

# Importance of timing in orthodontic treatment



'Timing is everything' holds best when it comes to treatment planning in orthodontics. It has been suggested that, although almost all types of malocclusion could be benefited from early treatment, the effectiveness of intervention depends on malocclusion.

The main reason for the controversy seems to be that our present knowledge about the timing of treatment is largely based on clinical experience and reflects various approaches and clinical traditions of orthodontic practice. Scientific evidence is limited and few studies have specifically targeted questions about the effects of early treatment <sup>1</sup>.

This article tries to review the various studies related to the debatic "one phase versus two phase orthodontic treatment".

Timing of treatment.

American orthodontist association recommends that kids see an orthodontist by age 7. A goal of "early" orthodontic treatment is to correct existing or developing skeletal, dentoalveolar, and muscular imbalances to improve the orofacial environment before the eruption of the permanent teeth is complete

(McNamara and Brudon 1993) <sup>2</sup>.

Salzmann noted that Mooress, in agreement with Tweed stated "it may be concluded that mixed dentition can be the most efficient orthodontic care for a specific patient if warranted by a carefully made analytical diagnosis. He went to say while mentioned frequently in the literature about self correction of malocclusion. there actually are few instance of self corrected

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malocclusion. He stated that beginning the treatment in the deciduous dentition phase is the “ epitome of dynamic orthodontic approach”.<sup>3</sup>

Lyman wagers claimed that the term ‘ prevention and interception’ are misnomers and gave the term “ pre orthodontic guidance” and “ correction” in substitute for them respectively.

Pre- orthodontic guidance-patients are one who have malocclusions in the deciduous or mixed dentition but do not need banded corrective.<sup>4</sup>

According to Dugoni , The ideal time to start a phase I treatment would be in the early mixed dentition , as soon as the upper lateral incisors are erupted. Early treatment is not usually started in the primary dentition expect for some crossbites an dsome Class II and Class III problems with crowding. most of these primary dentition problems could be postponed, rather than be faced , with three phases of treatment

1<sup>st</sup> stage- primary dentition,

2<sup>nd</sup> stage- mixed dentition

3<sup>rd</sup> stage- permanent dentition.

The goal of orthodontic treatment is to achieve “ the achievable normal occlusion which is esthetically pleasing and functionally stable”. Factors which influence orthodontic goal are not only the type of malocclusion, mechanotherapy or the type and duration of retention but equally important is the timing of treatment<sup>5</sup>

## One phase versus two phase

Anticipation is that early intervention may reduce the overall need for complex orthodontic treatment that may include permanent tooth extraction or orthognathic surgery. On the surface, this seems reasonable; it appears more logical to *prevent* an abnormality from occurring rather than waiting until it has developed fully. In a recent survey of the Diplomates of the American Board of Orthodontics, participants were asked what they perceived to be the benefits of early treatment (Bishara *et al.* 1998). The most common responses were as follows: (1) greater ability to modify growth; (2) improved patient self-esteem and parental satisfaction, (3) better and more stable results, (4) less-extensive therapy is required later; and (5) reduced potential for tooth damage such as trauma, root resorption and decalcification. <sup>6</sup>

Responses of this survey were supported by a study by King and coworkers (1999) in which orthodontists perceived that subjects who had received phase 1 treatment had less complex malocclusions and lower treatment priority than subjects in an untreated control group. Proponents of two-phase orthodontic treatment often contend that treatment in the late mixed dentition gives the clinician only one chance at correction, and if cooperation is poor the results may be unsatisfactory (Dugoni 1998). In addition, by delaying treatment many female patients may have passed the peak velocity of their skeletal growth and strategies aimed at growth modification may have reduced effectiveness <sup>7</sup>.

According to Dugoni (1998) benefits of treating Class II malocclusions in the early mixed dentition include the following: (1) reduced incidence of premolar extraction, (2) reduced need for surgical orthodontics, (3) better patient cooperation, (4) reduced incidence of root resorption, and (5) reduced incidence of ectopic cuspid eruptions <sup>8</sup> .

