

An Overview on Modifications of Twin Block Appliance

Sharath Kumar Shetty¹, Mahesh Kumar Y², Achu R. Babu^{3*}, Vijayananda Madhur⁴

¹Professor & HOD, Department of Orthodontics and Dentofacial Orthopaedics, K. V. G. Dental College and Hospital, Sullia, Karnataka India

²Professor, Department of Orthodontics and Dentofacial Orthopaedics, K. V. G. Dental College and Hospital, Sullia, Karnataka India

³Post Graduate Student, Department of Orthodontics and Dentofacial Orthopaedics, K. V. G. Dental College and Hospital, Sullia, Karnataka, India

⁴Reader, Department of Orthodontics and Dentofacial Orthopaedics, K. V. G. Dental College and Hospital, Sullia, Karnataka India

Review Article

*Corresponding author

Achu R. Babu

Article History

Received: 10.01.2018

Accepted: 18.01.2018

Published: 30.01.2018

DOI:

10.21276/sjds.2018.5.1.4



Abstract: Twin-block appliance, described by Clark in 1982, is one of the most popular functional appliance. Recent evidence suggest that it may also be considered the most successful in the treatment of II, division 1 malocclusion. The goal of twin block therapy was to produce a technique that could maximize the growth response to functional mandibular protrusion by using an appliance system that is simple, comfortable and aesthetically acceptable to the patients. Conventional twin-block appliances would have required several reactivations by chairside addition of acrylic or by laboratory reconstruction. Modification of the twin block allowed chairside reactivations with minimal inconvenience to staff and patient. This review article cover and update the knowledge about the various modifications of the standard twin block appliances.

Keywords: Twin block, modifications, Class II malocclusion.

INTRODUCTION

Patients with Class II malocclusion are one the most commonly treated cases in a routine orthodontic practice. The kind of treatment modality chosen depends on various factors out of which the patient's age\ growth status is an important one. In cases of patients in the growing age group, growth modulation therapy is usually the treatment of choice followed by a fixed orthodontic therapy. Various functional appliances have been developed over the years to achieve this goal. The twin Block appliance is one of the most commonly used which has proven to give great results [1]. Twin-block appliance, described by Clark in 1982, is currently the most popular functional appliance in the United Kingdom.

Recent evidence suggests that it may also be considered the most successful in the treatment of Class II, division 1 malocclusions [2]. 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

On 7th September 1977, DR Williams J Clark developed the Twin block appliance. The twin blocks were a natural progression in the evolution of functional appliance therapy, representing a significant transition from one piece appliance that restricts the normal function to a twin appliance that promotes normal function. The goal of twin block therapy was to produce a technique that could maximize the growth response to functional mandibular protrusion by using an appliance system that is simple, comfortable and aesthetically acceptable to the patients.

The basic philosophy [3] behind the twin block therapy was one, that the occlusal inclined planes were the fundamental functional mechanism for the natural dentition. If the mandible 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 inclined planes of the bite blocks in the twin block is to modify these inclined planes and cause more favourable growth pattern. Hence the unfavourable copal contacts of the distal occlusion are replaced by favourable proprioceptive contacts on the inclined planes to correct the malocclusion. Secondly, it could be worn 24 hours, hence the masticatory forces can be transmitted via the appliance to the dentition from where they are transmitted to the bony trabeculae according to wolfs law, influencing the rate of growth and the trabeculae structure of the supporting bone. Keeping these principles in mind Clarks came up with what was called

as the standard twin block appliance [4,5] and had the following components-

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

- Ball end on lower incisors.
- Labial bow to retract the upper incisors.
- Upper and lower base plates



Fig-1

The ideal indication for the use of this appliance includes Class II div 1 malocclusion with well aligned upper and lower arches, having overjet of 10-12 mm with a deep bite. Patient should be growing actively preferably should be in pubertal growth spurt and have a positive VTO. The standard appliance was easily accepted by the patients and gave good results for Class II correction [6]. However it did not cater to the individuals needs of all the patients who required some specific corrections along with the routine treatment. 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 d 2
- Twin block with conordefacebow
- Twin block appliance with bite jumping screw for progressive advancement

