Twin Block and Its Modifications

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Abstract

Twin block, one of the most commonly used functional appliances has many advantages over other functional appliances like comfort, esthetics and function. But using the same appliances for all clinical situations limited its use in various cases. To overcome such limitations of twin block appliance, various researchers have come up with various modifications. This article gives an overview of the different modifications of twin block appliance.

Twin Block and Its Modifications

Class II malocclusion are one the most common malocclusions encountered in a routine orthodontic practice. The treatment modality depends on the patient's age\ growth status primarily. In patients in the growing age group, growth modulation therapy is usually done followed by a fixed orthodontic therapy. Various functional appliances have been developed over the years to achieve this goal. Though various functional appliances have been developed and used, the twin Block appliance, described by Clark in 1982, is one of the most commonly used[1].

This article covers the various modifications of the standard twin block appliance which can be used in specific situations to give superior results.

Standard twin block appliance

Twin block appliance was developed by Dr. Williams J Clark in 1977**.**

It was a simple, comfortable and aesthetically acceptable two piece appliance aimed at maximizing the growth response to functional mandibular protrusion.

The basic philosophy[2] behind the twin block therapy was if the mandibular inclined planes are in a distal relation to that of maxilla then the force acting on the mandibular teeth will have a distal force vector leading to a class II growth tendency. The aim of the twin block is to modify these inclined planes and cause more favourable growth pattern. Secondly, since it could be worn 24 hours, the masticatory forces can be transmitted via the appliance to the dentition and then to the bony trabeculae thereby influencing the rate of growth and the trabecular structure of the supporting bone.

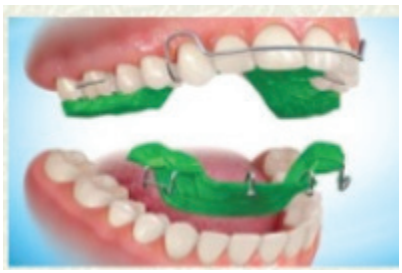

Fig 1

The standard twin block appliance [3,4] and had the following components-

- Occlusal bite blocks meeting at 70°
- Delta Clasps on upper molars and premolars.
- Ball end on lower incisors.

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 Labial bow to retract the upper incisors.

 Upper and lower base plates

The ideal indication for twin block appliance includes Class II div 1 malocclusion with well aligned upper and lower arches, having overjet of 10-12 mm with a deep bite and horizontal growth pattern. Patient should preferably be in pubertal growth spurt and have a positive VTO. However the standard twin block could not cater to the individuals needs of all the patients. To overcome this problem, various modifications have been in introduced over the period of time.

Various modifications of the twin block appliance

 Twin block appliance for transverse and sagittal development

 Twin block Croat appliance

 Magnetic twin block

 Twin block with spinner

 Fixed twin block

 Reverse twin block

 Twin block – hybrid appliance

 Neuromuscular twin block (GERBER BANDED BLOCK)

 Twin block for class 2 div 2

 Twin block with concorde facebow

 Twin block appliance with bite jumping screw for progressive advancement

□ Implant supported twin block

Twin block appliance for transverse and sagittal development

Twin block for transverse development

It is a combination of Schwarz appliance and twin block. Screws are incorporated in the upper and lower twin blocks for transverse development during the mixed dentition. When screw is added in the lower plate, the appliance is also termed as bow beer appliance [5].

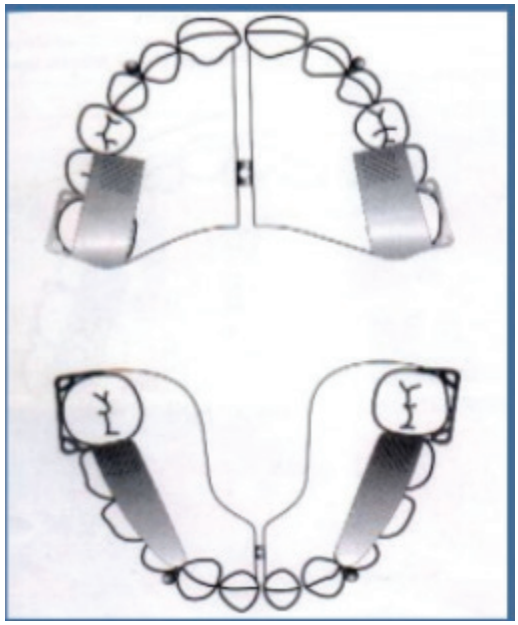

Fig-2

Twin block for sagital development

In this type of twin block ,the anteroposterior arch development is achieved by two scrrews aligned anteroposterior in the palate. This is usually required when upper and lower incisors are retroclined with a deep overbite. Twin block McNamara appliance, another modification has has two screws placed in the mid palatal region; one in anterior region in line with premolars and the other in posterior region in line with molars. This allows either only anterior or only posterior expansion as required [5].