The Department of Orthodontics at the University of the Pacific conducted a randomized retrospective study to evaluate treatment changes during early mixed dentition treatment (Dugoni 2006). The study sample was restricted to patients who originally were evaluated in the early and middle mixed dentition yielding three study groups: (1) delayed treatment ( *i. e.*, no treatment), (2) phase 1 treatment only, and (3) two-phase treatment. Preliminary analysis of the study indicates that approximately 42% of patients who received early treatment did not require a second phase of treatment. Subjects requiring full treatment and phase-1 treatment had fewer visits, shorter treatment times, and lower fees. In addition, 82% of subjects in the early treatment group did not require extraction in the permanent dentition <sup>9</sup> .

Another proposed benefit of early orthodontic intervention in Class II malocclusions is improved self-esteem. O'Brien and coworkers (2003) conducted a multicenter, randomized, controlled trial providing early functional appliance treatment for children aged 8 to 10 who presented with Class II, division 1 malocclusions. Comparisons were made to age and sex- " matched" subjects who were untreated. The second phase of the study examined the psychosocial impact of early orthodontic treatment. Results

indicated that children who had received early treatment reported higher self concepts and more positive childhood experiences than the untreated controls <sup>10</sup> .

However, not all clinicians agree, many preferring to wait until all the permanent teeth have erupted (excluding third molars) to start treatment.

Opponents of two-phase treatment argue that there are few, if any, benefits that are unique to and dependent on earlier treatment. Gianelly (1995) contends that at least 90% of all growing patients can be treated successfully in only one phase by starting treatment in the late mixed dentition. Gianelly (1995) proposed that the other 10% of patients could benefit from immediate resolution of the problem such as those presenting with crossbites or Class III malocclusions. <sup>11</sup> Opponents of two-phase treatment contend that patients probably only have a limited capacity to cooperate, and dual treatments that require two phases of compliance and retention may be more than patients can handle (Keeling *et al.* 1995; Berg 1979) <sup>12</sup> . Opponents also contend that there is no benefit concerning self-esteem and early Class II treatment. Dann and coworkers (1995) conducted research on children with Class II malocclusions concerning early treatment and its effect on self concept. The results indicated that there was no change in mean self concept score in treated subjects, nor was there any association between reduction of Class II malocclusion features and improved self concept. These findings suggest that children with Class II malocclusions do not generally present for treatment with low self concept and, on average, self concept does not improve during early orthodontic treatment <sup>13</sup> .

Tulloch and coauthors (2004) conducted a randomized clinical trial of preadolescent (early) versus adolescent (later) treatment of children with severe Class II malocclusions. Severe malocclusions were those having an overjet greater than 7 mm. The peer assessment rating (PAR) was used to rate alignment and occlusion. Differences among groups with respect to skeletal relationship and PAR score were not statistically significant at the end of Phase II treatment. In addition, two-phase treatment appeared to be inefficient in that it did not reduce the average time a child spent in fixed appliances nor did it reduce the complexity of later treatment ( *i. e.*, need for extraction or orthognathic surgery). “ During phase 2 of the trial, the advantage created during phase 1 of treatment in the two early treatment groups was lost, and, by the end of fixed appliance treatment, there was no significant difference between any of the three groups” (Tulloch *et al.* 2004: 660) <sup>14</sup> .

O’Brien and coauthors (2003) evaluated the effectiveness of early orthodontic treatment with a twin-block functional appliance in a multicenter, randomized clinical trial. In comparison to the study conducted by Tulloch and coauthors (2004), this study used 14 hospital-based orthodontic specialists in the United Kingdom. Importantly, treatment was provided by many operators outside of a controlled university setting where treatment is carried out on selected populations. In overview, the authors wanted to see how effective early Class II treatment is in the “ real world” of orthodontic practice outside dental schools. The results showed that treatment with the twin-block appliance reduced overjet, corrected molar relationship, and reduced the severity of the malocclusion. The majority of the correction was

attributed to dentoalveolar changes and small amounts of favorable skeletal change. The study continued until the children had completed phase 2 treatment. An aim of the study was to learn whether early treatment resulted in a reduced need for phase 2 treatment, and if differences in skeletal pattern or final dental occlusion were evident. At the end of phase 2 treatment, there was no difference between the patients who had early treatment and those who did not for any variable evaluated, and most treated subjects required a second phase of treatment (O'Brien *et al.* 2003). In conclusion, these findings agree with those of Tulloch and coauthors (2004) in that it appears that early orthodontic treatment for Class II malocclusions does not confer any advantage over a later single-phase treatment<sup>13, 14</sup>.