Twin block appliance for transverse and sagittal development

Twin block for transverse development

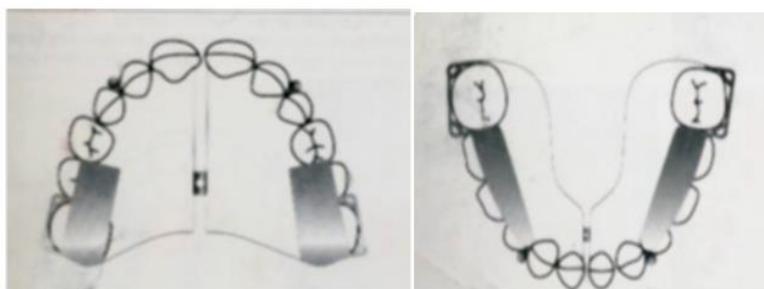


Fig-2

It is nothing but a combination of Schwarz appliance and twin block Screws are incorporated in the upper and lower twin blocks to develop the arch form

during the mixed dentition. When screw is added in the lower plate, the appliance is also termed as bow beer appliance [7].

Twin block for sagittal development

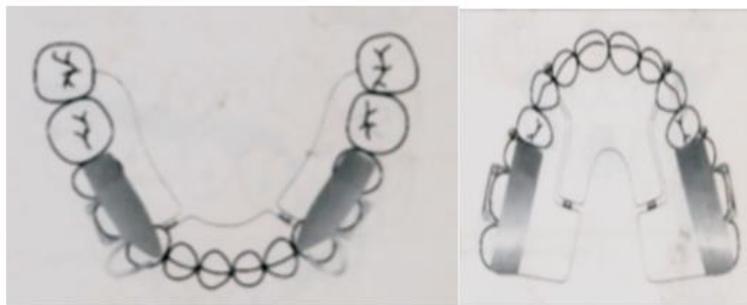


Fig-3

Twin block sagittal appliance: such a type of twin block in which the anteroposterior arch development is achieved by two screws which are aligned anteroposterior in the palate. This is usually needed when upper and lower incisors are retro lined with a deep overbite. Twin block McNamara appliance

is another modification in which two screws are placed in the mid palatal region one in anterior region in line with premolars and the other in posterior region in line with molars. The advantage is that either only anterior or only posterior expansion can be obtained as required [7].

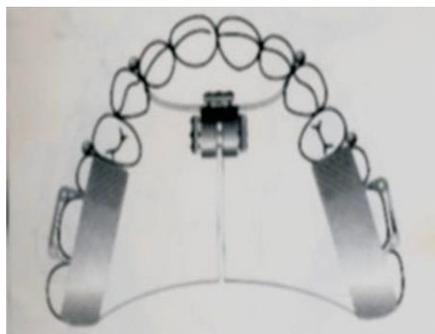


Fig-4

Twin block for transverse and sagittal appliance

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. The

disadvantage with such a screw is that it may impede the speech because of its bulk[7].

Twin block crozat appliance

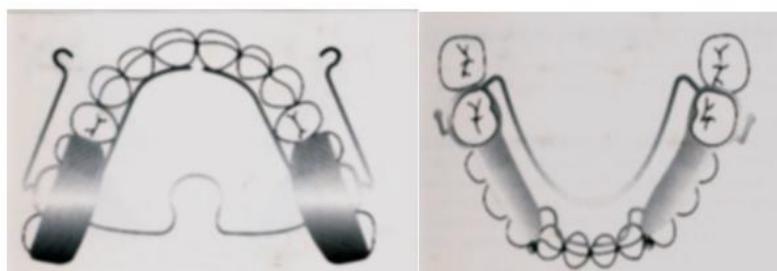


Fig-5

Is suitable in adult treatment with minimum palatal and lingual coverage. Disadvantage of this type

of appliance is that it requires careful adjustment to maintain symmetry [7].

