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## THE TWIN-BLOCK APPLIANCE IN ORTHODONTICS: INDICATIONS AND ADVANTAGES

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### Abstract

TWIN-BLOCK is a removable orthodontic appliance designed by W. Clark in 1977. Is frequently used in the treatment of second class orthodontic anomalies with mandibular deficiency. In contemporary literature very little has been reported for the use of this functional appliance therefore, the main goal of this research was set to make a literature review to describe the indications, advantages and of these orthodontic appliances. As sources of information was used PubMed. The keywords used for searching were “twinblock, indications”, “twin block, advantages”. Twin Block device is indicated in cases such as: classII 1st dev, classII 2nd dev and class III malocclusion, frontal open bite, deep bite, cross bite, asymmetries faces, TMJ disorders. The advantages of use include: Ease of use; the twin block is a removable appliance, which allows patients to take better care of their oral hygiene. It stimulates the growth of the jaws due to its mild orthopaedic effect and it is easy to repair. Comfort; for many patients, it is more comfortable to wear than other orthodontic devices, thanks to its special design.

The possibilities to influence on the type of growth are limited because they depend on a number of factors, however, usage of the Twin Block device can achieve satisfactory effects on the growth of the bone segment of the orofacial system.

**Keywords:** *twin-block, advantages, limitations, indication*

### Introduction

The Twin Block is one of the most innovative techniques in modern orthodontics, designed for the correction of dental alignment and occlusal issues in young patients. This appliance works through a combination of orthodontic forces that stimulate balanced growth of the dental arches, contributing to the improvement of permanent tooth positioning. The surrounding muscles and soft tissues generate pressure that is transmitted to the skeletal and dental structures, resulting in skeletal growth modification and tooth movement. The device gained worldwide popularity shortly after its introduction by W. Clark in 1977 due to its effectiveness and the advantages it offers over other appliances in the correction of orthodontic anomalies. The most common Class II skeletal malocclusions are caused by a retrognathic or retruded

mandible, and this appliance is frequently used in the treatment of such conditions. It is fabricated in a dental laboratory, where the technician bases the construction on the patient's dental model and bite registration. The appliance is removable and consists of two parts (Fig. 1): an upper component — which includes one or more expansion screws — and a lower component made of acrylic resin in the anterior region. These two parts come into contact during occlusion, promoting mandibular propulsion and advancement. In cases of lower crowding, a guiding spring can be added to the lower plate. A unique feature of the Twin Block, as Clark himself stated, is its construction as two separate components.

Unlike all other functional appliances, which consist of a single block, the Twin Block stands out for its dual-component design. The key feature that defines a functional orthopaedic appliance for Class II cases with mandibular deficiency is the presence of occlusal sliding planes (bite blocks), constructed based on specific bite indications. These bite blocks should have a vertical height of approximately 7 mm to allow forward mandibular movement. However, once the patient is in occlusion, the mandible should not return to its original position, even during maximum mouth opening. The angulation of the inclined planes must be set at 75 degrees to the occlusal plane to promote anterior sliding. The position of the inclined plane should begin at the cusp of the lower second premolar. This is determined based on the surface of the upper inclined plane, which should be located mesial to the lower first molar to avoid interfering with its eruption. [2]

**Figure.1**



Correction of the anteroposterior dimension is usually achieved within a 3–6-month period, while vertical facial dimension correction typically follows during the subsequent 6 months. [3] The selection of functional appliances depends on several factors, such as the patient's age, level of cooperation, and the comfort provided by the appliance. [4] The optimal age for Twin Block therapy is during or immediately

after the pubertal growth peak. The primary goal of orthodontic treatment in these patients is to establish a harmonious dento-skeletal relationship between the jaws, along with an aesthetically pleasing facial profile. [5]

### **Objective of the Study**

Contemporary scientific literature reports relatively little regarding the advantages and limitations of this widely used functional appliance. Therefore, the primary aim of this study is to review the literature in order to describe the indications and advantages of the Twin Block appliance.

### **Materials and Methods**

The information sources used in this review article were obtained primarily from the widely accessed scientific database, PubMed.

The keywords used for the search included: “Twin Block, indications”, and “Twin Block, advantages”.

### **Indications for Twin Block Orthodontic Appliances**

Clark (1995), the designer of this functional orthodontic appliance, emphasized that the Twin Block is indicated in the following cases:

Class II malocclusion, Division 1

Class II malocclusion, Division 2

General Class II malocclusion

Anterior open bite

Deep bite

Crossbite

Temporomandibular joint (TMJ) disorders

#### **Twin Block for Deep Bites**

1. The upper occlusal sliding plane should not be in contact with the mesial surface of the lower molars, allowing for their free extrusion. During follow-up appointments, a small portion of the occlusal resin is trimmed to facilitate this extrusion of the lower molars.

2. Additional acrylic is added to the lower incisor region to prevent their extrusion.

3. No clasps should be placed on the second premolars (or the primary molars), as these may interfere with the extrusive movement of the molars.

#### **Twin Block for Open Bites**

1. Adams clasps are placed on the upper and lower molars to help control molar extrusion.

2. The upper acrylic bite block is placed in contact with the occlusal surfaces of the lower molars

3. Extrusion in the anterior segment (to aid in the closure of the open bite) the acrylic on the upper plate should always be relieved in the region just posterior to the incisor.

## Advantages of Twin Block Orthodontic Appliances

Treatment with appliances as the Twin Block offers several advantages. [6,7,8] It is suitable for use in both permanent and mixed dentitions. The appliance promotes harmonious jaw development, reducing the need for surgical interventions in adults and helping temporomandibular joint (TMJ) issues. Its adaptability enhances the orthopaedic effect, ensuring long-term results without compromising oral health. The most significant dental and skeletal effects of the appliance include: proclination of lower incisors, retroclination of upper incisors, distalization of upper molars, mesialization of lower molars, increasing of mandibular length, and forward movement of the mandible. During the treatment period, orthopaedic effects are observed at both the skeletal and dental levels, and changes the form and tonicity of the masticatory muscles. Skeletal effects include deceleration of sagittal maxillary growth and acceleration of mandibular sagittal development, particularly in the ramus area. This results with an increasing of the SNB angle and decreasing ANB angle.

An increase in the anterior and posterior height of face, the goniac angle and the angle of anterior cranial base are also observed. Dentoalveolar changes are characterized by protrusion of the lower and retrusion of the upper incisors, distalization of the upper and extrusion of the lower molars. De Vincenzo in 1997 [10] described the main advantages of this orthodontic appliance as follows:

1. Usage of this appliance do not requires patient cooperation;
- 2 Provides comfort during use;
3. Optimal direction of force;
4. Ability to produce rapid orthodontic movement;
5. Resistance to breakage;
6. High biocompatibility and avoidance of tissue irritation;
7. Promotion of good oral hygiene in motivated patients;
8. Ease of installation thus saving the clinician time;
9. Low cost.

## CONCLUSION

The possibilities to influence the change in the type of growth are limited because they depend on a number of factors, however, usage of the Twin Block device can achieve satisfactory effects on the growth of the bone segment of the orofacial system,

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