

CLINICAL SECTION

Maurice Berman Prize 2003

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A crowded, high angle Class II case is presented and illustrated with stage clinical photographs. It was successfully treated with modified Twin Blocks and high pull headgear, extraction of all four first premolars, and upper and lower pre-adjusted edgewise appliances.

Key words: Orthodontics, clinical case report, modified twin blocks

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Introduction

The Maurice Berman Prize is awarded annually at the British Orthodontic Conference and entry is open to any member of the British Orthodontic Society. The prize is awarded for demonstrating, by stage photographs, the highest level of clinical ability in the treatment of a patient to an ideal result. The initial severity of the case, optimal facial and dental aesthetics, final occlusion, and quality and completeness of the photographic record are taken into account. The case successfully submitted for the award at the 2003 Bournemouth Conference is described.

Case report

A 12-year-old Caucasian female was referred by her General Dental Practitioner regarding crowding. She was a crowded, high angle Class II case.

Medically she was fit and well. Interestingly, both her older sister and mother had recently undergone orthodontic treatment for their Class II malocclusions. Her mother had a bilateral sagittal split osteotomy and was keen for her daughter to avoid orthognathic surgery.

Extra-oral assessment

She presented with a mild Class II skeletal pattern with bimaxillary retrusion, an increased maxillary mandibular planes angle and average lower anterior face height. Her lips were incompetent at rest, she had a high lip line with 2 mm gingival display on smiling and an obtuse nasiolabial angle.

Intra-oral assessment

She was in the permanent dentition with the exception of the third molars. She had an unrestored dentition and was caries free. Her oral was fair.

In the mandibular arch there was moderate crowding of the lower labial segment, the lower left canine was distally angulated, the lower right canine upright and the buccal segments were reasonably well aligned. In the maxillary arch there was severe crowding of the upper labial segment, the maxillary canines were mesially angulated and excluded buccally, and the buccal segments reasonably well aligned.

In occlusion, she had a Class II division 1 incisor relationship with a 10 mm overjet and a 4 mm incomplete overbite. The lower center line was correct and the upper displaced to the right by 1 mm. The molar and canine relationships were a full unit Class II bilaterally. There was a crossbite affecting the upper right lateral incisor and the lower right canine; there was no mandibular displacement detected. Pretreatment photographs are presented in Figure 1(a–I).

The Dental Health Component score on the Index of Treatment Need was 5a and the pretreatment weighted Peer Assessment Rating was 48.

Radiographic assessment

The panoramic radiograph confirmed the presence of all permanent teeth, with root length and bone levels within normal levels (Figure 2a,b). Analysis of the lateral cephalogram indicated a Class II skeletal pattern with bimaxillary retrusion. SNA was 74° and SNB was 70° with an adjusted ANB of 7.5°. The maxillary mandibular planes angle was increased and the lower anterior face height within normal limits. The lower incisors were retroclined at 86° and the upper incisors normal inclination at 108°. The cephalometric analysis is presented in Table 1.

Etiology

The etiology of the Class II discrepancy is an inherited skeletal pattern, which has resulted in Class II buccal

