with great results. It has been said that the initial treatment should begin around the age of 7 years as early treatment provides both timely detection of problems and greater opportunities for more effective outcomes (Xeniotou-Voutsina, 1988).

Why has 7 years been considered to be the optimum timing for treatment?

At the age of 7 the first molars have erupted due to which the back bite is established and the erupting incisors are also made available which help establish overbite, open bite, crowding or gummy smiles. Timely screening techniques can be used to help monitor the movements of teeth and skeletal growth.

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Preventive orthodontic procedures

- Parent education
- Caries control
- Care of deciduous dentition
- Management of ankylosed teeth
- Checkup for abnormal habits
- Checking for occlusal prematurity

Interceptive orthodontic procedures

- Muscle exercise
- Correction of crossbite
- Serial extraction
- Space regaining
- Control of oral habits

Early treatment and class II malocclusion

Angle's class II malocclusion forms a major part of orthodontic practice. In the early 80s camouflage treatments were used but they did not provide satisfactory results therefore an array of functional appliances were introduced such as Balter's bionator and the twin block appliances conceived by William Clark (Clark, 1982; 1988). These are incorporated in the two phase treatment in which the first phase is used to correct skeletal abnormalities followed by which a fixed appliance is used with a non-extraction technique (Clark, 1991; Clark, 1990). Several studies have been carried out in the UK and the United States to measure the efficacy of treatment under ideal conditions (Goracci and Cacciatore, 2017; O'Brien, 2006; O'Brien *et al.*, 2009a; O'Brien *et al.*, 2009b; Ramirez-Yanez and Faria, 2008; Thiruvengkatachari *et al.*, 2015). The twin block appliance was used for moderate to large overjet in which the criteria included a 7mm overjet with no other craniofacial discrepancies (Ehsani *et al.*, 2015). The blocks were activated as required and the patients undergoing the treatment were asked to wear the appliance for 24 hours a day (Ehsani *et al.*, 2015). As a result the overjet had been reduced as the individuals were treated during their mixed dentition growth phase (Ehsani *et al.*, 2015). Treatment age for class II malocclusion is between 8-11 years, at this age bone growth and mixed dentitions are made available for the correction of the dentofacial abnormalities (Ghafari, 1998). As stated by Joseph Ghafari, early treatment in class II cases is beneficial as it helps in avoiding extractions of the permanent teeth and optimal timing of treatment in late mixed dentition would correspond to the time just before the loss of the second deciduous molars (Ghafari *et al.*, 1998). The main aim of early treatment in class II cases is to control the first permanent molar from utilizing the E space made available and achieving ideal incisal angulation (Ghafari, 1998). The early treatment provides a greater opportunity for the non-extraction therapy. Phase I of the treatment extends for about 15 months and phase II extends till all the second molars have erupted and alignment.

Early treatment in class III malocclusion

The inability to predict mandibular growth seems to create great reluctance towards the early treatment of class III malocclusion as ever after preventive treatment the growth of

the lower jaw may need further surgical correction at the end of the growth phase (Sharma *et al.*, 2014). The dentoalveolar problems created by the anterior positioning of the mandible have led to various jaw discrepancies. A pre-treatment profile assessment needs to be done before to check for the maxilla-mandibular relationship. Wits appraisal is commonly used to diagnose the class III cases and to identify which treatment modality would be best suited for each case. Early intervention is known to help prevent the failure of maxillary growth and mandibular over closure (Sharma *et al.*, 2014; Woon and Thiruvengkatachari, 2017). Maxillary protraction requires around 350-600gm of force per side depending on the age of the patient. With this magnitude of force around 4.5mm of overjet can be achieved in 8 months after which the patient is made to wear a retentive appliance till the growth has completed as there may be high chances of relapse. Although class III malocclusion is said to be a hereditary disorder, various abnormal habits such as mouth breathing have also proven to be a causative factor (van Vuuren, 1991). Studies have shown that the maxillary protraction method can be made effective in mixed and early permanent dentitions (Cattaneo *et al.*, 2011; Koo *et al.*, 2017; van Vuuren, 1991). Several studies have shown that the anterior maxillary discrepancies can be treated in children using bonded maxillary expanders and facemasks (Moon *et al.*, 2015). Facemasks and palatal expansion therapy have proven to be effective in the early treatment of class III malocclusion (Farronato *et al.*, 2011; Liu and Zhou, 2013; Moon *et al.*, 2015; Seo *et al.*, 2015).

Issues associated with the consideration of early treatment

Patient's self-esteem rises as the treatment commences from the initial stages of malocclusion thereby providing parent satisfaction. This treatment method also provides more stable results and is said to be a less extensive therapy that makes better use of bone growth. On the other hand, there may be potential iatrogenic problems that may occur with early treatment such as dilacerations of roots. Moreover, impaction of maxillary canines by prematurely up righting the roots of lateral incisors may also be seen along with impaction of second molars by distalization of first molars.

Conclusion

An ounce of prevention is better than a pound of cure. Proper diagnosis and treatment planning are essential in determining good overall outcomes and they are usually seen during the mixed dentition period as there is more adaptability and stability.

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