

AN INTRODUCTION TO INTERCEPTIVE ORTHODONTICS

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Abstract

Interceptive orthodontic treatment is used to eliminate or reduce the need for major treatment in the permanent dentition. It is technically simple and relatively cheap, compared to comprehensive treatment with full fixed appliances. The early loss of primary molars and non-nutritive sucking habits may lead to develop a malocclusion in permanent dentition and interceptive measures are used to avoid adverse occlusal and dental consequences. Early assessment is the key of interceptive orthodontics. The purpose of this article to discuss briefly about interceptive orthodontics.

Key words: Interceptive Orthodontic, Habit, Malocclusion, Development stage.

Introduction

Interceptive orthodontics deals to intercept a malocclusion that has already developed or is developing & the goal is to restore a normal occlusion. The word "orthodontics" was coined, it was known that teeth moved in response to pressure. Primitive (and surprisingly well-designed) orthodontic appliances have been found with Greek and Etruscan artifacts.¹ The first treatment of an irregular tooth was recorded by Celsus (25 BC-50 AD), a Roman writer, who said, "If a second tooth should happen to growing children before the first has fallen out, that which ought to be shed is to be drawn out and the new one daily pushed toward its place by means of the finger until it arrives at its just proportion." A clear mechanical treatment was advocated by Pliny the Elder (23-79 AD), who suggested filing elongated teeth to bring them into proper alignment. This method remained in practice until the 1800s.²

Malocclusions were called "irregularities" of the teeth, and their correction was termed "regulating." It remained for the Enlightenment to reawaken the spirit of scientific thought necessary to advance dentistry and other disciplines.

Pierre Fauchard "repositioned" teeth with a forceps, called a "pelican" because of its resemblance to the beak of that bird, and ligated the tooth to its neighbors until healing took place. At that time, little attention was to anything other than the alignment of teeth and then almost exclusively to the maxilla. Moreover, he was the first to recommend serial extraction by extracting premolars to relieve crowding.³

However, before the time of Edward Angle, the treatment of malocclusions was chaotic, with little understanding of normal occlusion and even less understanding of the development of the dentition. Appliances were primitive, not only in design but also in the metals and materials used. There was no rational basis for diagnosis and case analysis. It was Edward Hartley Angle (1855 -1930), early in the 20th century, who dominated the emergence of "orthodontia as a science and a specialty".⁴

Definitions of interceptive orthodontics

Interceptive orthodontics deals to intercept a malocclusion that has already developed or is developing, & the goal is to restore a normal occlusion.¹

According to American Association of Orthodontics (1969), interceptive orthodontics has been defined as "that phase of science & art of orthodontics employed to recognize & eliminate potential irregularities & malpositions of the developing dentofacial complex".⁵

According to Proffit & Ackerman (1980), interceptive orthodontics is defined as "elimination of existing interferences with the key factors involved in the development of the dentition".⁵

According to Shetty & Tandon (2001), it is defined as an early intervention in the developing dentition to minimize the developing malocclusion or elimination of potential factors which interfere with normal occlusion.

Difference between Preventive & Interceptive Orthodontics

The terms preventive and interceptive orthodontics are sometimes used synonymously. But it should be understood that preventive orthodontic procedures are undertaken when dentition and occlusion are perfectly normal, while the interceptive procedures are carried out when the signs and symptoms of malocclusion have appeared. In interceptive orthodontics, the orthodontist is dealing with malocclusion as a "fait accompli" at least to a minor degree. If he renders the proper service with dispatch, autonomous adjustments will restore normal growth but if he waits for too long he is left with no other alternative than to resort to corrective orthodontics which might be a compromise most of the times.¹

Thus preventive orthodontics is the prevention of potential interferences with occlusal development while interceptive orthodontics basically refers to measures undertaken to prevent a potential malocclusion from progressing into a more severe one.

Maturational development & facial form relative to treatment timing

It is important for the clinician to be able to reveal the developmental uniqueness of an individual, especially at a young age, so that the timing and design of treatment modalities can be most advantageously facilitated. Correlation of information integrating a child's

maturational age, facial form, and proposed treatment mechanics is essential if a successful treatment result is to be achieved. Chronologic age is not a reliable developmental standard, as it is not necessarily correlated with the maturational age of the patient.

