

## Dentoalveolar and Skeletal Effects of Occlus-o-guide: a literature review

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# Dentoalveolar and Skeletal Effects of Occlus-o-guide: a literature review

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## Abstract

The Occlus-o-guide is a preformed, elastomeric, removable orthodontic appliance used in early age to prevent the development of malocclusions. It can be considered as a functional device, due to its ability to bring the mandible forward to correct II Class malocclusion and a positioner for performing minimal tooth movement and for guiding the eruption. The ideal timing for treatment starts in mixed dentition. It can be used to treat increased overbite, increased overjet, upper and lower malpositioned or rotated incisors, anterior crowding or spacing, severe curve of Spee, upper interincisal diastema, dental crossbite of premolars, interception of Class II malocclusions, interception of bad oral habits, Class II molar relation or head-to-head relationship, not coincident midlines, joint problems associated with overbite in growing child, pseudo Class III. The research was conducted by using Pubmed database. The keywords used were *Occlus-o-guide* and *Eruption guidance appliances*. A total of 9 articles were selected and included in this review according to inclusion and exclusion criteria. Occlus-o-guide is a valuable therapeutic option in treatment of Class II, division I malocclusions in the early mixed dentition, because it produces a significant increase in mandibular length. Furthermore, it does not affect maxillary growth and it is capable to improve overjet, overbite, crowding, rotations, little midline discrepancies and minor TMJ problems. Finally, it is possible to affirm that treatment in early mixed dentition with Occlus-o-guide is an effective method to restore a normal occlusion and decrease the need for further orthodontic treatment.

## Background

The Occlus-o-guide is a preformed, elastomeric, removable device, especially used in early orthodontic treatment and to prevent the development of malocclusions. This orthodontic device was designed in 1975 by Dr. Bergersen as Eruption Guidance Appliance (EGA) and indicated as an additionally phase of the orthodontic fixed therapy. However the treatment with the Occlus-o-guide was soon proved to be as effective as comprehensive orthodontic

treatment. Indeed it can be considered as a functional device due to its ability to bring the mandible forward to correct II class sagittal discrepancies and at the same time it allows a vertical growth of the posterior teeth by producing an anterior opening. In addition to that, it performs minimal tooth movement through the elastomeric material like a positioner does.

The Occlus-o-guide consists of a single block which contacts the two arches, built on a head-to-head incisal relation. It exists in various series and sizes appliance, depending on the stage of dental eruption sequence and the clinical features case of the patient. It is constructed with elastomeric silicone that contains a special substance called cooperation detector that changes the opacity of the device in contact with oral fluids. It gets more opaque the longer it is applied, but the color change is reversible if the patient stops using the appliance. This feature allows the clinic to check on patient's cooperation easily. The ideal timing for treatment, that gives the best results in less time, starts in mixed dentition: from 8 to 12 years old. Delaying treatment timing may extend the period of retention and decrease the stability of final results.

The Occlus-o-guide can be used to treat: increased overbite (when there is sufficient residual vertical growth of the face), increased overjet (when there is sufficient residual horizontal growth of the face), upper and lower malpositioned or rotated incisors (if there is sufficient space or it can be created), anterior crowding or spacing (up to 4mm in mixed dentition), severe curve of Spee, upper interincisal diastema (up to 3mm), dental crossbite of premolars, interception of Class II malocclusions, interception of bad oral habits, Class II molar relation or head-to-head relationship, not coincident midlines, joint problems associated with overbite in growing child (if the disc can be reduced or recovered during mandibular movements), pseudo Class III (up to 1-2 mm). The device can be used also in adult patients with more restricted indications and less effectiveness.

## Methods

This research was conducted by using Pubmed database. The keywords used were *Occlus-o-guide* AND *Eruption Guidance Appliances*. Original articles, literature reviews, randomized studies, case-control

studies were included. Case reports were excluded. Only articles in English were included.

## Results

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A total of 9 articles were selected and included in this review.