Breman and Pancherz *et al.* (2002) studied the efficiency of early and late Class II division 1 treatment. Efficiency was defined as a better result in a shorter time. Results showed that treatment time and PAR scores decreased with increasing dental development, indicating that early Class II division 1 treatment is less efficient and less successful than a later one phase treatment.<sup>15</sup>

Johnston and Livierates (1995) conducted a study comparing one-stage and two-stage nonextraction alternatives in Class II samples. Comparisons between the two groups (one stage and two stage, were conducted by examining pretreatment and post treatment lateral cephalograms. Both groups exhibited similar patterns of skeletal change that could not be distinguished from each other. Skeletal changes in both groups were largely



responsible for molar and overjet corrections. The magnitude of differential jaw growth was greater in the two-phase group presumably because treatment started earlier and finished later. <sup>16</sup>

Dolce *et al.* (2005) conducted a similar comparison and observed an early mandibular response in patients treated with a Bionator. The data revealed that the sagittal jaw relationship improved significantly in both phase 1 treatment groups compared with the observation group. However, this initial mandibular response was not evident after both groups had received full appliance therapy. This study differed from previous studies in that it used centographic analysis. <sup>17</sup>

## Discussion

Coming to the raging debate in orthodontics today, Dr. Paul Reggiardo , trustee of American academy of pediatric dentistry says “ ask a roomful of dentist and orthodontists what is the best age to start treating kids? and you’ll get as many answers as you have practitioners”

“ We ‘ re talking about two concepts i. e orthodontics and dental facial orthopaedics” explains Dr. Donald. F, president of the California society of pediatric dentists and professor and chairman of pediatric dentistry at UCLA. Hence suggesting two problem categories justifying the two phase treatment. <sup>18</sup>

But here comes the statement of Brodie on “ GENETIC PARADIGM”- ‘ the pattern of growth is unchanging and immutable i. e growth is under a tight

genetic control. Leaving the rationale for early growth modification under debate.

Today the American Orthodontist Association recommends that kids see an orthodontist by age 7. However practitioners like Dr. Alan Bloore consider that only 1/3<sup>rd</sup> of patients receiving 2 phase orthodontic treatment actually need it in true sense<sup>18</sup>

There has been considerable discussion in the orthodontic literature regarding the biological and clinical advantages and disadvantages of early orthodontic treatment. Some have argued that early treatment has no longterm advantage (Bowman 1998; King *et al.* 2003; Tulloch *et al.* 2004). Others argue that early treatment may reduce treatment time and reduce the complexity of the second phase of treatment (Dugoni 2004)

In a recent American association of orthodontist report based on 3335 replies found that “ 85% of the orthodontist indicated that less than one half of their cases were mixed dentition and 15% of the orthodontist indicated that the permanent dentition accounted for 50-100% of their cases.

Coming to today's generation of youths destined for braces is more likely to get them while the tooth fairy is still leaving them money. And they'll likely get them twice. Today as many as 80% of children go through two-phase orthodontia, according to some estimates. Though the two-step process costs more in time and dollars, proponents believe it achieves better results.

Some dentists and orthodontists say too many in their profession overprescribe early orthodontia. The motivators are greed and parental

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vanity, they charge. “ Where as the parents opt for 2 phase treatment less out of fear and more to gain control ; parents today want to be proactive and not just reactive” says Dr. Conrad Sack.( 18, 19)

Nevertheless the treatment in mixed dentition opens the door for an orthodontist to apply his judgment and experience. Proper diagnosis and treatment planning can produce the most gratifying results during mixed dentition stage. It is here we have growth to assist us, the hard tissue are highly responsive to forces applied and soft tissue show higher degree of adaptability, thereby enhancing the stability of results. On the other hand lack of careful planning can lead to disastrous results. It should be remembered that there is generally greater danger in: “ Too much too soon, rather than in too little too late”.