Twin Block appliance. A Systematic Review.

Peer review status:
No

Corresponding Author:
Dr. Martina Mezio,
Attender, Department of Oral and Maxillo Facial Sciences, Sapienza, Orthognathodontics Unit - Rome- Italy - Italy

Submitting Author:
Dr. Martina Mezio,
Attender, Department of Oral and Maxillo Facial Sciences, Sapienza, Orthognathodontics Unit - Rome- Italy - Italy

Other Authors:
Dr. Denise Giovannoni,
Attender, Department of Oral and Maxillo Facial Sciences, Sapienza, Orthognathodontics Unit - Rome- Italy - Italy
Dr. Ludovica Caterini,
Attender, Department of Oral and Maxillo Facial Sciences, Sapienza, Orthognathodontics Unit - Rome- Italy - Italy
Dr. Martina Dari,
Attender, Department of Oral and Maxillo Facial Sciences, Sapienza, Orthognathodontics Unit - Rome- Italy - Italy
Dr. Elisa Pacella,
Attender, Department of Oral and Maxillo Facial Sciences, Sapienza, Orthognathodontics Unit - Rome- Italy - Italy

Article ID: WMC005372
Article Type: Systematic Review
Submitted on: 09-Nov-2017, 10:38:03 PM GMT  Published on: 10-Nov-2017, 09:03:10 AM GMT
Article URL: http://www.webmedcentral.com/article_view/5372
Subject Categories: ORTHODONTICS
Keywords: Twin-block therapy, skeletal growth, mandibular growth, vertical changes, functional appliances, dentoalveolar effects.

How to cite the article: Mezio M, Giovannoni D, Caterini L, Dari M, Pacella E. Twin Block appliance. A Systematic Review. WebmedCentral ORTHODONTICS 2017;8(11):WMC005372

Copyright: This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC-BY), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Source(s) of Funding:
No found has been taken
Competing Interests:
None.
Twin Block appliance. A Systematic Review.

Author(s): Mezio M, Giovannoni D, Caterini L, Dari M, Pacella E

Abstract

Functional appliances have been used for long time in the treatment of Class II Division 1 malocclusions. Several varieties of functional appliances are currently in use with the aim to improve skeletal imbalances. Alteration of maxillary growth, possible improvement in mandibular growth and position, and change in dental and muscular relationships are the expected effects of these functional appliances. One of the more popular functional appliances used today is the Twinblock. Twin block, compared to other functional devices, can promote mandibular growth and also allows to work on the vertical component of malocclusion. The appropriate timing of treatment and patient collaboration are crucial to achieving a satisfactory therapeutic result.

Introduction

Malocclusions of class II can manifest in various skeletal and dental configurations. Most Class II patients have a deficiency in the anteroposterior position of the jaw. Functional appliance therapy has become an increasingly popular method of correcting Class II malocclusion. Several varieties of functional appliances, such as bionator, FR-2 of Fränkel, Herbst, Twin Block, have been used for many years in the treatment of Class II Division 1 malocclusions to improve skeletal imbalances.

The Twin-block was developed to correct Class II malocclusions characterized in part by mandibular skeletal retrusion. The Twin Block functional appliance was invented by William J. Clark in 1982. It consists of a double acrylic resin plaque anchored with delta ganges on the first molars and first premolars, a vestibular arch from the right canine to the left one, a bite block, inclined by 65-70 ° that causes a mandibular advance. The lower resin plaque has a first molar delta claps and ball claps placed in the interproximal areas anteriorly. The â bite block is placed mesially at the distal marginal edge of the second premolars. These separate plates make the twin block appliance different from other removable functional appliances, which are basically monoblocks. The appliance is constructed from bite registrations taken with the incisors in an end-to-end position.

Other auxiliary elements such as transverse expansion screws can be added Â in case of contraction of the upper jaw, whereas screws and sagittal springs can be added to recover arc space. To facilitate the correction of the maxillary protrusion may be associated with extraroral traction or traction with intermsholar clamps applied on upper vestibular arch bends and on lower molar claps. The twin block is less bulky Â than other functional devices and this could improve patient compliance. Major freedom in mandibular movements and speech disturbance is minimized. Patient cooperation is one of the most important factors for successful functional appliance treatment.

