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Myobrace versus twin block in the treatment of class II malocclusion in Children: A systematic review

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ABSTRACT

Background: One of today's largest global problems is malocclusion. We must prevent this through the screening and early treatment of young children, because malocclusion treatment conducted during a child's growth and development stage either the primary or mixed dentition era yields the best outcomes. Functional appliances are usually used during initial orthodontic treatment, such as myobrace and twin block appliances. Myobrace comes in various sizes. The size chosen depends on the treatment objectives, which may include correcting class II malocclusions. The twin block appliance is a functional device commonly employed to treat class II malocclusions.

Purpose: This investigation's main goal was to compare the efficacy of the myobrace and twin block appliances in class II malocclusion treatment to select a more appropriate pediatric dentistry device.

Results: A total of 5 articles were selected from 306 articles based on relevant keywords. All selected studies were conducted within the last 10 years.

Discussion: Myobrace and twin block appliances can address overjet issues and achieve significant overjet measurement reductions. This appliance promotes mandibular growth and enhances the facial profiles of individuals with class II malocclusions.

Conclusion: In order to treat individuals with class II malocclusions, the myobrace and the twin block both address skeletal and dentoalveolar discrepancies. But compared to the myobrace, the twin block appliance had more noteworthy outcomes.

1. Introduction

Individuals worldwide direct their attention to the face and mouth because these are always the first things to pay attention to when people interact and communicate. Teeth play important roles in terms of aesthetics and psychological and social impacts. (Singh et al., 2019) One of the biggest global problems related to the previous statement is malocclusion. The American Academy of Pediatric Dentistry (AAPD) suggests screening young children for malocclusions because they are easier to treat when children are growing and developing". (Habashy, 2020; Johnson et al., 2021).

A deviation from ideal dental alignment is called malocclusion, and it denotes an abnormality in the dimensions and orientation of the teeth, the facial bones, and the soft tissues that surround the lips, cheeks, tongue, chin and nose. (Habashy, 2020) Malocclusions result in

aesthetic dissatisfaction. According to the RISKESDAS 2018 survey's findings, malocclusion is the third most common dental disorder in Indonesia, after periodontal and dental caries. Indonesia's malocclusion incidence is notably high estimated at approximately 80 %, especially in the 9–14 year age group. (Johnson et al., 2021).

For best outcomes, malocclusion treatment should be performed when the kid is still growing and developing, during the primary or mixed dentition phases. A functional appliance is usually used during initial orthodontic treatment. (Aufar et al., 2019; Rongo et al., 2019) A range of myofunctional appliances are employed to treat malocclusions, including the myobrace and twin block appliances. (Rongo et al., 2019).

The myobrace is a new type of tool made by a manufacturer that trains orofacial muscles and maintains dentoalveolar balance. The myobrace comes in various sizes, corresponding to the primary, mixed, and permanent tooth stages. The treatment objectives which may

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include rectifying harmful habits, promoting dental arch development, and correcting class II and III malocclusions dictate the specific size choice. (Shahamfar et al., 2020) Tentolouri et al.'s 2021 clinical trial revealed results that resoundingly affirm the myobrace's efficacy in treating class II malocclusions. (Perrotta et al., 2019) Apart from myofunctional appliances like the twin block appliance, there are other alternatives available for correcting malocclusions. A well liked functional device for treating class II malocclusions is the twin block appliance. (Hanoun et al., 2020; Rongo et al., 2019).

The effectiveness of the myobrace and twin block appliance in treating class II malocclusions in children is evaluated in this systematic study.

2. Methods

In October 2022, we searched the internet for items that were posted between 2012 and 2022. Children under the age of eighteen, twin block, class II malocclusions, and myobrace were the inclusion criteria for the search. Articles released prior to 2012, articles that were inaccessible, book chapters, literature reviews, case studies, and systematic reviews were all excluded from this analysis. Journal search using keywords: *((myobrace) OR (prefabricated appliance)) AND (malocclusion class II) AND (myofunctional appliance) AND (children).*

3. Results

A total of 5 articles were selected from 306 articles based on relevant keywords. The researcher identified 11 seemingly relevant journals by evaluating the titles and abstracts. Then, the researcher thoroughly read these journals' full content to assess their eligibility according to the inclusion criteria. Finally, the researcher reviewed and selected 5 journal articles that met the criteria and were included in the synthesis table for further analysis Table 1.

4. Discussion

Class II malocclusion is a common orthodontic problem that is often seen in adolescents, according to Xie et al., 2020 About thirty percent of malocclusion cases that dentists treat are class II division I malocclusions. Perrotta S. et al. found that approximately 32.6 percent of the 700 youngsters they studied had class II malocclusion in their Italian study.7,8 According to AUFAR RA, et al., malocclusion is thought to be the third most common dental disorder in Indonesia, after periodontal disease and dental caries, with a prevalence of over 80 % based on data from RISKESDAS 2018. (Johnson et al., 2021).