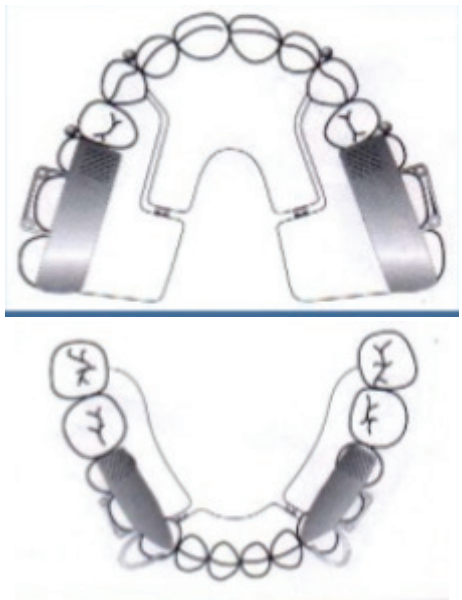

Fig-3

Twin block for transverse and sagittal appliance

For patients who require both sagittal and transverse development of the arches, a three way screw can be used in the anterior part of the palate. But this screw may impede the speech because of its bulk[5].

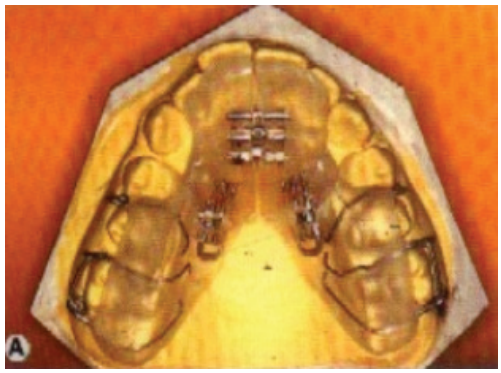

Fig-4

Twin block crozat appliance

This appliance has minimum palatal and lingual coverage. Is suitable in adult treatment. Disadvantage is that it requires careful adjustment to maintain symmetry [5]

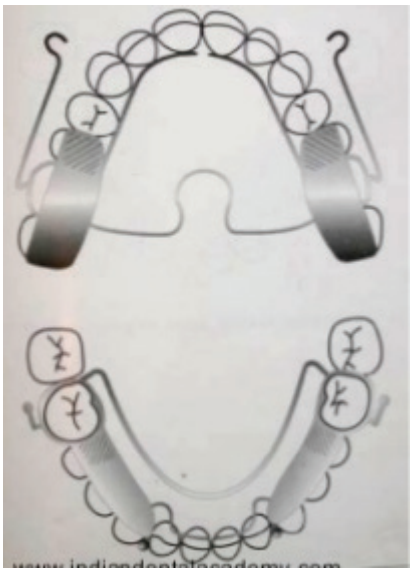

Fig-5

Magnetic twin block appliance

In this magnets are incorporated in the inclined planes. Repelling magnets on the posterior bite blocks increase the intrusive forces for correction of anterior open bite**.** In twin block therapy magnets can also be used to increase the occlusal contacts to maximize the functional forces.

The magnets used are of two types[6] :- Samarium Cobalt and Neodymium Boron (is more powerful).They can be used in both repelling or attracting modes. Magnets are also used to correct facial asymmetries. The mandible responds faster on the side of correction with attracting magnets on it.

