

## CLINICAL SECTION

# Class III Twin Blocks: a case series

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## Abstract

*Objective:* To evaluate the use of Class III Twin Blocks for the early treatment of Class III malocclusion.

*Design:* Retrospective analysis.

*Subjects and Method:* 14 subjects were consecutively treated with a modified version of the Class III Twin Block appliance. Lateral cephalometric radiographs taken at the start and end of treatment were assessed digitally.

*Results:* The mean age of subjects was 10 years and mean treatment time was 6.6 months. The cephalometric analysis of changes during treatment shows proclination of the upper incisors [mean 5.1°, SD 5.1], retroclination of the lower incisors [mean -4.5°, SD 3.9], reduction in angle SNB [mean -1.3°, SD 1.8] and an increase in the maxillary/mandibular planes angle (mean 2.1°, SD 2.2). Average cephalometric digitizations and photographs of a clinical case are shown.

*Conclusions:* Class III Twin Blocks can be used successfully for early treatment of Class III malocclusion. A randomly allocated prospective study is required to fully evaluate the efficacy of this appliance.

*Index words:* Class III, Twin Blocks, Function Regulator III

Received 14 January 2001; accepted 15 November 2002

## Introduction

The Twin Block appliance<sup>1</sup> is widely used for the treatment of Class II malocclusions. However, Clarke has also described a version of the twin block that may be used for Class III malocclusions.

Orthopaedic correction of Class III malocclusion has been described utilizing a Delaire<sup>2</sup> style face mask or reverse headgear for maxillary deficiency.<sup>3</sup> Chin-cup type headgear may also be used for the treatment of mandibular prognathism.<sup>3</sup> Other functional appliances for treatment of Class III malocclusion have been described. The most commonly used is the Function Regulator III (FR III) described by Frankel.<sup>4</sup>

Frankel states the mode of action of the FR III is to eliminate factors that impede maxillary growth while preventing mandibular development. This is similar to the proposed mode of action of the Class III Twin Block. Clark<sup>1</sup> states that reverse angulation of blocks harnesses occlusal forces to advance the maxilla and maxillary dentition while using the mandible as anchorage and restricting its development.

Loh and Kerr analysed 20 cases treated with the FR III to determine its effects and indications for use.<sup>5</sup> They

concluded that change was effected by slight adjustment of upper and lower incisor inclinations and a backward rotation of the mandible with associated increase in face height. A Class III malocclusion with a deep overbite seemed to be the best indication for treatment with the FR III.

Analysis of a case series is used to investigate the efficacy of Class III Twin Blocks for the early treatment of Class III malocclusion.

## Subjects

Fourteen subjects under 12 years of age with a Class III malocclusion and reverse overjet were included in this series.

## Method and materials

Bite registration was taken in maximum retrusion with about 2 mm inter-incisal clearance.

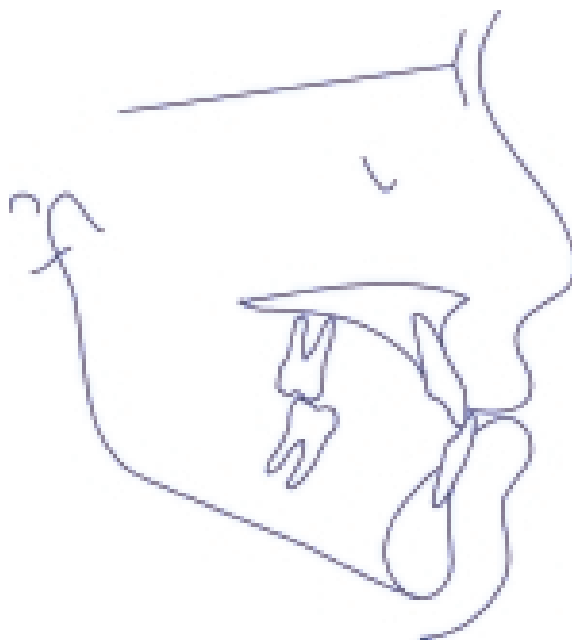
A modified version of the Clark Class III Twin Block<sup>1</sup> was constructed from heat-cured acrylic resin with inclined planes at 70 degrees directing occlusal force downwards and backwards. A midline palatal screw was incorporated for expansion of the upper arch where this