Myofunctional devices were first proposed by Robin in 1902 and Anderson in 1908, according to Idris et al. Their goal was to encourage mandibular growth in patients suffering from class II malocclusion.

Table 1
Journal Synthesis

No	Author (Year)	Title	Objective	Method	Result
1	Johnson J.S., Savitha Satyaprasad, Hurlihal Sharath Chandra Krishnamoorthy Shankar Havaladar, Ambili Raj, and Nandan Suresh (2021)	A Comparative Assessment of Dentoskeletal Treatment Outcomes in Class II Malocclusion Using Twin Block Appliance and Myobrace System	This study evaluated the effectiveness of both the twin block and myobrace systems in correcting class II malocclusions in developing children.	This study participants were divided into three groups of 10 children. Group I consisted of children treated with the twin block appliance. Group II included children who were treated with the myobrace system.	The twin block appliance creates significant bony and dentoalveolar modifications. This change in mandibular growth is more obvious when compared to the myobrace system.
2	Yasmine Elhamouly, Azza A. El-Hussein, Hanan A. Ismail, and Laila M. El Habashy (2020)	Myofunctional Trainer versus Twin Block in Developing Class II Malocclusion: A Randomized Comparative Clinical Trial	This study evaluated and compared of the dentoalveolar effects of using both the myobrace system and the children's twin block appliance in patients diagnosed with class II malocclusions.	This study included healthy children between the ages of 9 and 12 years who exhibited Angle's Class II Division I malocclusion, confirmed by clinical assessment and verified with lateral cephalometric x-rays.	Significant improvement in the vertical inter-arch relationship and a substantial reduction in overbite were observed as a result of using the twin block appliance. However, the myobrace resulted in increased overbite measurements. It is important to remember that the myobrace's poor retention and limited patient compliance were two major drawbacks.
3	Abdulfatah Abdulrazak Hanoun, Gururajaprasad Kaggal Lakshmana Rao, Mohd Fadhli Khamis Norehan Mokhtar(2020)	The effectiveness of the Prefabricated Myofunctional Appliance T4FTM was assessed in comparison to the TwinBlock Appliance for Treatment of Malocclusion Class II: A Randomized Clinical Trial	The objective of this study was to compare the alterations in skeletal and dentoalveolar structures among Malay patients with Class II malocclusion who underwent treatment using the myobrace and twin block appliances.	In this study, a randomized clinical trial was conducted where participants were randomly split into two teams: one team received active twin block appliance therapy, whereas the other team was given the myobrace device.	Significant differences were observed in the SNB and ANB angles between the two groups. Notably, all the favorable changes were observed in the group treated with the twin block appliance.
4	Ling X, Ping W, Jianhua W (2020)	Modifications in Soft and Hard Tissue After Twin-Block and Myofunctional Appliance Treatment for Class II Malocclusion: A Pilot Study	This study aimed to evaluate and contrast the clinical results of employing twin block and myobrace appliances for treating Class II malocclusion.	Twenty-two youngsters, six boys and sixteen girls, ages nine to eleven, were enrolled in the study; all had been diagnosed with Class II malocclusion. Two groups were randomly selected from among the participants: the twin block group and the myobrace group.	The group of Twin block significantly greater improvements in skeletal and soft tissue indices compared to the Myobrace group.
5	Ghassan I, Hajeer Y, and Azzam AJ (2018)	Changes in soft and hard tissues after treating Class II malocclusion with Twin Block versus Trainer: a randomized controlled study	The objective of this study was to evaluate therapy for growing kids with Class II malocclusion using either the Twin Block or Myobrace appliances.	60 kids with Class II malocclusion diagnoses, ranging in age from 8 to 12, were included in the cohort for this investigation.10	The Twin Block group demonstrated significantly greater enhancement of Class II dentofacial and skeletal features compared to the myobrace group.

Furthermore, several research have reported on the efficacy of myofunctional appliances for correcting class II malocclusions. (Rongo et al., 2019; Perrotta et al., 2019; Idris et al., 2019) Numerous myofunctional gadgets have been created since Newel first introduced the mouth screen in 1912, these include twin oral screens and oral shields. (Tentolouri et al., 2021; Antonarakis and Kiliaridis, 2019; Brierly, 2017).

Myofunctional appliances have been employed for an extensive period, particularly when managing class II malocclusions. (Circic et al., 2018; Afrazah et al., 2022) Several types of myofunctional appliances used are twin block appliances and myobrace. (Zhang and HE JM, Zheng WY., 2021; Entrenas et al., 2019; Wishney et al., 2019) Antonorakis et al., claimed that by reducing overjet, the utilization of myofunctional appliances in kids having malocclusion of class II can help improve their smiles. (Barber, 2015; Wirawan and Herdiyati, 2018; Akan and Kursun, 2021).

Myobrace is designed to offer a combination effect, encompassing guidance of teeth development, training for muscle function, and thorough early intervention. This appliance is user-friendly, simple to take out, and clean. (Hu et al., 2022; Chen et al., 2022) Myobrace developed with Australian technology and with this appliance, the alignment of dental and habits can be corrected without the need for brackets intervention. (Verma et al., 2022; Cunha Busquet et al., 2021).

