

REVIEW ARTICLE

Interceptive Orthodontics-A Short Review

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ABSTRACT

The term interceptive orthodontics used in this paper is defined as the prompt treatment of unfavorable features of a developing occlusion categorized as local factors, crowding and displacements of the mandible in closing from the rest position. Interceptive orthodontics is defined as a – phase of science and art of orthodontics employed to recognize and eliminate the potential irregularities and malpositions in the developing dentofacial complex. Guidance of the eruption and development of the primary and permanent dentitions is an integral part of the care of pediatric patients. Such guidance should contribute to the development of a permanent dentition that is in a harmonious, functional and esthetically acceptable occlusion. This article aims to provide a simple guide to the correct diagnosis of anomalies and to choosing the most suitable treatment for each case.

Keywords – Interceptive orthodontics, crossbite, midline diastema, habits, ectopic eruption.

INTRODUCTION

One of the main functions of the primary dentition is the maintenance of the arch length, so that the permanent dentition, which replaces have sufficient space to erupt. The three features of primary dentition that indicate good dental development are spacing, anthropoid spaces mesial to the maxillary canine and distal to mandibular canines, and straight or mesial step primary second molar occlusion. Early orthodontic intervention is carried out to enhance dentoalveolar, skeletal and muscular development before complete eruption of the permanent dentition. The early orthodontic intervention can be broadly classified as: preventive orthodontics, which prevents interferences with occlusal development; and interceptive orthodontics, this is treatment to intercept a developing problem or to correct existing early malocclusion.¹⁻³

INTERCEPTIVE ORTHODONTICS

Richardson (1982) defined interceptive orthodontics as the prompt treatment of unfavorable features of a developing occlusion that may make the difference between achieving a satisfactory result by simple mechanics later, thus reducing overall treatment time and

providing better stability and functional and aesthetic results⁴. The percentage of children who would benefit from interceptive orthodontics has been reported from 14% to 49%.^{5,6}

INTERVENTION SEEKING ABNORMALITIES AND TREATMENT

A. LOCAL FACTORS

Local factors such as impacted upper first molars, scissor bite of first molars, retained primary teeth related to malposed permanent teeth and delayed eruption of permanent teeth caused by supernumerary teeth need interceptive orthodontics for the normal development of the mixed dentition. Prolonged retained primary teeth can cause displacement or failure in the eruption of the permanent teeth.⁴ The primary teeth should be extracted to allow spontaneous alignment. Extraction of the supernumerary teeth and exposure of the permanent teeth will allow spontaneous eruption. Mesially impacted first permanent molars can be relieved by using separators, Kesling metal springs or brass wire twisted at the contact point. Severe ectopic eruption may require a fixed appliance to distalize the permanent molar.⁷⁻¹⁰

B. CROWDING

Management of crowding in the mixed dentition includes interproximal primary tooth reduction, extraction of the primary tooth and/or sectional fixed appliance to align rotated permanent incisors. If there is no spacing in the primary dentition there is 70% chance of crowding of the permanent teeth, if there is less than 3mm spacing there is 50% chance of crowding.^{11,12}

C. EARLY LOSS OF PRIMARY TEETH

Early loss of primary first molars before 7.5 years of age leads to a temporary lack of space, which can be regained, on the eruption of the permanent successor. On the contrary, loss of a second molar before this age results in a permanent loss of space due to the mesial drifting of the permanent first molars. Using space maintainer can prevent this space loss; space maintainers are passive fixed appliance such as distal shoe or lingual arch and removable appliances such as the partial denture. Space regained appliances may obtain up to 3 mm per quadrant of space by making drifted teeth upright. It is not indicated for severe crowding or in cases that need extraction later. Unilateral loss of primary canine usually requires extraction of the antimere to prevent midline shift.¹³⁻¹⁶

D. ECTOPIC ERUPTION OF MAXILLARY CANINE

In Class I non-crowded situations where the permanent canines is impacted or erupting buccally or palatally, the treatment of choice is the extraction of the primary canines when the patient is 10-13 years old. Power and Short (1993) showed that interceptive extraction of the primary canine completely resolves permanent canine impaction in 62% of cases; another 17% show some improvement in terms of more favourable canine positioning. The success of early interceptive treatment for impacted maxillary canines is influenced by the degree of impaction and age at diagnosis.¹⁶⁻²⁰

E. MIDLINE DIASTEMA

There are several reasons for midline diastema to occur, the development cause is due to the pressure exerted by the developing lateral incisor on the distal aspect of the central incisor, which cause median diastema. This stage is called as “ugly duckling” stage and it corrects with the eruption of the maxillary permanent canines. The other causes of midline diastema are low frenal attachment, presence of a supernumerary teeth or cyst in the midline of the upper arch, proclination of the upper incisors, peg shaped laterals and microdontia of upper

central incisors. The pathological cause should be identified and removed early. The midline diastema can be closed with a removable appliance or sectional fixed appliance.²¹⁻²⁵

F. ANTERIOR CROSS BITE

Anterior cross bite which is localized must be treated at an early stage because the upper incisor may be abraded by the lower and the periodontal support of the incisor may suffer as a result of occlusal trauma. Cross bite can also result in mandibular shift; this can produce an undesirable growth pattern, dental compensation leading to a true prognathism and/or asymmetry at a later time and potentially harmful functional patterns. Unilateral cross bites can be corrected using an upper removable appliance with z-spring.^{21,22}

G. MANDIBULAR DISPLACEMENT DURING FUNCTION

Displacement or deflection of the mandible from closing from the rest position occurs when there is a discrepancy between muscular positioning and the jaw relationship determined by the teeth. The displacements may be anterior, lateral or posterior; they may lead to temporomandibular joint dysfunction, pain of the masticatory muscles and undesirable growth modifications. The treatment includes habit counselling, grinding of the primary canine or expansion appliance.²⁵⁻²⁹

H. HABITS

Digit or pacifier sucking habits have long been recognized to affect occlusion and dental characteristics. Usually these habits are rarely seen beyond the age of 6 years, Warren and Bishara (2002) found that some changes in the dental arch perimeters and occlusal characteristics persist well beyond the cessation of the pacifier or digit habit. Parafunctional habits that are detrimental to the occlusion of the permanent incisors should be stopped before the complete eruption of the permanent incisors so that malocclusion may self-correct and less complex orthodontic treatment is required later.³⁰

LIMITATION OF INTERCEPTIVE ORTHODONTICS

Barrer reported that limitations of early interventions are unfavourable craniofacial growth, persistent habits, severe ectopic eruption and congenitally malformed or missing permanent teeth. These factors should be considered in the treatment plan. Some of the contraindications of early treatments are changes that cannot be retained by stable occlusion, e.g. Unfavourable soft tissue/skeletal growth and persistent habits. Patient factors such as immaturity lack of motivation or parental supervision, small mouth size, low pain threshold and poor oral hygiene could influence the success of the interceptive orthodontics. The goals and objectives of early treatment must be established firmly in order to prevent unnecessary, prolonged treatment that may burn out the patient in the second- phase treatment later.^{30,32}

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