**Fig. 1** Upper Class III twin block.

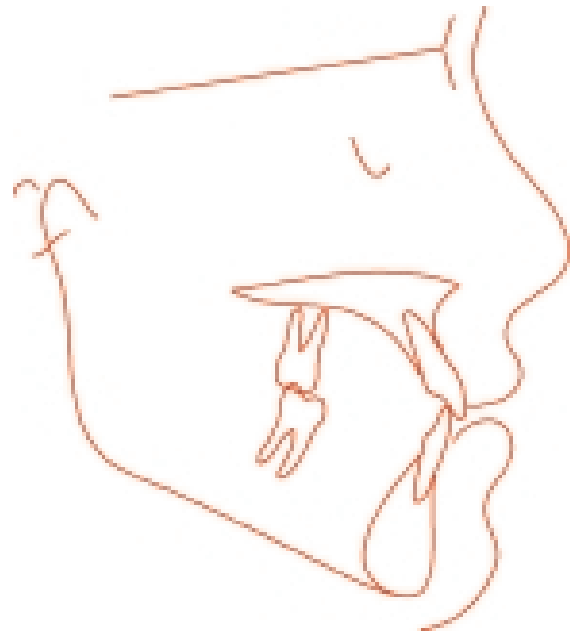


**Fig. 2** Lower Class III twin block.

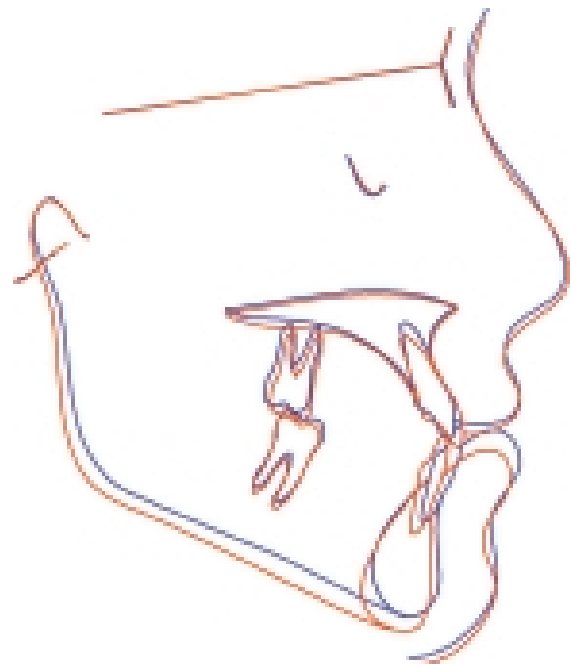


**Fig. 3** Pre-treatment average cephalometric digitization.

was required. A lower labial bow and Adams clasps or ball-ended clasps on upper and lower first molars and premolars (0.7 mm diameter stainless steel wire) retained the appliance. If premolars were not present then Adams clasps were placed on deciduous molars or C clasps on deciduous canines. Deciduous canines were not routinely removed before treatment. The design of the appliance is shown in Figures 1 and 2.



**Fig. 4** Post-treatment average cephalometric digitization.



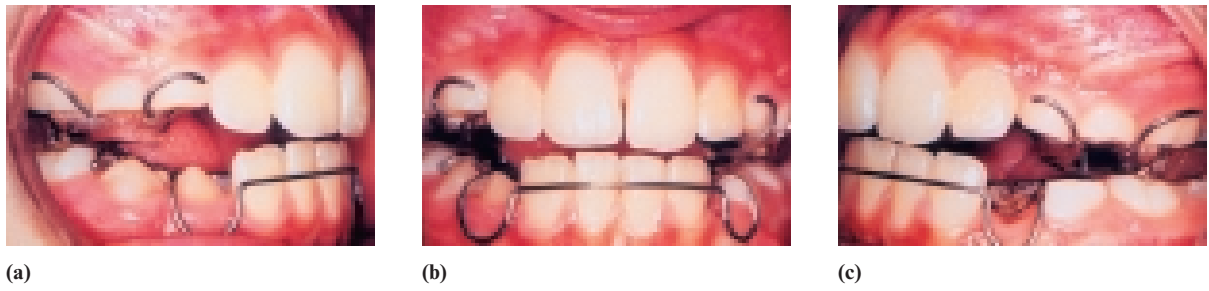
**Fig. 5** Average cephalometric superimposition on sella-nasion line. Pre-treatment, blue; post-treatment, red.

