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Forestadent Travel Award

J. I. RUSSELL. B.D.S., PH.D., F.D.S.R.C.P.S.(GLASG.), D.D.ORTH.R.C.P.S.(GLASG.), M.ORTH. RCS. (ENG.)
Cleft Palate Unit, Royal Liverpool Children's NHS Trust, Alder Hey Hospital, Eaton Rd, Liverpool L12 2AP, UK.

Introduction

The Forestadent Young Specialist Prize is awarded following the submission of case records of three treated cases displayed in the Clinical Demonstrations section at the annual British Orthodontic Conference. This award is given to support a visit to an overseas orthodontic centre or conference. Cases must have been treated by the orthodontic practitioner within 12 years of initial orthodontic qualification. The three cases presented for the award during the 1998 conference in Torquay are described.

Case Report 1

An 11-year-old Causasian male was referred by his general dental practitioner. He was concerned about the prominence and irregularity of his upper anterior teeth. On examination he presented with a Class II division 1 malocclusion on a Class II Skeletal base. There was mild mandibular retrognathia. The Frankfort-mandibular planes angle and lower anterior face height proportion were average. The lips were incompetent, habitually apart, the upper central incisors resting on the lower lip. There was no history of digit sucking.

Examination of the dentition revealed the permanent teeth, with the exception of 5 | 5, 7| and the third molars, to be erupted. E | E were retained, 6 | 6 were hypoplastic, but the dentition was caries free, and the oral hygiene and gingival condition were good. There was mild crowding of the lower arch with the lower labial segment at a normal inclination. The upper arch was crowded with shortage of space for the erupting 3 | 3. The upper canines were buccally displaced and the upper central incisors were mesiolabially rotated and proclined. The overjet was increased at 9 mm, with an incomplete overbite of 2 mm. The upper centreline was coincident with the facial plane, whilst the lower centreline was 1 mm to the right. The molar relationship was Class II on the right and ¾ unit Class II on the left (Fig. 1a–g).

The Panoramic radiograph showed the presence of all unerupted teeth, including third molars with good size crowns. There was no radiographic evidence of caries. The lateral cephalogram (Table 1) demonstrated the patient's skeletal II base, increased maxillary-mandibular planes angle and proclined upper incisors.

The aims of treatment were:

(1) provision of space for upper arch alignment;
(2) retraction of the upper labial segment, while maintaining the existing lower incisor position, to camouflage the underlying skeletal discrepancy;
(3) obtain Class I molar ($\frac{7 \mid 7}{6 \mid 6}$) and incisor relationships;
(4) co-ordination of both arches, improving the crossbite tendencies.

The treatment plan was as follows:

(1) transpalatal arch to bands 7 | 7 for anchorage reinforcement;
(2) extraction 6E | E6;
(3) upper and lower fixed appliances for alignment, levelling, and retraction of the upper labial segment;
(4) headgear to be used for anchorage reinforcement if required.

Treatment was completed with 17 visits over a 19-month period. The transpalatal arch alone was worn during the first 3 months until the extractions were completed and the 5 | 5 had erupted. An upper pre-adjusted Edgewise fixed appliance (0·022 × 0·028-inch Roth prescription bands and brackets) was then placed. Upper canine retraction was achieved by means of lace-backs and the upper incisor attachments gradually engaged. Seven months into treatment a lower pre-adjusted Edgewise fixed appliance (Roth prescription bands and brackets, lower incisor brackets with 6-degree lingual crown torque) was provided. Anchorage was reassessed throughout treatment but headgear was not needed. Co-ordinated 0·019 × 0·025-inch stainless steel working archwires were used in the last 4 months of treatment. The upper archwire had additional buccal root torque 2 | 2. Class III elastics were also used in the last three

TABLE 1 *Case 1: pre- and post-treatment cephalometric analysis*

	Pretreatment	Post-treatment
SNA (°)	80	79
SNB (°)	73	73
ANB (°)	7	6
MMPA (°)	33	32
UI to Mx (°)	116	100
LI to Mn (°)	95	96
Interincisal angle (°)	116	132
LI edge to UI centroid (mm)	−2	+2
SN to LI (°)	77	79
Lower face height (as % of total)	55	55·5
LI to APog plane (mm)	+1	+3
Lower lip to E plane (mm)	−2	−3