Materials and Methods

This review was designed to study the mandibular skeletal and dentoalveolar changes produced by the Twin Block appliance. Especially to underline the effects of Twin Block on the vertical component of malocclusion. The systematic review of literature has been performed on the principal medical databases: PubMed, Scopus. The keywords used were: Twin-block therapy, skeletal growth, mandibular growth, vertical changes, functional appliances, dentoalveolar effects. Following the search, 40 articles were selected.

Discussion

Skeletal and dentoalveolar effects

The main objective of Twin-block therapy is to increase mandibular growth by stimulating increased growth at the condylar cartilage. The biological responsiveness of the condylar cartilage depends on the growth rate of the jaw. However, the jaw growth rate is not constant throughout the life but has a peak during puberty. Better results are obtained when the treatment with functional device coincides with the growth peak.

Several methods can be used to calculate the peak of skeletal growth, these biological indicators include increase in body height, skeletal maturation of the hand and the wrist, dental development and eruption, menarche, breast and voice changes, and cervical vertebrae maturation.
Some authors demonstrated only small changes in mandibular growth and concluded that it was not affected by treatment with functional appliances. On the other hand, other authors suggested that there may be significant influences on mandibular growth after timely intervention.

Sandler reported an average increase in the distance from articulation to gnathion of 2.4 mm during a 12-month period of Twin-block treatment. Mills and McCulloch shows an increase of 4.2 mm and increase in mandibular length of 2.7 mm. The greater increase in total mandibular length was associated with significant increases in the height of the mandibular ramus and in the length of the mandibular body in the group treated at the peak. The greater additional growth of the mandible is concomitant with significant changes in the direction of condyloar growth. Patients show significantly more backward direction of growth in the mandibular condyle, as revealed by the significant opening of the mandibular angle.

Lund and Sandler also noted distal movement of the upper molars, an increase in mandibular length, as significant increases in both anterior and posterior facial height and a slight inhibition of forward maxillary growth, some proclination of the lower incisors and lingual tipping of the upper incisors.

Robertson suggested that the principal changes that occurred with functional appliance therapy were dentoalveolar, including distalization of the upper molars and retroclination of the upper incisors, along with mesial movement of the lower molars and proclination of the lower incisors. The lingual tipping of the maxillary incisors could be caused not only by the contact of the lip musculature during Twin-block treatment, but also by the vestibular arch, which might come into contact with the incisors during sleeping. The most apparent dentoalveolar effect was proclination of the mandibular incisors and was probably a result of the mesial force on the mandibular incisors induced by protrusion of the mandible. Twin-block therapy produces an efficient reduction in the overjet and a remarkable correction in the molar relation. Both the distal movement of upper molars and the mesial movement of lower molars contributed to the correction in molar relation. Mills and McCulloch concluded that the headgear effect caused relative distalization of the maxillary molars during Twin-block appliance treatment.

**Vertical Changes.**

Control of the vertical dimension is one of the proposed benefits of the Twin-block appliance. Vertical changes included the delay of eruption of the upper maxillary molars and the enhanced eruption of the mandibular molars.

The acrylic bite blocks either can inhibit molar eruption in patients with increased facial height (long face) or can be modified to allow posterior dental eruption in patients with reduced facial height (short face). Removing acrylic selectively we allow an increase in the vertical dimension and this an important component of Twin-block therapy.

Toth and McNamara reported 3.0 mm increase in anterior face height and 3.2 mm increase in posterior face height. Lund and Sandler found 2.6 mm increase in total anterior face height after Twin Block therapy. Mills and McCulloch noted an increases of 3.8 mm in total anterior face height and 2.9 mm for posterior face heights. Therefore, two-block therapy is indicated in patients with deep bite.

**Conclusion**

- Major favorable effects induced by Twin Block therapy are obtained during the peak puberty growth.
- Significant increases in mandibular length were observed.
- The dentoalveolar effect consist of lingual tipping of maxillary incisors and vestibular tipping of lower incisors.
- Significant decreases in overbite and overjet were observed at the end of treatment with Twin-block.
- A proposed benefit of the Twin-block appliance is the ability to control vertical development, an increase in total anterior face height was observed.

**References**

2. Renfroe EW. A study of the facial patterns associated with Class I, Class II, Division 1, and Class II, Division 2 malocclusions. Angle Orthod 1948;18:12-5.
3. Rothstein TL. Facial morphology and growth from


