

Clinical Section

Orthologic Travel Award 1996

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Introduction

The Orthologic Prize is awarded to the candidate presenting the best two M.Orth examination cases, which are displayed at the Clinical Demonstrations section of the annual British Orthodontic Conference. The two cases successfully submitted for the award during the 1996 conference held in Scarborough are described: a Class III malocclusion and a Class II Division 1 malocclusion.

Case report 1

This 13-year-old girl was concerned about the appearance of her upper canine teeth which were erupting buccal to the arch (Fig. 1a-h). On examination, she presented with a Class III incisal relationship on a Skeletal I base with an increased lower anterior facial proportion and an increased Frankfort-mandibular planes angle. Intraorally all permanent teeth had erupted apart from the third molars. There was mild crowding (2 mm) in the lower arch with the lower incisors retroclined. In the upper arch there was severe crowding in the labial segment with the canines erupting buccal to the arch. The lateral incisors were retroclined and lying slightly palatal to the arch. Both the upper and lower buccal segments were acceptably aligned.

In occlusion there was a reverse overjet of -2 mm measured on the right central incisors whilst the lateral incisors were in cross-bite by -4 mm. The overbite was reduced and incomplete apart from the mesial tip of the upper left central incisor which just met its lower counterpart. The centre lines were almost coincident. All teeth from the upper right second molar to the upper left lateral incisor were in cross-bite. The first molars were a quarter of a unit Class III on the right and Class I on the left. No displacement was detected on closure in to ICP.

A panoramic radiograph (Fig. 1) showed that all four third molars were developing normally. It also revealed that the roots of the upper and lower incisors were short and spindly, and the patient was warned of possible root resorption during treatment. Cephalometric analysis (Table 1) demonstrated the presence of a mild Skeletal Class III relationship. There was an increased lower anterior facial proportion and a slightly increased maxillary-mandibular planes angle. The upper and lower incisors were normally angulated to their bases.

Pretreatment IOTN (DHC) = 4d
Pretreatment PAR = 39

The aims of treatment were:

- (1) to relieve the crowding through the loss of all four first premolars;
- (2) to level and align the arches;
- (3) to correct the teeth in cross-bite by retraction of the lower labial segment, proclination of the upper labial segment and expansion of the upper arch;
- (4) to close any residual spaces;
- (5) to attain Class I incisal and buccal segment relationships;
- (6) retention and monitor 3rd molar development.

The treatment plan involved the extraction all four first premolars under local anaesthetic followed by the use of upper and lower pre-adjusted Edgewise fixed appliances (0.022 × 0.028-inch slot). The upper incisor brackets and upper molar bands were Roth prescription, whilst all other brackets and bands used were Andrews prescription.

Treatment consisted of 19 visits over a 24-month period and involved the extensive use of Class III intermaxillary elastics in order to correct the incisor relationship. Following initial alignment, a 0.018-inch stainless steel archwire was placed in the upper arch with circle hooks mesial to the upper first molars to act as stops. This harnessed the Class III traction to correct the overjet, whilst maintaining the arch length. Once the incisal relationship had been corrected, 0.019 × 0.025-inch stainless steel working archwires were placed and any residual spaces were closed in a conventional manner while still maintaining the Class III traction. Correction of the posterior cross-bite was achieved through expansion using the upper archwires. Following space closure a 0.021 × 0.025-inch stainless steel archwire was placed in the upper arch to fully express the torque in the upper incisor brackets. Upper and lower removable retainers were fitted at debond (Fig. 3a-h).

Case 1 assessment

This 13-year-old patient presented with a mild Class III Skeletal pattern. Although one could not be sure about any remaining facial growth it was felt that she could be treated with orthodontics alone. This was on the basis that the sagittal discrepancy was mild and that being a 13-year-old girl, significant unfavourable growth was unlikely.

During treatment the patient wore her Class III elastics extremely well. Whilst this allowed her incisal relationship to be corrected it also resulted in some extrusion of her upper molars as confirmed by cephalometric super-



FIG. 1 (a-h) Case 1 pretreatment records.

impositions (Fig. 2). The occlusion of the buccal segments could have been improved at the end of treatment by banding the second molars. However a decision was made not to prolong the treatment any further in view of the oral hygiene, and more importantly the considerable root resorption which had occurred on all teeth included in the appliance (Fig. 3i). The upper arch was eventually fitted with a Begg retainer which may help the buccal occlusion to interdigitate better (Fig. 3h).

