

Need for Interceptive Orthodontic treatment in Children of Chennai – A Pilot Study

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Abstract:

Introduction: Interceptive orthodontics is a type of phased orthodontics in which growth is used to correct developmental occlusion problems. Early diagnosis and treatment is the key principle of this type of orthodontics. It can eliminate or decrease the severity of the developing occlusion, therefore reducing the treatment time and cost. Improving the satisfaction of the parents and self-esteem of the children. The aim of the article is to evaluate the need for interceptive orthodontic treatment in children in Chennai and to study the prevalence of malocclusions that may require interceptive orthodontic treatment.

Materials And Method: The case history, history of habits such as thumb sucking etc, canine relation, molar relation and missing teeth will be recorded in children between the age group of 6 to 12 years.

Results: It was obtained that only 75% of the children have visited a dentist. 23% have a thumb sucking habit and 1% have bruxism. From the children evaluated 23% anterior crossbite, 11.7% posterior crossbite, 31.7% open bite, 5% deep bite, 23% spacing, 6.7% crowding and 15% midline diastema.

Conclusion: Most children have not visited a dentist and have developing malocclusions that can be treated with interceptive orthodontics, hence proves the need for interceptive orthodontics.

Keywords: interceptive orthodontics, crossbite, openbite, deepbite, molar relation

INTRODUCTION:

Interceptive orthodontics are simple orthodontic procedures which are done to correct a developing malocclusion. These procedures reduce the severity of the malocclusion, which in turn help to improve the self-esteem and image of the patients, tooth eruption patterns, growth patterns and control oral habits [1].

According to the College of Diplomates of American Board of Orthodontists, Early treatment is defined as is treatment started in either the primary or mixed dentition to enhance the dental and skeletal development before the eruption of the permanent dentition. Its purpose is to correct or intercept a malocclusion, thereby reducing the need for or the complexity of any treatment in the permanent dentition [2,3]. Therefore, the American Academy of Orthodontics states that children at the age of 7 should have an orthodontic examination as only a specialist can identify the malocclusion and treatment will be easier and also cost efficient [4]. In one study, patients which are capable of developing future orthodontic problems were identified in 28% of those screened, and most of the developing malocclusions were judged to be suitable for interceptive orthodontic treatment [5]. A similar study found that about 27% of the children screened in a large Nigerian sample needed some form of interceptive orthodontic treatment [6]. A study done in a community dental clinic where children at ages 9 and 11 years also found that one-third would benefit from interceptive orthodontic treatment [7].

The main advantages of interceptive orthodontic treatment are reduction of protrusion, dental and skeletal malformations, reduction overjet, providing space for eruption and correcting abnormal muscle morphology [8]. Interceptive orthodontic procedures does not always provide finished orthodontic results without a second phase of treatment in the permanent dentition, several

studies have suggested that systematically planned interceptive treatment in the mixed dentition might contribute to a significant decrease in treatment need between the ages of 8 and 12 years, often producing results so that further treatment can be categorized as elective. Malocclusions are not life threatening, but some recommend the use of interceptive orthodontics as a public health initiative in order to provide orthodontic treatment in areas where there are limited access and resources, reducing the costs in these under privileged areas.[9]. The study is designed to evaluate the prevalence of various dental abnormalities that could lead to malocclusions in the future to prove the need for interceptive orthodontics in children from socio-economically challenged areas of Chennai, India.

MATERIALS AND METHODS:

A total 60 children between the age group 6-12 (36 boys and 24 girls) were screened in the areas of Perunguluthur and Old Washermanpet. Parental consent was obtained prior to screening and the screening was approved by the Ethical committee.

Case history including previous medical and dental history, oral habits, dentition, dmft/DMFT index, primary molar and canine relation were recorded. The following dental abnormalities were recorded such as:

1. Anterior crossbite
2. Posterior crossbite
3. Open bite
4. Deep bite
5. Spacing
6. Crowding
7. Midline diastema

The data collected was analysed by using IBM SPSS 16 software (IBM Corporation, United States of America) and the frequencies and percentages were calculated.

RESULTS:

In the study, a total of 60 children participated, out of which 36 were boys and 24 were girls. The average age of the children were 8 ± 2 years old. The distribution in the age group were 45 (75%) 6-8 years old, 10 (16.6%) 9-10 years old and 5 (8%) 11-12 years old.

From the case history recording, it was found that:

Past Dental history:

45 (75%) of the children have never visited the dentist and only 15 (25%) have been to a dentist once.