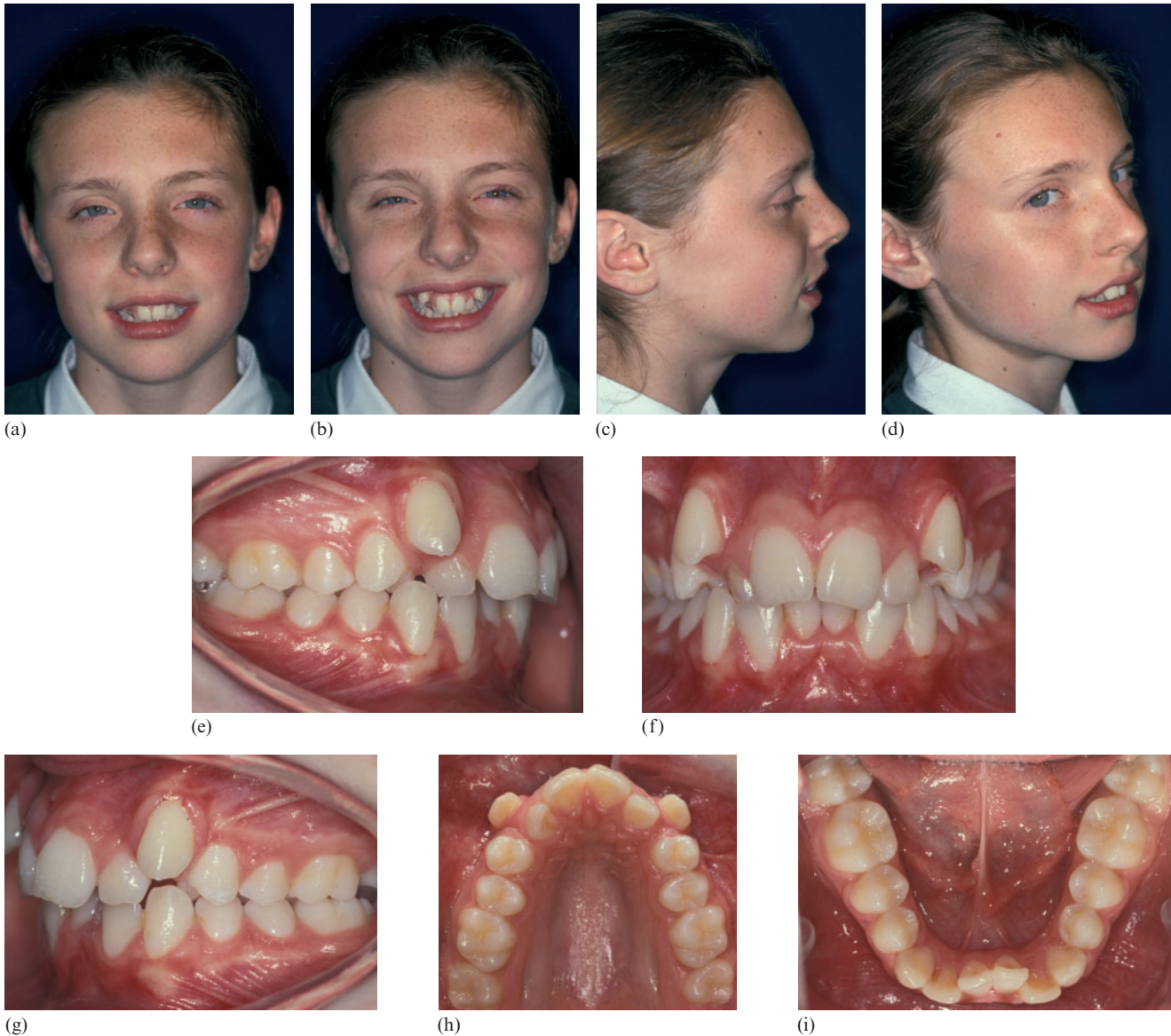


Figure 1 (a-i) Pretreatment photographs

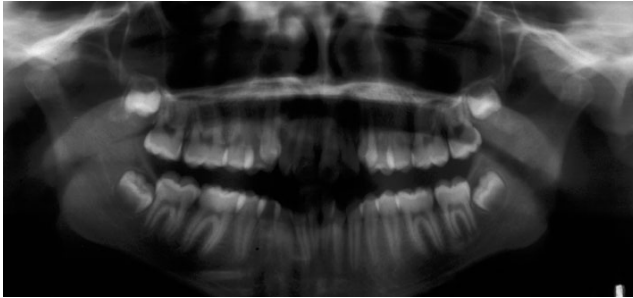
Table 1 Pretreatment, post-functional and post-treatment cephalometric analysis

	Pretreatment	Post-functional	Post-treatment
SNA (°)	74	74	74
SNB (°)	70	73	73
ANB (°)	4(7.5)	1(4.5)	1(4.5)
MMPA (°)	34	34	34
SnMxP (°)	9	9	9
LAFH/TAFH (%)	55	56	56
UI/MxP (°)	108	102	109
LI/MnP (°)	86	90	90
I/I Angle (°)	132	134	127
LI/Apo (mm)	0	3.5	3

segments and an increased overjet of 10 mm. The high maxillary mandibular planes angle of 34° has contributed to the incomplete overbite. The crowding is due to dento-alveolar disproportion and has resulted in buccal displacement of the maxillary canines.

Aims of treatment

- Sagittal correction of the malocclusion.
- Relief of crowding.
- Leveling and alignment of the dentition.
- Class I molar and canine relationship.
- Space closure.
- Achieve good functional, as well as static occlusion.



(a)



(b)

Figure 2 (a,b) Pretreatment radiographs*Treatment plan*

- Oral hygiene instruction.
- Modified Twin blocks combined with high pull headgear.
- Extraction of all four first premolars.
- Inclined clip over bite plane.
- Upper and lower pre-adjusted edgewise fixed appliances.
- Retention.

Rationale

Twin Blocks were used to provide sagittal correction of the malocclusion. High-pull headgear was fitted for vertical maxillary restraint and to prevent an increase in the lower anterior face height. Extraction of all four first premolars was required for the relief of crowding. An inclined clip-over bite plane was used to maintain the sagittal correction, during the transition from functional to fixed appliances. Pre-adjusted Edgewise appliances were used for arch alignment and leveling, space closure, achievement of buccal interdigitation and detailing of the occlusion.