Magnetic twin block appliance

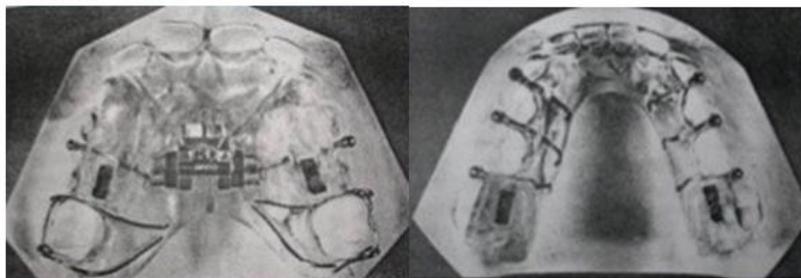


Fig-6

Magnets are incorporated in the inclined planes on the posterior bite blocks to increase the intrusive forces in correction of anterior open bite. Dellinger in 1986 investigated the effect of repelling magnets and found that they increased the opposing forces in the occlusal bite blocks to intrude opposing arches. In twin block therapy magnets can be added to increase the occlusal contacts on the bite blocks so as to maximize the functional forces in order to correct the malocclusion.

There are two types of magnets which are used [8]:-
Samarium and Cobalt

Neodymium and Boron (is more powerful)

Both repelling and attracting magnets have been used in twin blocks Magnets are also used in cases of facial asymmetries. The mandible responds faster on the side of correction with attracting magnets on it, while on the other side magnets with lesser force are used

Twin block with a spinner

In patients needing twin block therapy that have a tongue thrust habit a spinner can be added to control tongue thrust [7].

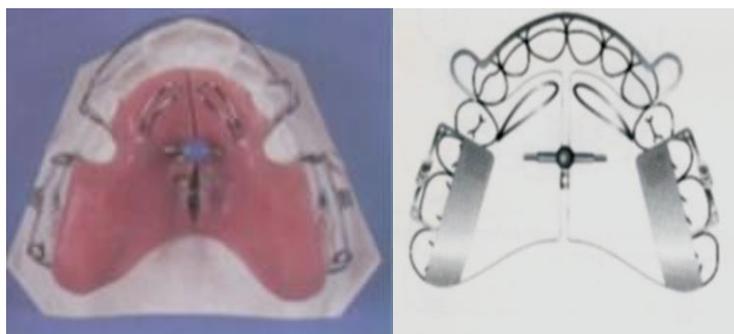


Fig-7

Fixed twin block

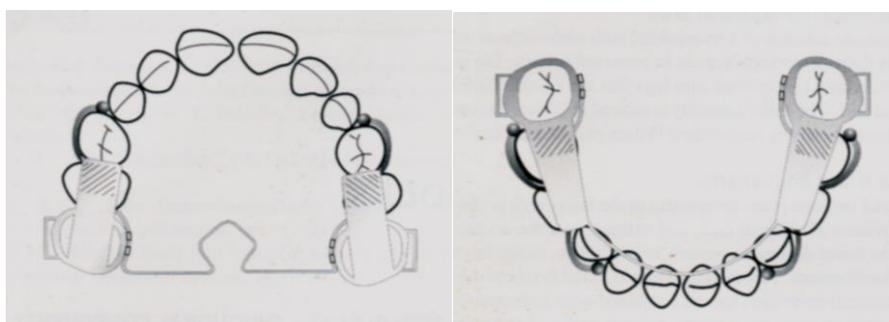


Fig-8

It is essentially used in cases where patient is not motivated enough to wear the twin block twenty four hours i.e. a non cooperative patient. A fixed twin block has the following components. Trans palatal Arch with occlusal inclined planes cemented on both the sides. Occlusal inclined planes are held in place by the

wire tags which are nothing but extension of the Trans palatal arch. Lingual arch extends over the occlusal surface of the molars premolars depending on the stage of development. The occlusal inclined plane component in the lower arch is combined with the Wilson 3D lingual arch and extends over the occlusal surfaces of

the lower deciduous molars, or premolars, depending on the stage of development [9].