Brushing technique and frequency:

44 (73.3%) of the children brush their teeth once a day and the remaining 16 (26.7%) brush their teeth twice a day. Majority of the children (88.3%) use the horizontal technique and only 7 (11.7%) use the circular technique.

Oral Habits:

Majority of the children did not have any oral habits, only 14 (23.3%) of the children had a thumb sucking habit and 1 (1.7%) had bruxism.

From the clinical examination, it was found that:

Dental Caries:

44 (73.3%) had dental caries, in which 23 (52.5 %) had caries in more than two teeth, 14 (31.8%) had caries in two teeth and 7 (15.9%) had caries in a single tooth. The most commonly found decayed tooth was the 1st permanent molar followed by the 1st and 2nd primary molars and anterior teeth.

Loss of Primary teeth:

When the primary tooth was missing it was recorded, without taking the reason for the missing tooth. The most commonly missing teeth were the primary molars (48.3%) followed by primary canines (18.3%).

Canine and Molar relation:

Flush terminal relation was seen in 21(35%) children, Distal step relation was seen in 6 (10%) children and Mesial step relation was seen in 4 (6.7%).

Class 1 primary canine relation was seen in 29 (48.3%), class 2 primary canine relation was seen in 14 (23.3%) and class 3 primary canine relation in 6 (10%).

Class 1 permanent molar relation was seen in 21 (35%), class 2 molar relation in 7 (11.7%), class 3 molar relation in 4 (6.7%) and 28 (46.7%) had unerupted 1st molars

Open bite, Anterior crossbite and Posterior crossbite:

Out of the 60 children screened, 19 (31.7%) had open bite, 14 (23.3%) had anterior crossbite, 7 (11.5%) had posterior crossbite and 3 (5%) had deep bite.

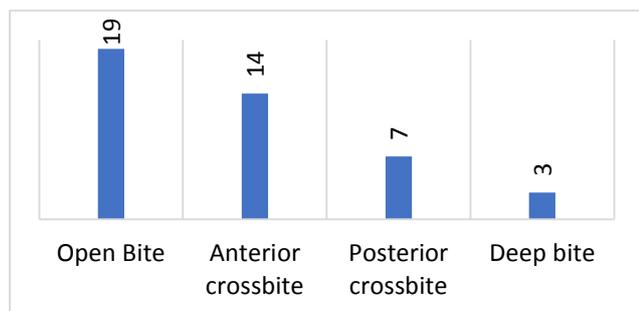


Fig 1: The various dental features such as open bite, anterior crossbite, posterior crossbite and deep bite seen in the 60 children screened.

Spacing, Crowding and Midline diastema:

Spacing was seen 14 (23.3%) children, crowding in 4 (6.7%) and midline diastema in 9 (15%).

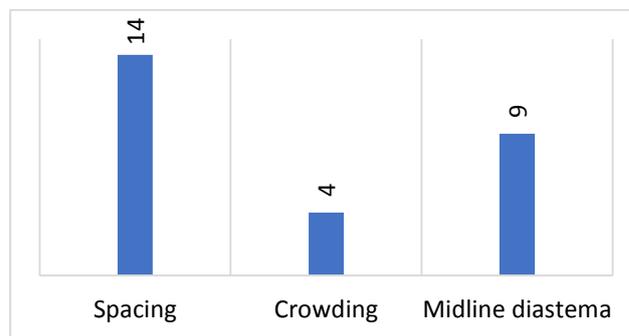


Fig 2: The various dental features such as spacing, crowding and midline diastema seen in the 60 children screened.

DISCUSSION:

The study is based on theory that through interceptive treatment, malocclusions can be treated during the developing stages. A study conducted in the United States showed that interceptive orthodontics benefitted 27.3% of all treated cases [9]. Studies conducted in Finland, found that 20.4% and 28.5% were in need of interceptive orthodontic treatment [10,11]. Karaiskos et al reported that caries was a common finding, 30.4% had caries in the 9-year-old group and 18.6% in the 6-year-old group with 13.4% children having caries in a single tooth and 17% had caries in more than one tooth in the 6-year-old group. In the 9-year-old group, 9.3% had caries in a single tooth and 11.3% had caries in more than one tooth. The most commonly affected tooth with caries in both groups was the primary second molar followed by the first permanent molars. As caries is one of the underlying causes a risk of malocclusion due to premature loss of primary teeth. According to the study, 29.4% in the 9-year-old group and 11.9 in the 6-year-old group had premature loss of primary teeth. For molar occlusion, 20.1% of the children in the 6-year-old group were not examined due to the permanent first molars not yet erupted and for the children where occlusion was measured, 63.2% had class 1 relation, 32.1% had class 2 relation and 5.7% had class 3 relation in the 6-year-old group and in the 9-year old group , 51.9% had class 1 relation, 45.5% had class 2 relation and 2.6% had class 3 relation [5]. Another study conducted in South Africa also showed similar results stating a high prevalence of untreated caries and premature loss of teeth [12]. Premature loss of teeth can lead to space shortage due to the remaining teeth moving into the leeway space, this can be controlled by a space maintainer. But the use of space maintainer is not usually indicated, but according to state of eruption, occlusion, general spacing and crowding, oral hygiene status and co-operation of the child [9].

