Twin Block Appliance Therapy in the Management of Class II Patients: A Clinical Report

Bhullar MK[1], Uppal AS[2], Kochhar GK[3], Uppal BS[4]

Abstract:

Dental malocclusion can be due to underlying skeletal discrepancies or dentoalveolar discrepancies. When the malocclusions are secondary to abnormal skeletal development the approach in treating such malocclusions changes from being an orthodontic one. Such malocclusions in growing patients can be treated with functional appliance therapy or orthopaedic appliance therapy. The decision whether to treat the patient with functional appliance or an orthopaedic appliance depends upon the cause of malocclusion. Functional appliances are mostly used in cases where the malocclusion is due to restricted growth of the jaws. In case of class II malocclusion it can be used to facilitate the growth of mandible and help achieve a balance in maxillomandibular relations.the functional appliance therapy aims to improve the functional relationship of dentofacial structures by eliminating unfavourable developmental factors and improving the muscle environment. The aim of this paper is to provide an insight into the mechanism of action, design and treatment steps of the most commonly used functional appliance, the twin block appliance.

Keywords: Class II malocclusion, Functional Appliance, Twin Block Appliance.

Introduction

Functional orthopedics evolved based on the fundamental principle that function modifies anatomy.[1] The challenge of functional therapy is to maximize the genetic potential of growth and guide the growing face and developing dentition towards a pattern of optimal development. Functional appliance therapy aims to improve the functional relationship of dentofacial structures by eliminating unfavourable developmental factors and improving the muscle environment enveloping the developing occlusion through alteration of the position of the teeth and supporting tissues; A new functional behaviour pattern or engram is established that can support a new position of equilibrium. Functional appliances harness the natural forces of the orofacial musculature and transmit these to teeth and alveolar bone through the medium of the appliance. These appliances modify growth to intercept and treat jaw discrepancies.[2] These appliances bring about orthopaedic, dentoalveolar and muscular changes.

Twin Block Appliance

The twin block appliance was developed by Clark in 1977. Twin block is a two piece appliance designed for full time wear. Twin blocks are occlusal inclined planes that

Corresponding Author : Dr. Gulsheen Kaur Kochhar, Senior Lecturer, Swami Devi Dyal Hospital and Dental College, Barwala, Panchkula (India). **(M)** +91-9888416164 **E-mail :** gulsheenuppal@gmail.com

1. Reader, Department of Orthodontics and Dentofacial Orthopedics, Luxmi Bai Dental College and Hospital, Patiala, Punjab.
2. Senior Lecturer, Department of Conservative Dentistry and Endodontics, HSJ Institute of Dental Sciences &Hospital, Panjab University, Chandigarh.
3. Senior Lecturer, Swami Devi Dyal Hospital and Dental College, Barwala, Panchkula.
4. Medical Officer, Mini PHC, Surtapur, Punjab.

effectively modify and achieve rapid functional correction of malocclusion. Upper and lower bite blocks interlock at seventy degrees and take advantage of functional forces applied to the dentition. Occlusal inclined planes give greater freedom of movement in anterior and lateral excursion and cause less interference with normal function. Occlusal forces transmitted through the dentition provide constant proprioceptive stimuli to influence the growth rate and adaptation of the trabecular structure of the supporting bone.[3]

Bite Registration: In growing children, with overjet as large as 10mm, the bite may be activated edge to edge on the incisors with a 2mm interincisal clearance. In vertical dimension, 2mm of interincisal clearance is equal to approximately 5 or 6 mm of clearance in the first premolar region.[3] The bite of the patient is taken with the help of exactobite registration gauge. Banks P Wright J, O'Brien K[4] showed that incremental bite advancement produced no advantages over maximum advancement.

Occlusal inclined planes: the position and angulation of the occlusal inclined planes are crucial to efficiency in correcting arch relationships. The inclined planes are angled at 70 degrees to the occlusal planes and this angulations effective in guiding the mandible into occlusion in a forward position.

Lower inclined plane: the position of the inclined plane is determined by the lower block and is important in the treatment of deep overbite. The inclined plane must be clear of the mesial surface contact of the lower first molar. Thus, the inclined plane on the lower bite block is angled from the mesial surface of the second premolar or second deciduous molar.

Upper inclined plane: it is angled from the mesial of the upper second premolar to the mesial of the upper first molar. The flat occlusal portion then passes distally over the remaining upper posterior teeth in a wedge shape, reducing in thickness as it extends distally.

Treatment stages:

The treatment is done in two stages:

Active phase: twin block uses posterior inclined planes to adjust the vertical dimension and correct the malocclusion by functional mandibular protrusion.

Support phase: An anterior inclined plane is used to retain the corrected incisor relationship until the buccal segment occlusion is fully established.