At debond, both left and right lateral excursions of the mandible exhibit canine guidance with no working/non-working side interferences present:

Post-treatment weighted PAR score = 1
 Percentage reduction in PAR = 97%

Case report 2

This 13-year-old girl was concerned with her upper midline diastema and deep bite. At 10 years of age she had received orthodontic treatment whilst in her mixed dentition for reduction of a large overjet (14 mm). A Twin Block

FIG. 2 Lateral cephalogram tracing superimpositions: case 1 (SN at S).



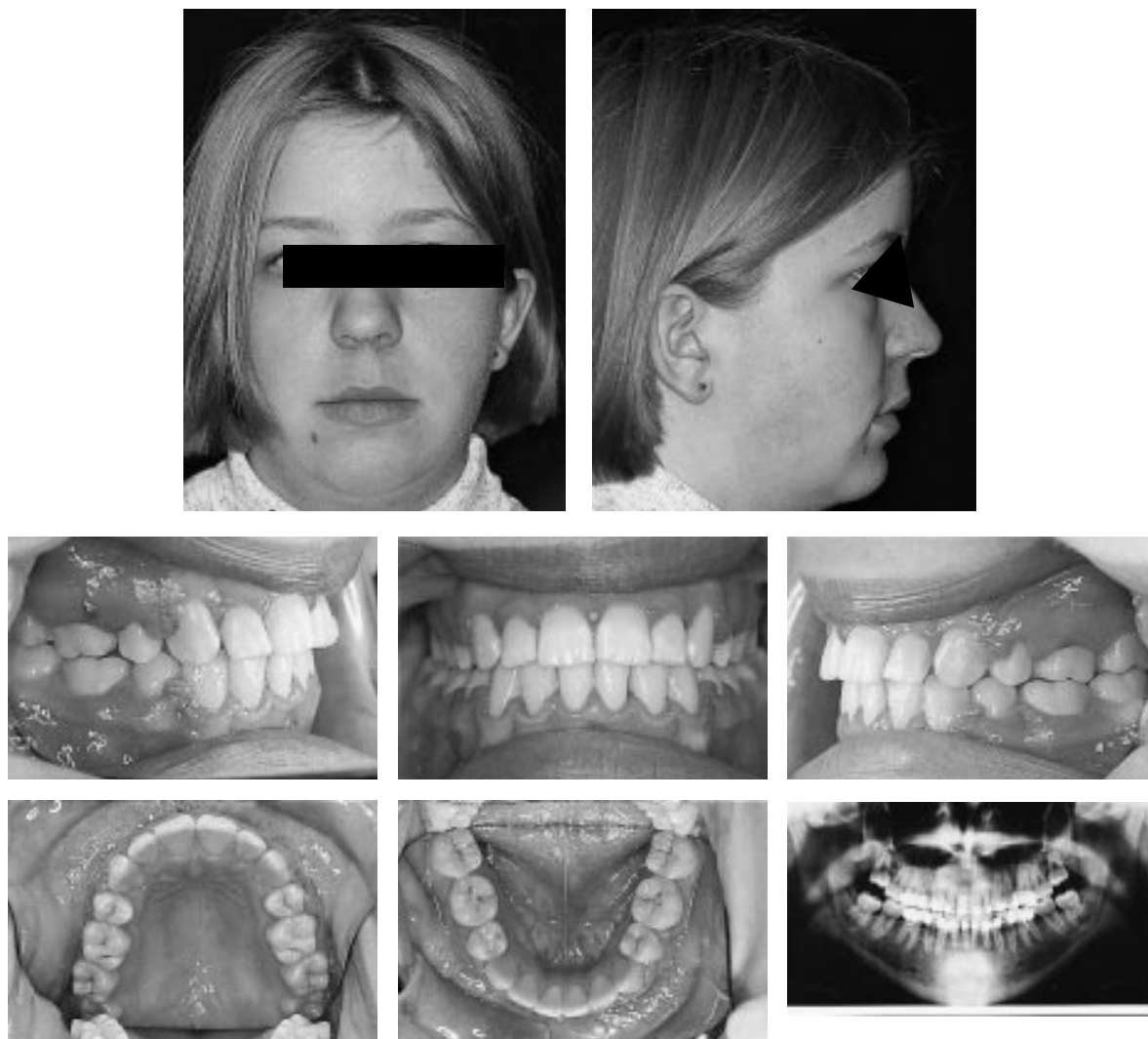


FIG. 3 (a-h) Case 1 post-treatment records.

functional appliance and headgear was used initially, followed by a retention period wearing headgear to banded upper first molars. This successfully reduced the overjet to 4 mm, but the overjet subsequently increased back to 8 mm on cessation of wearing the functional appliance.