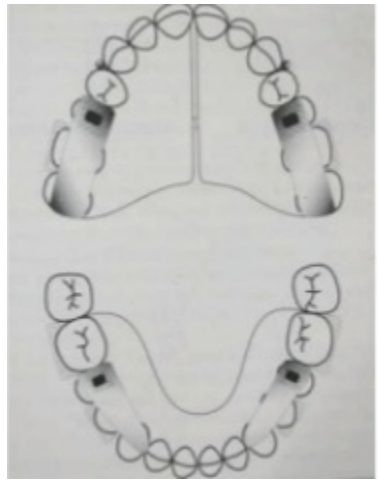

Fig-6

Twin block with a spinner In patients with tongue thrust spinner can be added to control tongue thrust [5].

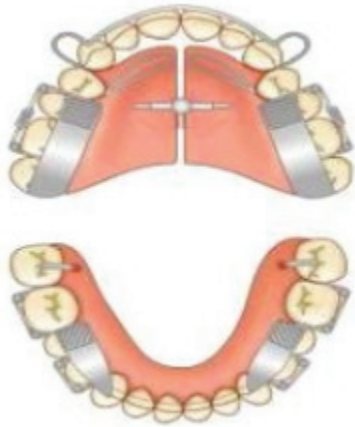

Fig-7

Fixed twin block

It is essentially used in non cooperative patient. A fixed twin block has the following components. Transpalatal Arch with occlusal inclined planes cemented on both the sides. Occlusal inclined planes are held in place by the wire tags which are extensions of the Transpalatal arch. In the lower,lingual arch extends over the occlusal surface of the molars or premolars depending on the stage of development. [7]

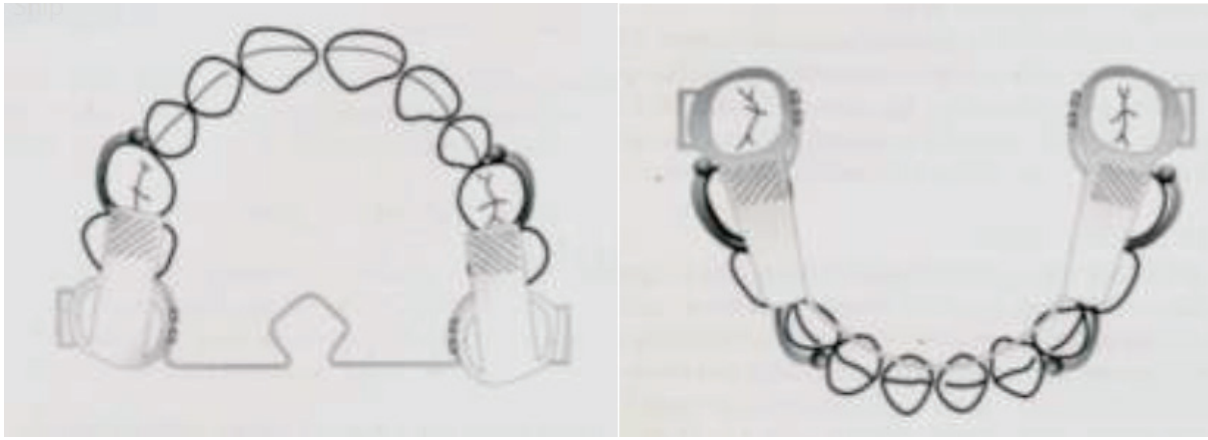

Fig-8

Reverse twin block

This modification is given in class III malocclusion cases, for the correction of maxillary protrusion. In the upper plate, inclined plane is in the at the anterior and in the lower plate, the inclined plane is in the posterior. The angulation of the inclined planes is also reversed to push the maxilla forward and hence the name reverse twin block [8].

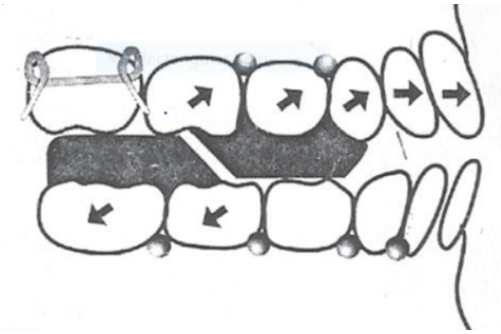

Fig-9

Twin block hybrid appliance

This modification adds upper lip pads (originally used in the frankel appliance) to the upper anterior segment of the twin block to increase the forward movement of the incisors[9].