**Table 1** Cephalometric changes during treatment with Class III Twin Blocks

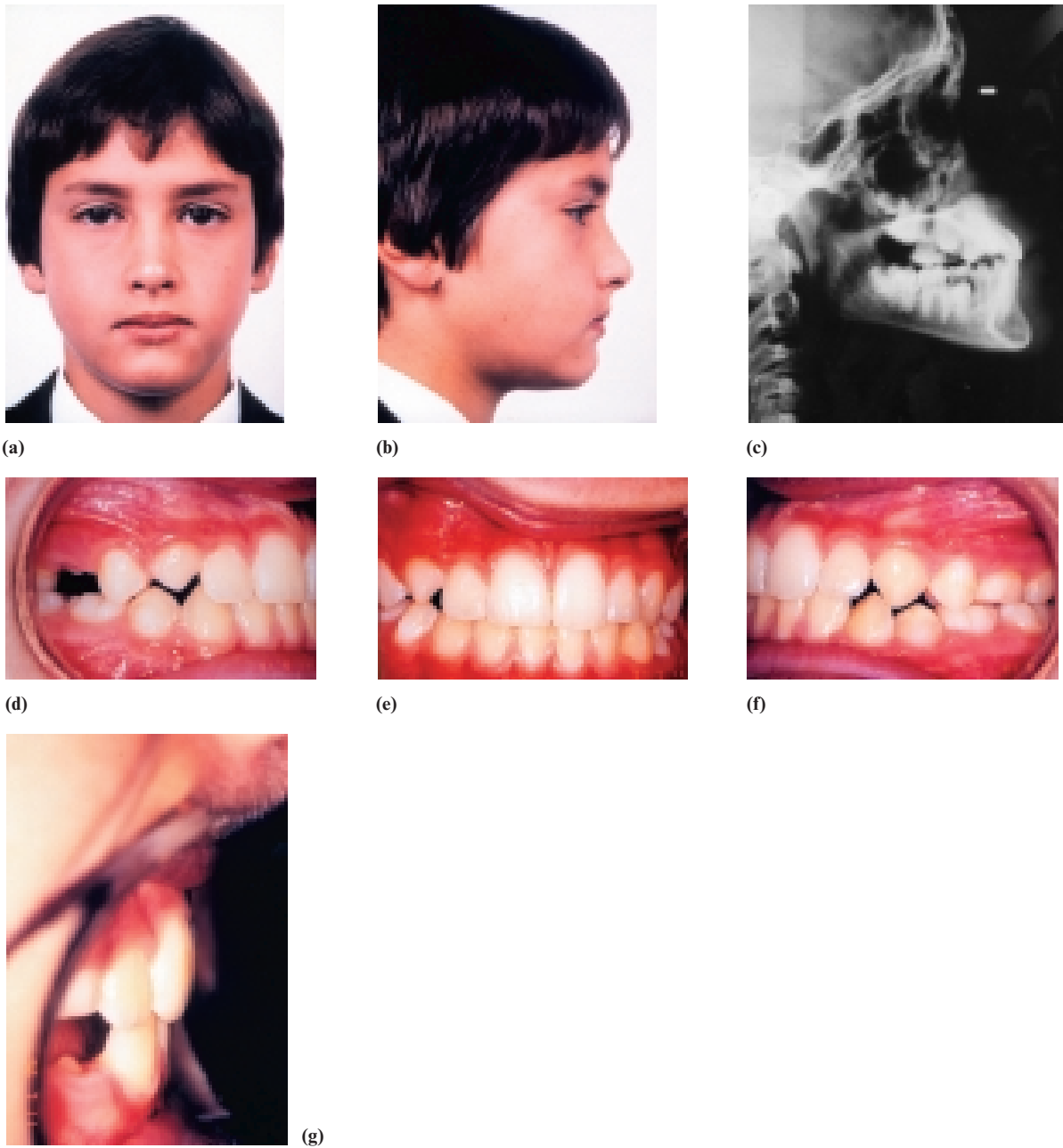
Changes during treatment	Mean	Range	SD	95% CI	t value	p value
SNA (°)	0.179	-3.0-3.5	1.996	-0.974-1.331	0.335	0.743
SNB (°)	-1.393	-4.0-1.0	1.799	-0.354-2.432	-2.896	0.012
ANB (°)	1.429	-2.0-5.5	2.487	0.207-2.865	2.149	0.051
Maxillary/mandibular planes angle (°)	2.107	-2.5-6.0	2.177	0.850-3.364	3.622	0.003
Upper incisor angle (°)	5.107	-1.5-17.0	5.107	2.158-8.056	3.742	0.002
Lower incisor angle (°)	-4.464	-15-0.5	3.925	-6.730 to -2.198	-4.256	0.001
Lower anterior face height (mm)	1.750	-5.5-6.0	2.673	0.207-3.293	2.450	0.029