In a study done by Prabakar et al, found the incidence of malocclusion was high, 48.5% had class 1 malocclusion followed by 26.7% had class 2 division 1 malocclusion, 9.5% had class 2 division 2 malocclusion and 5% had class 3 malocclusion. Out of the 336 children screened,

majority of the children had overjet more than 5mm followed by deepbite and spacing of the teeth [8].

Crossbite is a dental malocclusion that need treatment as it can cause a true skeletal deformity if left untreated. Posterior crossbite is said to be cause due to increased cheek activity with reduced lingual support for upper primary molars and canines which causes the narrowing of the maxillary arch, in most children it is caused due to functional forced lateral bite [13]. Anterior crossbite can cause periodontal problems, mobility and fracture [14]. Coetzee et al showed that 13.1% prevalence of anterior crossbite and 7.8% posterior crossbite in 3 to 8year olds in South Africa [12]. There was a 13% prevalence in deep bite, 13% had proclination,6% had midline diastema,12% had open bite and 5% anterior crossbite, according to Kabue et al. He also found that 53% had terminal plane, 43% had mesial step and 1% had distal step [15] and in another study, it was 23.65% in deep bite and higher prevalence of crossbite in the anterior segment which was 10.5% in the 6-year-old group and 11.9% in the 9-year-old group where as the crossbite in the posterior segment was lesser, 3% in 6-year-old group and 7.8% in the 9-year-old group [5].

According to a study done by Singh VP et al, Crowding (19.75%) was the most common type of malocclusion seen in the study group followed by increased overjet (17.51%) and deep overbite (13.23%). Dental features like scissor bite (0.89%), reverse overjet (1.79%), and open bite (2.03%) were least noticed in the study group [16]. This similarly seen in studies done in a Maltese population, with 21.13% having increased overjet followed by 14.91 of the children having crowding [17]. Interceptive orthodontics by a general dentist or pedodontist can eliminate the need for expensive and extensive orthodontic treatment. By proper patient education, fluoride applications, restorative treatments and regular screening can help and prevent malocclusions from developing. Norwegian studies reported decrease in caries incidence with the extensive use of fluoride-based preventive programs cited as the major factor contributing to the decline during the late 1960s and early 1970s which can be a stepping stone toward interceptive orthodontics [18]. Some of the few interceptive orthodontic treatment options are habit breaking appliances, expansion appliances, space maintainers and crossbite and diastema correction appliances. Addressing problems in the mixed dentition offers several benefits. Children at this age are more attentive and cooperative than the teenage patients [19]. Early treatment of deleterious oral habits, such as thumb sucking and tongue thrusting, is recommended after 8 years of age as it can improve speech impediments due to the open bite, which often develops due to the oral habits [20]. Also, at 8 years, the first permanent molars are fully erupted, helping in the removable appliance therapy, which is also better tolerated at this age. Many dental practitioners, including the orthodontic department at the University of Bergen, treat crossbites during the mixed dentition because younger patients are said to respond better to treatment and early treatment also prevents the

risk of asymmetric facial growth and gingival damage [21,22].

Interceptive orthodontics reduces the financial burden and is much more affordable form of orthodontic treatment, therefore cost-effective analyses are necessary, to demonstrate the economic value of this treatment compared with comprehensive treatment in the permanent dentition. A Finnish study found that the cost was lower in 1-stage treatments started in the permanent dentition compared with 2-stage treatments started in the mixed dentition [23].

CONCLUSION:

The prevalence of various factors that could lead to malocclusions is an indication that there is a need for interceptive orthodontic treatment. The study also shows the need to provide awareness about interceptive orthodontic treatment as many parents cannot afford the expensive orthodontic treatment, therefore interceptive orthodontic treatment provides economic treatment options and also reduces the time required for the treatment. It shows the need for the implementation of primary dental care for children in underserved communities.

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