Reverse twin block



Fig-9

This is another modification given in case of class III malocclusion, for the correction of maxillary protrusion. It consists of an upper plate with inclined planes at the anterior and a lower plate with the inclined planes posteriorly. The angulation of the inclined planes

is also reversed in order to push the maxilla forward and hence called as a reverse twin block [10].

Twin block hybrid appliance



Fig-10

This modification is done to increase the forward movement of the incisors by adding upper lip pads (which are originally used in the frankfort

appliance) attached to the upper anterior segment of the twin block [11].

Neuromuscular twin block



Fig-11

The Banded Block (Twin Block) was first developed in 1995 by Jay W. Gerber. Patient cooperation problems lead to the initial development of a banded version of the ever popular removable Clark Twin Block. The birth of the Gerber Banded Block was due to the lack of success of the Herbs type appliances and many other fixed class II correctors [12]. Appliance is made of stainless steel wire and incorporates orthodontic bands in the superstructure to perform similar functions as what would be found in the major connector in removable partial dentures. The resulting

superstructure would provide 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 rounded so as to conform to the neuromuscular function as advocated by Jinkerson [12].

This author has advocated the use of a fixed Rickinator (fixed maxillary bite planes) or Rickinator Plus as the follow-up appliance to the various 'blocks'.

These fixed maxillary bite planes permit a controlled support of the AP correction derived from the 'blocks' and as a support appliance in vertical correction. RICKINATOR PLUS... Another big plus in the use of the Banded Block can be found in the use of the fixed Rickinator to stabilize the new position of the mandible. The appliance is constructed with the Banded Block by

the laboratory and sent with that appliance to the doctor. Typically 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.

Modified twin block for class ii div 2



Fig-12

Appliance consist of Adams clasp on maxillary and mandibular first molars and first premolars and ball ended clasps on the lower labial segment inclined planes are constructed at 70° to the occlusal plane the upper block contains a midline expansion screw double cantilever spring behind the upper labial segment.

Followed by bonding of the upper labial segment with readjusted edgewise fixed appliances. Advancement, if required is carried out by the addition of small acrylic tablets to the upper block [13].

Twin block with concorde facebow



Fig-13

In cases in which the skeletal discrepancy is severe, the addition of an orthopaedic traction system to support the action of occlusal inclined planes provides a versatile appliance technique that is effective in the treatment of a wide range of malocclusions. The indications for treatment include maxillary protrusion, mandibular protrusion, and vertical growth discrepancies. A functional orthopaedic approach eliminates the uncertainty of treatment response that is sometimes associated with purely functional techniques. The technique achieves rapid correction of malocclusion even in cases with severe malocclusions that are unfavourable for conventional fixed or functional appliance therapy.

appliance to be worn at night so as to reinforce the functional component for correction of a class II buccal segment relationship. 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 [14].

Twin block incorporating bite jumping screw for progressive advancement

Most functional appliances can only be reactivated by laboratory reconstruction or adjustments, or by time-consuming chairside additions of acrylic, with the accompanying risk of loose monomer in the intraoral cavity. A modified twin-block appliance allows controlled, stepwise bite advancements to be carried out easily at the chair.

In the early years of twin blocks, tubes were added to clasp for extra oral traction on the upper

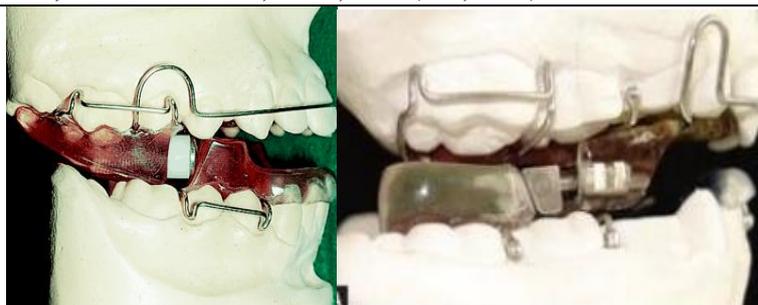


Fig-14

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, the longer 16mm or 20mm screws may be required [15].