By 12 years both the upper permanent canines were diagnosed as ectopically positioned, high up in the palate (Fig. 4a-b). The intention was to expose these teeth to

facilitate orthodontic alignment. However, when the canines were exposed under general anaesthetic, the oral surgeons considered that they were too unfavourably positioned for alignment and they were removed. The lower first premolars were also removed at the same operation in order to relieve the lower arch crowding.

By 13 years the patient presented with a moderate Class II division 1 incisal relationship on a mild Class II Skeletal pattern (Fig. 5 a-g) with an average lower anterior facial proportion and an average Frankfort-mandibular planes angle. The lips were habitually held apart at rest with the lower lip functioning behind the upper central incisors. The upper lip was short relative to the upper central incisors whilst the naso-labial angle was average.

Intra-orally, $\overline{c1c}$ were retained and $\overline{3|3}$ and $\overline{4|4}$ had been extracted previously. Otherwise all permanent teeth had erupted apart from the $\overline{7|}$ and the third molars which were developing normally. The lower labial segment was mildly spaced with the lower canines upright and rotated disto-lingually. The upper labial segment was spaced and proclined with a midline diastema of 3 mm. The upper right central and lateral incisors were rotated mesio-

TABLE 1 Case 1

	Pretreatment	Post-treatment
SNA (degrees)	84	83.5
SNB (degrees)	82.5	82
ANB (degrees)	1.5 (adjusted 0.5)	1.5 (adjusted 0.75)
SN / MxP (degrees)	5	5
MxP / MnP (degrees)	33	32
LAFH (per cent)	59	61
UI / MxP (degrees)	104	117
LI / MnP (degrees)	88	86
Wits	-7	-5

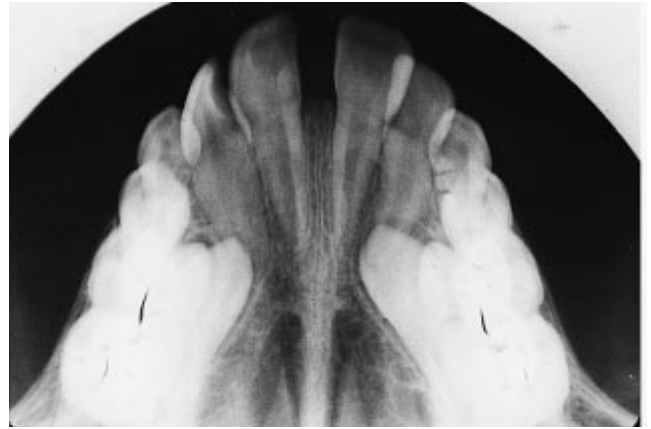
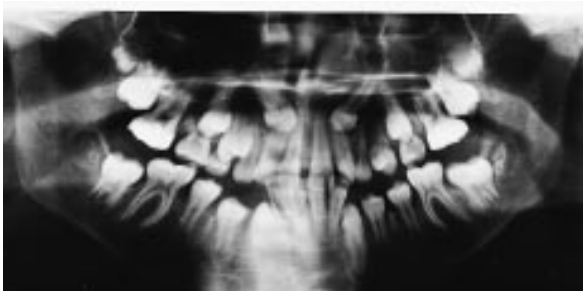


FIG. 4 (a,b) Case 2 pretreatment radiographs.



FIG. 5 (a-g) Case 2 pre-appliance records.



FIG. 6 (a-h) Case 2 post-treatment records.

labially. In occlusion, there was a Class II division 1 incisal relationship with an overjet of 8 mm. The overbite was increased and complete to the palate. The upper and lower centre lines were coincident with the facial midline. The first molars were a quarter of a unit Class III on the left and right. No displacement was detected on closure into ICP.

Cephalometric analysis (Table 2) revealed the presence of a Skeletal Class I relationship. There was an average

TABLE 2 Case 2

	Pretreatment	Post-treatment
SNA (degrees)	82	81
SNB (degrees)	79	78.5
ANB (degrees)	3	2.5
SN / MxP (degrees)	4	3.5
Mx / Mn (degrees)	33	32
LAFH (per cent)	55	56
Ui / MxP (degrees)	119	108
Li / MnP (degrees)	85	92
Wits (mm)	-3.5	-1
Li / NPo (degrees)	3.5	2

facial proportion and an increased maxillary-mandibular planes angle. The upper incisors were proclined at, whilst the lower incisors were retroclined.

Pretreatment IOTN (DHC) = 4a
Pretreatment PAR = 25

The aims of treatment were:

- (1) to create space for overjet reduction through loss of the retained deciduous canines;
- (2) to level and align the arches;
- (3) to reduce the overbite and overjet;
- (4) to close any residual spaces;
- (5) to attain Class I incisal and buccal segment relationships;
- (6) retention with removable retainers and an upper fixed bonded retainer.

