

**Short Communication****Semi-fixed twin block with fixed orthodontic mechanotherapy****Heena Ramchandra Keshwani<sup>1\*</sup>, Umal Hiralal Doshi<sup>1</sup>**<sup>1</sup>Dept. of Orthodontics and Dentofacial Orthopedics, CSMSS Dental College and Hospital, Aurangabad, Maharashtra, India**Abstract**

Non-compliance with removable Twin-block appliance wear is one of the most common problems for effective functional correction. This article describes a simple semi-fixed Twin-block design that allows full integration with any orthodontic fixed appliance system with the additional advantage of its use in the end stage of growth spurt.

**Keywords:** Non-compliance, Class II malocclusion, Semi-fixed, Twin block.

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**1. Introduction**

Twin block appliance introduced by Clark in 1977 is one of the most effective appliance in correcting Class II malocclusion.<sup>1</sup> Twin blocks are bite-blocks that effectively modify the occlusal inclined plane to induce favourably directed occlusal forces by causing a functional mandibular displacement. To achieve the treatment objective with this removable functional appliance, patient cooperation is required. In non-compliant patients, cementing the twin block for short duration is also suggested. To eliminate the factor of patient compliance, several modifications in the form of fixed or semifixed designs of twin block appliance have been made.<sup>2,3,4,5</sup> All these designs have their own advantages and disadvantages.

To overcome certain disadvantages of previous designs a new semi-fixed twin block design was developed that can be used simultaneously with the fixed mechanotherapy.

**1.1 Procedure**

1. Alignment of upper and lower arch is done with fixed mechanotherapy.
2. Impression of upper and lower arch is taken and working model cast is fabricated.

3. Bite registration is done in a conventional manner and working casts along with wax bite are mounted on three point or mean value articulator.
4. The wire framework for this semi fixed twin block is made by using 20 gauge hard stainless steel wire.
5. On the maxillary cast, a wire framework is made having a transpalatal bar continued as occlusal components having two helices placed between the 1st molar- 2nd premolar and 2nd premolar- 1st premolar facing out towards the buccal surface bilaterally. Occlusal wire component is placed 0.5mm above the occlusal surface of the teeth (**Figure 1**).
6. Similarly on mandibular cast, lingual arch is formed continued as a wire component placed 0.5mm above the occlusal surfaces of teeth having one helix between 1st and 2nd premolar facing out towards the buccal surface bilaterally (**Figure 2**).
7. The maxillary and mandibular blocks are prepared as per standard Twin-block design with inclined planes at about 70° to the occlusal plane by incorporating the wire framework on the occlusal surface of teeth except the helices which are kept free from the acrylic. The 0.5mm gap between the occlusal surface and the wire is to allow the acrylic to flow and adapt to the occlusal surface (**Figure 3, Figure 4**).

\*Corresponding author: Heena Ramchandra Keshwani  
Email: [heenakeshwani06@gmail.com](mailto:heenakeshwani06@gmail.com)

8. The retention of the blocks to the occlusal surface is obtained by engaging or passing the elastomeric chain or ligature wire through the helices and engaging it to the adjacent bracket and molar tube mesially and distally respectively in both the arches (**Figure 5**).
9. When trimming is required of the acrylic blocks, the elastomeric chain or ligature wire is disengaged, the blocks are removed and trimmed and then are reengaged in both the arches.
10. Simultaneous fixed orthodontic treatment is continued.
11. After the completion of active phase the correction is maintained using light class II elastics.



**Figure 1:** Wire framework on maxillary cast.



**Figure 2:** Wire framework on mandibular cast.



**Figure 3:** Wire framework with acrylic blocks on maxillary cast.



**Figure 4:** Wire framework with acrylic blocks on mandibular cast.



**Figure 5:** Intraoral photographs after semi fixed twin block appliance engagement

## 2. Discussion

Over the period of time various modifications have been made in conventional twin block design, to overcome the problems occurring due to patient compliance and prolonged treatment time duration. Although they had various advantages in producing acceptable treatment results, they also presented with various demerits. For example, Read introduced a fixed system of twin block in which the blocks are attached to the bands cemented to the teeth which presented with the disadvantage of breakage of appliance, need for meticulous design construction and difficulty in hygiene maintenance.<sup>3</sup> Qi et al designed a modified fixed appliance in cast cobalt chromium design which presented with the disadvantage of the additional laboratory design construction, bulkiness, need of GIC fixation of appliance and thus leading to poor hygiene maintenance.<sup>3</sup> Scotland in his article described the use of preformed blocks as twin block in upper and lower arch but the appliance was difficult to adjust, blocks were bonded to the tooth surface with excess composite and the attachment to molar tube was also a limiting factor.<sup>4</sup> Chandorikar et al designed an effective semi-fixed twin block which allowed trimming of maxillary block but lower blocks were bonded with GIC and hence could be difficult to maintain clean.<sup>5</sup>

After analysing the advantages and disadvantages of various modified designs of the twin block appliance, we designed this appliance to allow the orderly occlusal trimming of blocks and to simultaneously perform fixed

orthodontic mechanotherapy to shorten the treatment time duration by overcoming the shortcoming of patient compliance.

### 2.1. Advantages

1. Patient compliance is not necessary and the appliance works 24 hours a day.
2. Patient acceptance is better as palate is free of acrylic, hence less bulky.
3. Reduces chairside time.
4. Allows full assimilation with any fixed appliance system.
5. Treatment duration is decreased due to simultaneous advancement and fixed orthodontic treatment thus eliminating the transitional phase between functional phase and fixed phase.
6. Blocks can be easily removed and trimmed in orderly manner.
7. Oral hygiene can also be maintained by removing the blocks in regularly scheduled appointments.
8. This appliance can easily be used in Class III cases.
9. This can also be given before the beginning of fixed mechanotherapy by selective bonding the brackets on tooth to which elastomeric chains is to be attached for retention.
10. The transpalatal bar can modified to have tongue cribs, Nance palatal button as well as any expander whenever needed.

### 2.2. Shortcomings

1. The appliance requires additional wire bending.

2. The elastomeric chains tend to undergo distortion in the oral cavity hence regular appointments are necessary.

### 3. Conclusion

This modified semi fixed twin-block appliance is an effective method of treating Class II malocclusion in patients requiring fixed functional appliance together with fixed mechanotherapy. This could be especially useful in patients who are towards end of their growth spurts.

### 4. Source of Funding

None.

### 5. Conflict of Interest

None.

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