CONCLUSION

Over the years Twin Blocks remains as one of the most commonly used removable functional appliance. It has many advantages over other functional appliances such as comfort, aesthetics and function, thereby improving patient compliance. Clinical management that is adjustment and activation is simple- the appliance is robust and not prone to breakage. Chair side time is reduced in achieving major orthopaedic correction. Modification of the twin block allowed chairside reactivations with minimal inconvenience to staff and patient. Conventional twin-block appliances would have required several reactivations by chairside addition of acrylic or by laboratory reconstruction.

The various modification which have been incorporated over the years allow independent control of upper and lower arches in vertical, sagittal and transverse direction. Full-time wear consistently achieve rapid mandibular repositioning that remains stable out of retention. It is an extremely versatile appliance which benefits patients in all age group right from early childhood to young adulthood. Integration with fixed appliances is simpler than with any other functional appliance. In combined techniques, Twin Blocks can be used to maximise the skeletal correction while fixed appliances are used to detail the occlusion. Because Twin Blocks need have no anterior wires, brackets can be placed on the anterior teeth to correct tooth alignment simultaneously with correction of arch relationships during the orthopaedic phase. During the support phase an easy transition can be made to fixed appliances.

Conflict of interest: None

REFERENCES

1. Caldwell S, Cook P. Predicting the outcome of twin block functional appliance treatment: a

prospective study. *Eur J Orthod.* 1999; Oct; 21(5):533-9.

2. Chadwick SM, Banks PA, and Wright JL. The use of myofunctional appliances in the UK: A survey of British orthodontists, *Dent. Update* 25:302-308, 1998.
3. Clark WJ More on the Clark Twin Block *Am J Orthod Dentofacial Orthop* 1990; Mar;97(3):30A
4. Clark W. The twin block technique *Funct Orthod* 1991; Jan-Feb;8(1):24-5, 27-8. 42:
5. Clark WJ. *Twin Block Functional Therapy Application in Dentofacial Orthopedics.* Mosby – Wolfe; 1995.
6. Lund DI, Sandler PJ. The effects of Twin Blocks: a prospective controlled study. *American Journal of Orthodontics and Dentofacial Orthopedics.* 1998 Jan 31;113(1):104-10.
7. Kalra, d. H. Twin block appliance: its modifications.
8. Noar JH, Evans RD. Rare earth magnets in orthodontics: an overview. *Journal of Orthodontics.* 1999 Mar 1;26(1):29-37.
9. Schaefer AT, McNamara JA, Franchi L, Baccetti T. A cephalometric comparison of treatment with the Twin-block and stainless steel crown Herbst appliances followed by fixed appliance therapy. *American journal of orthodontics and dentofacial orthopedics.* 2004 Jul 31;126(1):7-15.
10. Kidner, G., DiBiase, A., & DiBiase, D. (2003). Class III Twin Blocks: a case series. *Journal of Orthodontics.*
11. Vig PS, Orth D, Vig KW. Hybrid appliances: a component approach to dentofacial orthopedics. *American Journal of Orthodontics and Dentofacial Orthopedics.* 1986 Oct 1;90(4):273-85.
12. Gerber JW. Banded block. *The Functional orthodontist.* 1999;16(4):16.
13. Dyer FM, McKeown HF, Sandler PJ. The modified twin block appliance in the treatment of Class II division 2 malocclusions. *Journal of Orthodontics.* 2001 Dec 1;28(4):271-80.
14. Clark WJ. The twin blocks technique a functional orthopedic appliance system. *American Journal of Orthodontics and Dentofacial Orthopedics.* 1988 Jan 1;93(1):1-8.
15. Banks P, Carmichael G. Stepwise overjet reduction with a modified twin-block appliance. *Journal of clinical orthodontics: JCO.* 1999 Nov;33(11):620.