In the review of Migliaccio et al. The author investigated the effects of Occlus-o-guide in the treatment of Class II division I malocclusions and found out that the appliance's effects are mainly dentoalveolar such as mesial shift of lower molars, extrusion of posterior teeth, lingual tipping and retrusion of upper incisors, protrusion of lower incisors. Moreover he concluded that all the works analysed agreed that the device showed great results in the treatment of anterior crowding, increase of the overbite and overjet, both in small deviations of the median line and in minor TMJ problems. In another research Farronato et al. compared the muscular variations at the electromyography level for the anterior temporalis muscles and masseter muscles during treatment with Occlus-o-Guide and Andresen activator appliances. They affirm that both the devices work creating muscular imbalance, however the imbalance was greater and the recovery of the orthological muscular balance was slower in patients under treatment with the Andresen activator as compared to those with the Occlus-o-Guide. Myrlun et al. study's aim was to investigate occlusal stability from the early mixed to the permanent dentition in children after early treatment with the eruption guidance appliance, their results were that overbite, overjet, sagittal molar relation and mandibular crowding improved during the study period. Furthermore patients with good compliance during the retention period had significant smaller overjet and overbite compared with the ones with poor compliance.

In another study of Nilsson et al. the eruption guidance appliance (EGA) was compared to twin-block appliance (TBA) and activator-headgear appliance (A-HG) in the treatment of Class II division I malocclusion. A total of 129 patients were included of which 47 were treated with EGA, 38 with TBA and 38 with A-HG. Despite the lower compliance of the group that used EGA, no statistically difference was found between the 3 groups regarding ages, compliance, mean overjet reduction, emergency visits and appliance breakage aspects. The aim of another study of Myrlund et al. was to find out if 1 year active treatment time with EGA was sufficient for achieving normal occlusal relationships and dental alignment in 7- to 8-year-old children. The results showed that the

group treated had a significantly decreased overjet and overbite while the controls had a slight increase. Moreover the class II molar relationship decreased from 46 to 4 per cent in the treated group, while the controls had no change. Also mandibular anterior crowding decreased in the treated group in contrast with the control group in which the crowding showed a slight increase.

The research of Keski-Nisula et al of 2008 evaluated skeletal and dentoalveolar changes induced by the eruption guidance appliance confronting 115 cephalometric radiographs of treated children with a control group of 104. They concluded that occlusal correction was achieved mainly through changes in the dentoalveolar region of the mandible. In addition, the appliance enhanced condylar growth resulting in a clinically significant increase in mandibular length. No effect was observed on maxillary position, maxillary size, inclination or protrusion of the maxillary incisors, or facial height. Janson compared occlusal changes in class II malocclusion treatment between Frankel and EGA and concluded that the two appliances provide similar occlusal changes. In addition to these studies Janson G. also evaluated long term stability of treatment with eruption guidance appliance, and concluded that cephalometrically, overjet and molar relationship were stable but there was a relapse of the overbite. The occlusion remained stable but there was a relapse of the anterior teeth crowding. In another research from the same author, the focus was on EGA effects in the treatment of Class II malocclusions, in a sample of 30 patients over a treatment period of 26 months. The research concluded that the effects of EGA were mostly dentoalveolar, with a smaller, but significant, skeletal effect.

## Conclusions

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Occlus-o-guide preformed appliance, according to these studies is a valuable therapeutic option in treatment of Class II, division I malocclusions in the early mixed dentition, because it produces a significant increase in mandibular length. Furthermore, many studies agree that Occlus-o-guide do not affect maxillary growth. The appliance has been shown to be capable to correct many aspects of the developing occlusion including overjet and overbite, and Class II molar relationship. The occlusion after treatment remains stable when a retainer is used, if not, the overbite correction is less stable when compared to overjet correction. Many of the studies agree that Occlus-o-guide can successfully be used to correct other malocclusions such as crowding, rotations, little

midline discrepancies and minor TMJ problems. Against this background, it is possible to affirm that treatment in early mixed dentition with Occlus-o-guide is an effective method to restore a normal occlusion and decrease the need for further orthodontic treatment.

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