**Fig. 6** (a-g) Subject before treatment with Class III twin blocks.



**Fig. 7** (a–c) Subject with Class III Twin Blocks *in situ*.



**Fig. 8** (a–g) Subject after treatment with Class III Twin Blocks.

Lateral skull cephalometric radiographs were taken before and after treatment. These radiographs were digitized and superimposed on the sella–nasion (SN) plane using OPAL (COGSOFT OPAL 1998, British Dental Hospital, UK) digitization software.

After completion of treatment no retention regime was used where the corrected overbite was good. In cases where stability was less certain, appliance wear continued at night.

## Results

The mean age of subjects at the start of treatment was 10.0 years (range 7.9–11.8, SD 1.2 years). Pre-treatment average lateral cephalometric digitization is shown in Figure 3. The mean treatment time was 6.6 months (range 4.0–10.0, SD 2.2 months).

The appliance was well tolerated by most subjects and changes were observed within 6 weeks of starting to wear the appliance. Cephalometric changes during treatment are shown in Table 1. Figure 4 shows an average cephalometric digitization of subjects at the end of treatment and a superimposition of pre- and post-treatment average digitizations are shown in Figure 5. There were significant changes in the inclination of the incisors with the upper incisors being proclined ( $P = 0.002$ ) and the lower incisors retroclined ( $P = 0.001$ ). Angle SNB decreased ( $P = 0.012$ ) and the anterior vertical dimension ( $P = 0.029$ ) and maxillary/mandibular planes angle ( $P = 0.003$ ) increased. Figures 6–8 show the treatment of one subject with Class III twin blocks.

## Discussion

The appliance is effective at correcting reverse overjet during the mixed dentition as an alternative to the Frankel FR III appliance or an upper removable appliance alone. Changes occur rapidly with a mean treatment time of only 6.6 months, which compares favourably with the FR III appliance that was shown to have a mean treatment time of 3.1 years and achieved similar results.<sup>5</sup> Changes are mainly dento-alveolar, due to proclination of the upper incisors and retroclination of the lower incisors. Skeletal change is limited to slight downward and backward rotation of the mandible, with an associated increase in anterior, vertical dimension. Treatment during the deciduous or early mixed dentition has been shown to give more favourable skeletal changes during treatment with a functional appliance or rapid maxillary expansion and protraction headgear.<sup>6,7</sup> The

mean age of subjects in this series may have been older than ideal. With this limited skeletal change prognosis for maintenance of the incisor relationship will depend on future skeletal growth. The indications for treatment with the reverse Twin Block are those cases in the mixed dentition with a reverse overjet associated with a mild sagittal skeletal discrepancy and an average or reduced anterior vertical dimension.

## Conclusions

- Class III Twin Blocks can be used successfully for early treatment of Class III malocclusions.
- The appliance is easily fabricated and well tolerated.
- Treatment changes shown in this case series were proclination of the upper and retroclination of the lower incisors. There is some decrease in SNB with an increase in anterior vertical dimension.
- A randomly allocated prospective study with long-term evaluation is required to fully evaluate the efficacy of this appliance.

## Acknowledgements

We would like to thank Mr Nigel Taylor from the Royal Surrey County Hospital, Guildford, who was involved in the treatment of some subjects, and Dr David Moles from the Eastman Dental Institute, London, for statistical advice.

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