Case Report

A 15 years female patient reported to the OPD with the chief complaint of forwardly placed teeth (Fig. 1,4). The patient presented with Angles Class II malocclusion (Fig.2,3). Patient had an ANB angle of 6 degree, saddle angle134 degrees, and FMA 12 degrees. Patients showed stage 5 CVMI status. Patient was treated with standard Twin Block appliance with full time wear. The molar relation changed to Class I after five months of appliance wear (Fig. 6,7). The twin block appliance therapy also resulted in the correction of overjet and overbite (Fig. 5,8). There was improvement in patients profile (Fig 9,10). This was followed by fixed orthodontic therapy to align upper and lower arches and establish inter-arch relations with reverse inclined plane to preserve the changes achieved with twin block. This shows that twin block appliance can be used successfully in late functional appliance treatment cases where other removable functional appliances are sometimes not that effective.

Fig. 1: Pre-treatment Frontal View showing increased overbite

Fig. 2: Pre-treatment Right Profile View showing Class II molar and canine relation

Fig. 3 : Pre-treatment Left Profile View showing Class II molar and canine relation

Fig. 4 : Pre-treatment Overjet View showing increased overjet

Fig. 5 : Post-treatment Frontal View showing corrected overbite

Fig. 6 : Post-treatment Right Profile View showing Class I molar relation

Fig. 7 : Post-treatment Left Profile View showing Class I molar relation

Fig. 8 : Post-treatment Overjet View showing corrected overjet

Fig. 9 : Pre-treatment Extra oral Profile View

Fig. 10 : Post-treatment Extra oral Profile View

Discussion

This case showed favourable changes with twin block appliance in late functional appliance treatment in a maturing patient. Lund DI, Sandler J[5] showed corrective changes with twin block appliance therapy resulting in reduction in overjet and forward movement of mandible. Mills CM, McCulloch KJ[6] evaluated the twin block appliance cases cephalometrically and showed favourable changes in the magnitude and direction of skeletal growth. Mills CM, McCulloch KJ[7] further established that the changes achieved during the active phase of twin block therapy are still retained post treatment when the patient matures into the permanent dentition. Cozza P, Baccetti T, Franchi L et al[8] assessed the scientific evidence on the efficiency of functional appliances in enhancing mandibular growth in class II subjects. They showed that Herbst appliance showed highest coefficient of efficiency followed by Twin Block appliance. O'Brien K, Wright J, Conboy F et al[9] evaluated the effectiveness of Twin Block appliance therapy with the timing of treatment and found that treatment with Twin Block appliance in children 8-10 years of age produce more of dentoalveolar changes. Baccetti T, Franchi L, Toth LR, McNamara JA[10] showed that optimal timing for twin block therapy of class II disharmony is during or slightly after the onset of pubertal peak in growth velocity.

Conclusion

The diagnosis and case selection are critical for successful treatment. The twin block appliance selected for a particular patient should be adapted to the type of growth pattern, direction and amount of growth required. These appliances are definitely one of the most powerful weapons in the arsenal of the orthodontist that can accomplish things not possible without such appliances.

References

1. Proffit WR, Fields HW, Ackerman JL. Contemporary Orthodontics. Third edition. St. Louis : Mosby Publications;1999.
2. Graber TM, Rakosi T, Petrovic AG. Dentofacial Orthopedics and Functional Appliances.2nd edition. St.Louis : Mosby Publications;1997.
3. Clark WJ. Twin Block Functional Therapy.2nd edition. St.Louis: Mosby Publications:1991.
4. Banks P, Wright J, O'Brien K. Incremental versus maximum bite advancement during twin block therapy: A randomized controlled clinical trial. Am J Orthod Dentofac Orthop. 2004;126(5):583-8.

5. Lund DI, Sandler J. The effect of Twin Blocks: A prospective controlled study. Am J Orthod Dentofac Orthop.1998;113(1):104-10.
6. Mills CM, McCulloch KJ. Treatment effects of the Twin Block appliance: A cephalometric study. Am J Orthod Dentofac Orthop.1998; 114(1):15-24.
7. Mills CM, McCulloch KJ. Posttretment changes after successful correction of class II malocclusion with the Twin Block appliance. Am J Orthod Dentofac Orthop.2000;118(1):24-33.
8. Cozza P, Baccetti T, Franchi L et al. Mandibular changes produced by functional appliance n class II malocclusion: A systematic review. Am J Orthod Dentofac Orthop.2006;129(5):599.
9. O'Brien K, WrightJ, Conboy F et al. Effectiveness of early orthodontic treatment with the Twin Block appliance. A multicenter, randomized controlled trial Part 1: Dental and skeletal effects. Am J Orthod Dentofac Orthop.2003;124(3): 234-43.
10. Baccetti T, Franchi L, Toth LR, McNamara JA. Treatment timing for Twin Block therapy. Am J Orthod Dentofac Orthop.2000;118(2)159-70.

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