The treatment plan involved the extraction of *clc* under local anaesthetic. Then an upper removable appliance with a flat anterior bite plane and lower pre-adjusted fixed Edgewise appliance (0.022 × 0.028-inch slot) was fitted to facilitate reduction of the overbite. Once this had been

achieved, an upper pre-adjusted Edgewise fixed appliance was fitted and Class II intermaxillary traction was used to complete the treatment aims.

The lower fixed appliance had Andrews prescription brackets and bands, while the upper fixed appliance had a combination of Roth prescription incisor brackets and molar bands, and Andrews prescription brackets on the premolars.

When the upper fixed appliance was placed, cuspid brackets were placed on the first premolars in order to give these teeth adequate tip because they were to replace the canines. Once the 0.019 × 0.025-inch stainless steel working archwires had been placed, conventional (i.e. sliding) space-closing mechanics were instigated, but the 42|24 spaces proved difficult to close completely. Therefore, an upper 0.014-inch stainless steel archwire was placed with space closing loops to close any residual space and intrude 21|12 slightly. A satisfactory outcome was attained and upper and lower vacuum formed retainers and an upper fixed 0.0175-inch multi-strand wire retainer were fitted. The upper fixed retainer will be left *in situ* to ensure that the midline diastema that the patient complained of at presentation does not reopen (Fig. 6a–h).

Case 2 assessment

This patient had a chronic digit sucking habit in her mixed dentition. This would account for the large overjet on what was essentially a skeletal 1 base. The use of a functional appliance and headgear helped to reduce the overjet to 4 mm, and correct the molar relationship through a combination of tipping teeth and possibly some maxillary restraint and unimpeded mandibular growth. Headgear to molar bands was then worn at night whilst awaiting the eruption of the permanent dentition. This helped to maintain the molar correction, but failed to prevent the overjet from relapsing back to 8 mm. This rebound in overjet occurred even though the patient had stopped her digit sucking habit, and may be attributable to the incompetent lip seal and short upper lip length relative to the upper incisors.

The cephalometric superimpositions (Fig. 7) reveal that the fixed appliance treatment corrected the overbite through a combination of intrusion and proclination of the lower incisors and intrusion of the upper incisors. The overjet was reduced principally by tipping and bodily retraction of the upper incisors.

The patient was treated with her upper first premolars replacing her permanent canines. It proved difficult to completely close the space between the upper lateral incisors and first premolars. The residual space is often a reflection of the upper first premolars having a narrower mesio-distal width than the permanent canines. Slight intrusion of the lower right canine may have helped close

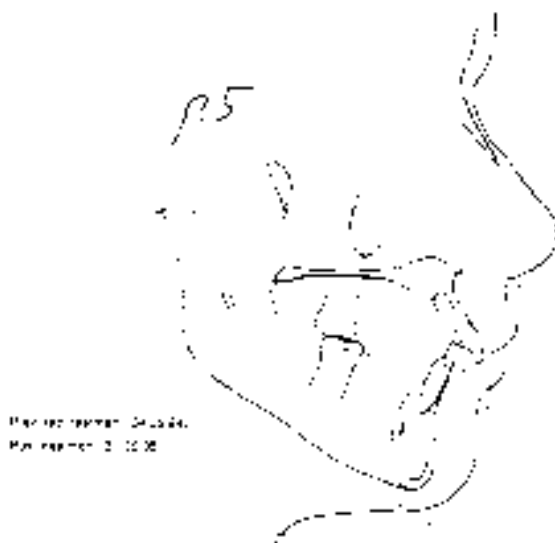


FIG. 7 Lateral cephalogram tracing superimpositions: case 2 (SN at S).

the residual space distal to the upper right lateral incisor. However, complete space closure was not achieved on the right and a small composite build up was placed mesial to the upper first premolar at debond.

The oral surgeons chose to remove the permanent canines at the time of exposure because they were considered to be in unfavourable positions to be brought down orthodontically. However, the radiographs available (Fig. 3j–k) show that although the canines were quite high up they were not that unfavourable. The apices were in a good position and the crowns were only just overlapping the lateral incisor roots on the OPG. An alternative treatment option would therefore have been to expose the permanent canines and allow them to erupt by themselves. If they had started to erupt, they could have been brought into the line of the arch orthodontically following extraction of the upper first premolars. If the canines had not begun to erupt they could have been surgically removed.

Post-treatment weighted PAR score	= 2
Percentage PAR reduction	= 92%

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