Treatment progress

Following oral hygiene instruction modified Twin Blocks were fitted. These appliances incorporated torquing spurs to the maxillary central incisors to attempt to reduce the inevitable retroclination of the upper labial segment and high pull headgear was attached to flying headgear tubes for vertical maxillary control (Figure 3a–c). The Twin blocks were worn full time and the headgear, with a force of 400 g per side, was requested 14 hours per day. Patient compliance was excellent; therefore, extraction of all four first premolars was carried out during this phase of treatment. Buttons were then bonded disto-incisally to all four canines, which allowed elastic traction to be used to retract the



(a)



(b)



(c)

Figure 3 (a–c) Modified Twin Blocks



Figure 4 (a–c) Elastic traction to canines

canines into the first premolar extraction sites, thereby maximizing both the horizontal and vertical anchorage provided by the base plates of the Twin Blocks (Figure 4a–c). Post-functional treatment photographs were taken after 7 months of treatment, when the buccal segment relationship and overjet had been overcorrected (Figure 5a–e). A lateral cephalogram taken at this stage demonstrated sagittal correction with reduction in the ANB due mainly to an increase in SNB and the maintenance of the maxillary mandibular planes angle at 34° (Figure 6). The upper incisors had been retroclined by 6° and the lower incisors proclined by 4° . Two months later all four first molars were banded and an inclined clip-over bite plane was fitted to maintain the sagittal correction achieved, prior to the placement of

fixed appliances. Pre-adjusted Edgewise brackets (0.022×0.028 inch slot, Roth prescription) were bonded to both arches with lacebacks to all four canines. Alignment was commenced with 0.016-inch Sentalloy initially by passing the lower central incisors until there was sufficient space to align them (Figure 7a–e). The lower second molars were banded and upper and lower 0.018 \times 0.025 Sentalloy arch wires used in transition to upper and lower 0.019 \times 0.025 inch stainless steel working archwires. Final spaces were closed using nickel titanium closing springs and some light Class II elastics. A lateral cephalogram (Figure 8) taken near the end of treatment confirmed that the sagittal correction during the Twin Block phase of treatment had been maintained and that the incisor inclinations were within normal

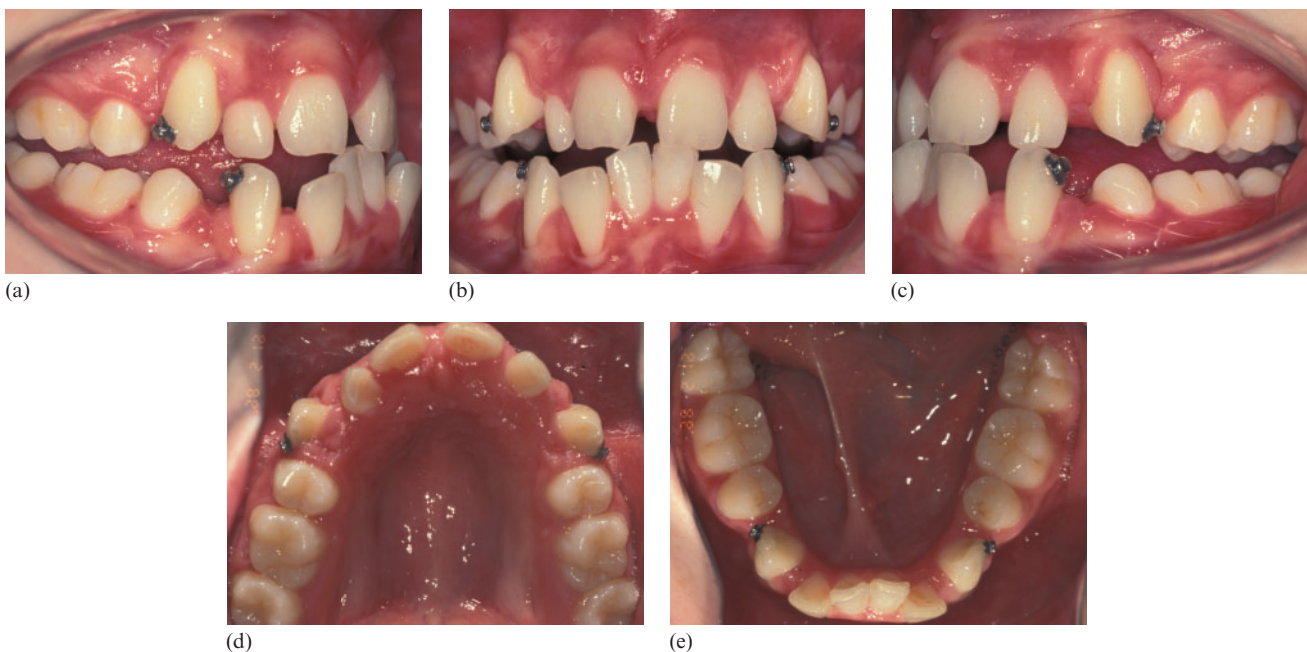


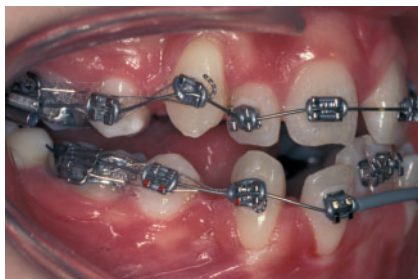
Figure 5 (a–e) Post-functional photographs