Treatment initiated during growing periods requires an understanding of the past and the predicted maturational profile of the patient and its influence on the developing facial form. Incremental skeletal and soft tissue changes in the face and their associated growth rates are closely correlated with an individual's patterns of maturational development. Dental development, especially when related to tooth eruption, is poorly correlated with general and facial skeletal growth.⁶

System of Skeletal Maturation Assessment

To properly identify the maturational age of an individual, it is essential that both maturational stage and maturational level be assessed. Maturational stage refers to the amount of progressive skeletal development that has occurred toward adulthood. The respective stages are designated by utilizing specific skeletal maturity indicators (SMIs) identified on hand-wrist radiographs.⁷ Maturational level refers to the rate of maturational development, whether it be advanced, average, or delayed relative to chronologic age. Individuals can demonstrate the same maturational stage (SMI) but vary relative to their maturation level. In these situations, individuals will exhibit differences in the lengths of time between the maturational stages, in the percentages of total growth completed, and in the associated velocity of growth.⁷

Objectives of Early Orthodontic Treatment

The objectives of early orthodontic treatment are as follows:⁸

1. Attain genetic growth potential
2. Establish normal relationships
3. Remove functional interferences
4. Maintain normal function
5. Allow for the normal eruptive sequence

1. Attain genetic growth potential

Once knowing what a child's growth pattern is, and if it is deemed unsatisfactory, the clinician can utilize certain orthopaedic devices, such as a headgear, to redirect the growth of the jaws to a more harmonious relationship. Therefore, it is dependent on the clinician to help the patient attain his or her growth potential with early orthodontic intervention.

2. Establish normal relationships

Clinician have very short period in growing patient to modulate the growth of the jaw for obtaining a normal maxilla-mandibular relationship but he can move teeth at any age. Presence of periodontal ligament makes possible the movement of teeth.

3. Remove functional interferences

Functional interferences developed by certain extrinsic factors during growth. Many oral habits such as thumb

sucking and mouth breathing can modulate the skeletal development of jaw, like create a narrow maxilla, when compared to the mandible, thus causing deviation of the lower jaw to one side or the other during occlusion. These types of functional interferences must be treated early, or the patient may suffer from various growth discrepancies of the jaws, or abnormal temporomandibular joint dysfunctions

4. Maintain normal function

It is very important that clinician must know the every minute detail regarding every stage of dental development that's why he or she can differentiate what is normal and what is abnormal. Developing feature of one stage is normal for that particular stage but if it seen in another stage it is abnormal. The dentist must know the difference between "transient" and "incipient" malocclusions.

5. Allow for the normal eruptive sequence

Permanent teeth follow a certain eruptive sequence which is different for maxillary and mandibular teeth. It is not so important that the patient follows his or her "calendric" development, as long as the permanent teeth are erupting in correct sequence. It is important to remember also that if a permanent tooth is erupting on one side of the dental arch, its "mirror image" tooth on the other side should also show evidence of eruption.

Rationale for Early Treatment

One may be able to remove etiological factors, enlist natural growth forces, and provide differential crown response and obtain a balanced profile prior to eruption of most permanent teeth. Clinician can utilise growth better in the young and there is more growth available. AAO recommends visit to an orthodontist by age of 7.

Benefits of Interceptive Orthodontics

1. The possibility of achieving a better result: With modern precision bracket appliances beautiful results are obtained routinely if skeletal dysplasia is not severe. However, it is difficult to camouflage gross craniofacial morphology by tooth movement alone.^{7,8}
2. Some forms of treatment can be done at an early age. Interception of deleterious habits is easier than treatment after years of ingrained habit reinforcement

Difficulties in Interceptive Orthodontics

Misperceptions exist about the goals of treatment: This is an important difficulty in defining clearly the goals. More logical goals are the removal of primary etiologic factors and "the correction of skeletal dysplasia prior to the eruption of teeth, neither of which necessarily results in precise positioning of teeth". Improper interceptive treatment can be harmful: Just as growth can be directed advantageously, it can also be misdirected³²Diphasic treatment may lengthen the chronologic treatment time: Diphasic treatment achieves better results with less clinic

time but longer calendar time, when the chronological time is lengthened, patient cooperation may worsen. Ill-conceived or improper early treatment damage or prolong the therapy as well as it may exhaust the spirit of cooperation, making later treatment more difficult.^{6,7,8}

Development Of Normal Occlusion

Normal development is the changes one would expect in the 'average' child. Occlusal development may be divided into five stages:^{4,1}

Stage 1: Birth to establishment of deciduous dentition

Stage 2: Deciduous dentition to early mixed dentition

Stage 3: Early mixed dentition to late mixed dentition

Stage 4: Late mixed dentition to permanent dentition

Stage 5: Permanent dentition

Normal Features of Mixed Dentition

From a clinical point of view, there are two very important aspects to the mixed dentition period: (1) the utilization of the arch perimeter and (2) the adaptive changes in occlusion that occur during the transition from one dentition to another. The alveolar process is one of the most actively adaptable areas of bone growth during the period of transition between the dentitions. Therefore, it is an ideal time for most major orthodontic interventions

Conclusion

Interceptive orthodontics is based on identify and remove the developing malocclusion during developing stage. Interceptive orthodontic works on interception of development of severity of malocclusion. In this category assessment of child in early developing stage is very important and if there is any developing malocclusion then we can correct or improve by treatment at the appropriate time to the basic non-preventable level. Awareness and interception on right time is the key for it. This part examines the key areas relating to interceptive orthodontics with the available evidence to support the clinical management of common problems presenting in the mixed dentition.

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