Fig-10

Neuromuscular twin block

This Banded Block (Twin Block) was first developed in 1995 by Jay W. Gerber. The Gerber Banded Block was introduced to overcome the defects of Herbst type appliances and many other fixed class II correctors [10].Appliance made of stainless steel wire which incorporates orthodontic bands in the superstructure that provides support for the mandibular or maxillary acrylic blocks. The acrylic blocks are similar to that found in the original Clark appliances. The difference is that the corners or lateral edges of the acrylic are slightly to conform to the neuromuscular function as advocated by Jinkerson [10] This author advocates the use of a fixed Rickinator (fixed maxillary bite planes) or Rickinator Plus as the follow-up appliance. These fixed maxillary bite planes permit a controlled support of the anteroposterior correction derived from the 'blocks' and acts as a support appliance in vertical correction. Rickinator plus stabilizes the new position of the mandible. After four to six months of treatment the upper and lower Banded Blocks are removed and the Rickinator Plus appliance is immediately inserted using lingual Wilson 3-D attachments.

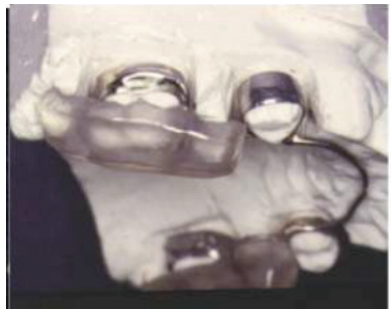

Fig-10

Modified twin block for class ii div 2

Appliance consist of Adams clasp on maxillary and mandibular first molars and first premolars and ball end clasps on the lower labial segment. inclined planes are constructed at 70 degree to the occlusal plane. The upper block contains a midline expansion screw and adouble cantilever spring behind the upper labial segment.Advancement, if required is carried out by adding small acrylic tablets to the upper block. [11]

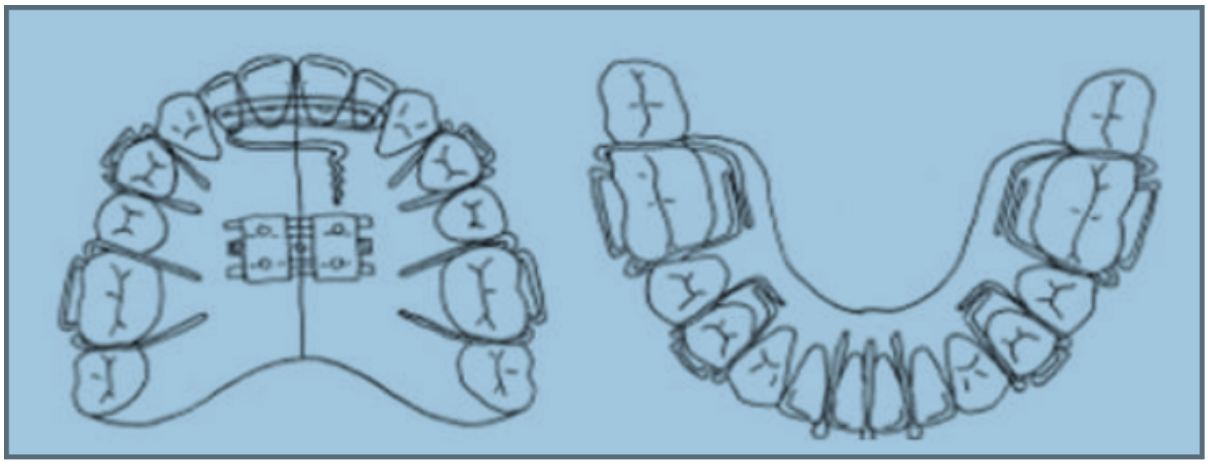

Fig 11

Twin block with concorde facebow

This is used in cases where skeletal discrepancy is severe. The addition of an orthopaedic traction system to support the action of occlusal inclined planes makes this appliance an effective technique to treat of a wide range of malocclusions. This is indicated in cases of maxillary protrusion, mandibular protrusion, and vertical growth discrepancies.

This technique achieves rapid correction of malocclusion even in cases with severe malocclusions that are unfavourable for conventional fixed or functional appliance therapy. It provides interpapillary and extra oral traction to restrict maxillary growth and at the same time, encourage mandibular growth in combination with functional mandibular protrusion[12].