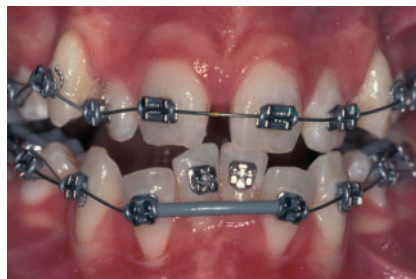
Figure 6 Post-functional lateral cephalogram



Figure 8 Near end of treatment lateral cephalogram



(a)



(b)



(c)



(d)

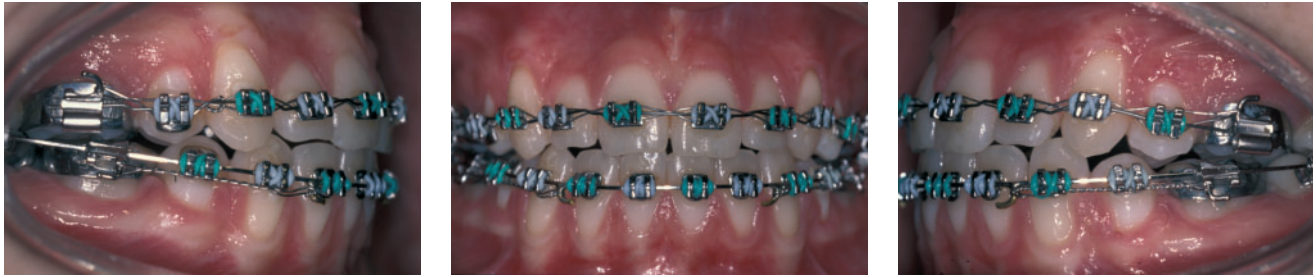


(e)

Figure 7 (a-e) Bond up



Figure 9 Near end of treatment panoramic radiograph



(a) (b) (c)

Figure 10 (a-c) Finishing wires



(a) (b) (c)



(d) (e) (f)



(g) (h) (i)

Figure 11 (a-i) Functional occlusion



Figure 12 (a-i) End of treatment photographs



Figure 13 Pretreatment (black) and post-treatment (red) cephalometric tracings superimposed on SN at sella



Figure 14 (a-i) Photographs taken 3 years post-debond

limits; the upper incisors at 109° and the lower incisors at 90° . A panoramic radiograph (Figure 9) was taken to assess root position. Upper and lower 0.014 inch regular stainless steel finishing wires were placed to tip both the upper lateral incisors and the upper left canine mesially and also to extrude both the upper second premolars (Figure 10a-c). To improve the buccal interdigitation the archwires were sectioned distally to the canines and blue box elastics used. Just prior to debond the functional occlusion was checked to ensure right and left canine guidance with absence of non-working side contacts and gentle posterior disclusion with anterior guidance in protrusion (Figure 11a-e). Following debond upper and lower Hawley retainers were fitted. The end of treatment photographs are presented in Figure 12a-i.

Case assessment

The patient presented with a Class II division 1 incisor relationship on a mild skeletal II base with bimaxillary retrognathia and increased maxillary mandibular planes angle. She had Class II buccal segments with an increased overjet and crowded labial segments. As a result of the Twin block phase of treatment both growth modification and dento-alveolar movement has contributed to the sagittal correction. Cephalometric superimposition demonstrated maxillary restraint, both horizontal and vertical mandibular growth or repositioning and a forward mandibular rotation (Figure 13). Dento-alveolar movement included proclination of the lower labial segment and mesial movement of the molars.

Extra-orally, her face has changed slightly as she looks less Skeletal II; however, she still has an element of bimaxillary retrusion. Her lips are now competent at rest. Intra-orally the crowding has been relieved, alignment has improved, the overjet has been reduced and the buccal segment relationship corrected. At the end of treatment, a good functional as well as static occlusion was achieved with canine guidance on lateral excursions and incisal guidance on protrusion, and no non-working side interferences. The prognosis for this case is good, as there is good buccal interdigitation, which should help to maintain the antero-posterior correction, and the lip competency should retain the overjet reduction.

Treatment took 33 months in total and the final PAR score was 3 with a percentage reduction in PAR score of 93.8%. The photographs in Figure 14a–i were taken 3 years post-debond and 1 year after the cessation of the retainers.

Acknowledgements

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