Myobrace is an orthodontic device that has been developed for treating individuals with malocclusion with delayed mixed dentition (typically 8–12 years of age). It can also be utilized in adults with non-extraction cases and mild to moderate malocclusion. The appliance aims to enhance the balance of facial muscles and mastication, as well as improve tongue posture, aligning the teeth, and promoting mandibular development. (Verma et al., 2022; Cunha Busquet et al., 2021).

Myobrace is recommended for use for one to two hours of the day and ten to twelve hours throughout the evening. Examination of the dental arch, improvements were observed in the correction of anterior open bite and class II malocclusion. (Fekonja, 2022; Männchen et al., 2022) The juniors' myobrace device (3–6 years) is a specially designed three-stage system (J1, J2, and J3) that aims to address concerns with upper and lower jaw development and to break undesirable oral habits. (Cunha Busquet et al., 2021; Fekonja, 2022) The device known as myobrace for teens is a myofunctional orthodontic system consisting of four stages. It is specifically designed to address complex orthodontic needs and provide an alternative to braces and extractions. (Cunha Busquet et al., 2021).

Hanoun et al., concluded that myobrace is a useful tool for treating class II malocclusions based on RCT clinical studies. It is very effective in resolving dentoalveolar and skeletal abnormalities in the sagittal plane. (Aufar et al., 2019) Habashy et al stated that individuals having class II malocclusion were treated with myobrace, resulting in a significant reduction in overjet of approximately 2.5 mm. According to Johnson et al., the use of the myobrace resulted in an average overjet reduction of 2.55 mm and a notable reduction in the ANB angle of approximately 1.14 degrees in individuals who have class II malocclusion. (Habashy, 2020).

Introduced by Clark in 1982, class II malocclusions are frequently treated using the twin block device. It consists of acrylic bite blocks on the upper and lower jaw that interlock at a 70-degree angle to guide the mandible downward and forward. (Lin et al., 2019; Zhang et al., 2020) Children with a considerable overjet and class II malocclusion benefit the most from it, even at an early stage of development, as functional devices like twin blocks can be utilized. (Chen et al., 2022; Golfeshan et al., 2018; DiBiase and Qureshi, 2020) Ajami S et al stated that twin blocks have the potential to impact the class II malocclusion patients' facial aesthetics by causing modifications to the skeletal and dentoalveolar structures. (Fekonja, 2022).

Habashy et al., stated that twin blocks have demonstrated effectiveness in the management of malocclusion class II, as evidenced by a reduction in overjet of approximately 3.75 mm. Additionally, Johnson et al., discovered a 2.20 ANB angle reduction and an overjet of 5.25 mm

in class II malocclusion patients using twin block devices. Lin et al., claim that by encouraging mandibular growth and modifying the overjet and soft tissue profile angles, twin blocks may improve the facial profile. Myobrace and twin block appliances have both shown promise in treating class II malocclusion, according to Johnson et al. Changes in dentoalveolar structure and skeleton can be induced by myobrace. However, the twin block appliance is recognised for encouraging mandibular development and producing significant changes to the skeleton and dentoalveolar structure. According to Xie et al., 2020 the myobrace and twin block appliances had noteworthy outcomes when used to treat class II malocclusion, demonstrating similar effectiveness. (Spalj et al., 2017; Albajalan et al., 2020) The ANB angle is observed to be reduced by roughly 1.92 using the twin block appliance and 1.34 using myobrace. Additionally, both appliances stimulate downward growth of the mandible, aiding in the correction of malocclusion. (Hanoun et al., 2020) However, when it comes to soft tissue changes, particularly the convexity of the facial angle, twin blocks have been found to be more effective. (Parekh et al., 2019; Parekh et al., 2019) According to Hanoun et al., patients with class II malocclusion who received treatment with both twin block and myobrace showed noteworthy outcomes. Overjet was reduced by around 2.12 mm and the ANB angle decreased by 0.84 as a result of myobrace. Conversely, a greater decrease in overjet of about 4.26 mm and a decrease in the ANB angle of about 1.65 were caused by the twin block appliance. Twin block appliance use seems to produce better results, especially when it comes to treating skeletal and dentoalveolar discrepancies. (Oh et al., 2020).

5. Conclusion

Both the myobrace and the twin block demonstrate effectiveness in treating patients whose malocclusion is class II by addressing skeletal and dentoalveolar discrepancies. However, the twin block appliance tends to yield more significant results compared to the myobrace.

CRedit authorship contribution statement

Rezky Oktaviyani Rusli: Conceptualization, Writing – original draft, Visualization. **Harun Achmad:** Writing – review & editing, Supervision. **Wesley Kuandinata:** Project administration, Software. **Iriani Fatimah:** Investigation, Validation. **Nurwahidah A:** Formal analysis, Resources. **Sulfina Halid:** Data curation. **Nurul Hikmah La Mente:** Methodology.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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