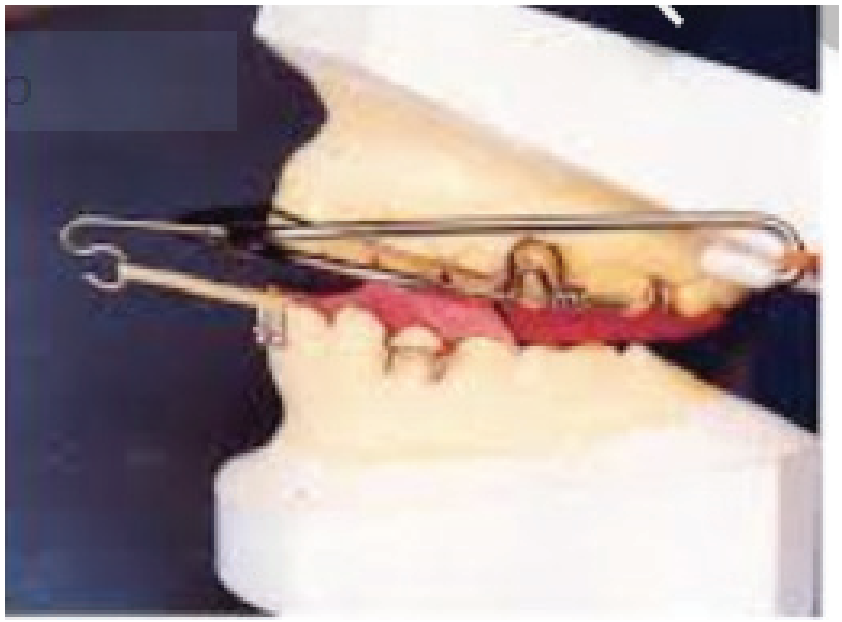

Fig-12

Twin block incorporating bite jumping screw for progressive advancement

Most functional appliances are reactivated in the laboratory, or by adding of acrylic and taking long chair side time. This carries the risk of loose monomer in the intraoral cavity. This modified twin-block appliance allows controlled, stepwise and easy bite advancements at the chair side.

Advancement screws are incorporated in the maxillary appliance blocks and activated by the insertion of cylindrical acetyl resin spacers of various thicknesses. Bite reactivations of as much as 7mm can be readily achieved using the standard 12mm advancement screws. For greater activations, 16mm or 20mm screws may be required. [13]

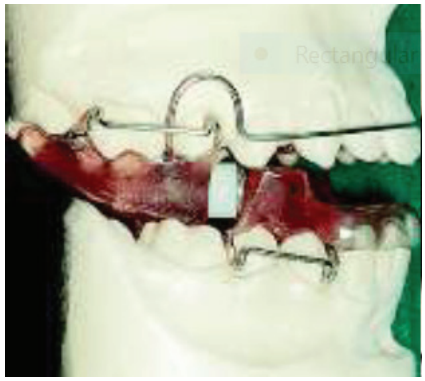

Fig-13

Implant supported twin block

This technique uses two orthodontic mini-implants (1.5 × 9 mm × 9 mm) inserted bilaterally on lower arch between the mandibular second premolar and first molar. The use of mini-implant anchorage with twin-block therapy can provides absolute control over the position of lower incisors which cannot be controlled by any other mean

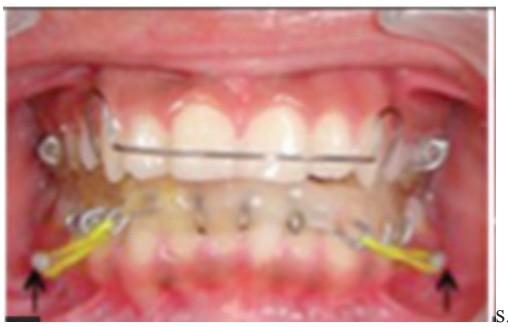

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Fig-13

Conclusion

Modification of the twin block allowed easy chairside reactivations and independent control of upper and lower arches in vertical, sagittal and transverse direction. Thus twin block has become an extremely versatile appliance which benefits patients in all age group right from early childhood to young adulthood.

Ethical Clearance – Not required since it is a review article

Source of Funding – Nil

Conflict of Interest – Nil

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