TABLE 2 *Case 1: pre- and post-treatment occlusal changes*

	Pretreatment	Post-treatment
Overjet (mm)	9	3
Overbite (mm)	2	2
Incisor relationship	Class II div 1	Class I
Molar relationship	Class II ¾ Class II	Class I (7/6)
IOTN aesthetic component	9	1
IOTN dental health component	4a	1
Weighted PAR score	31	1
% Reduction in PAR		97
Category of improvement		Greatly improved

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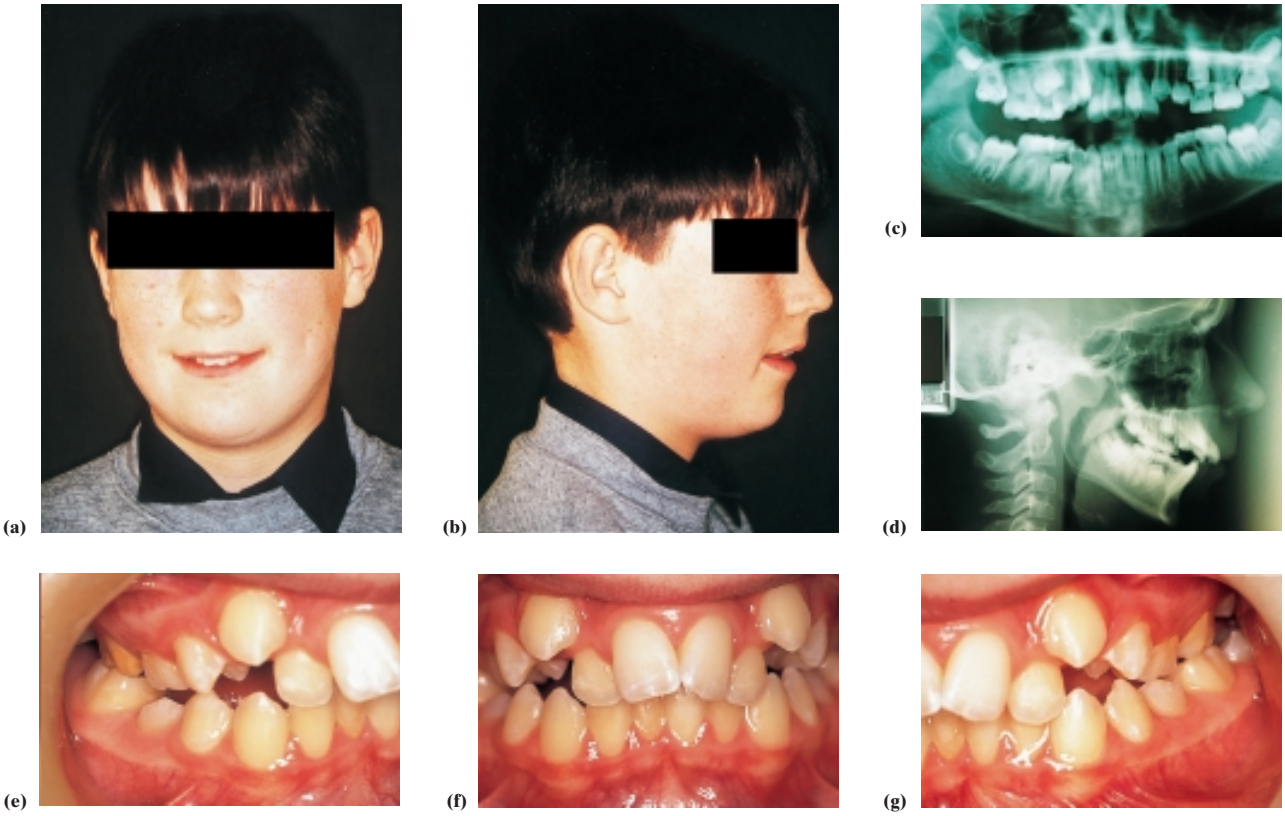

FIG. 1 (a–g) Case report 1: pretreatment records.

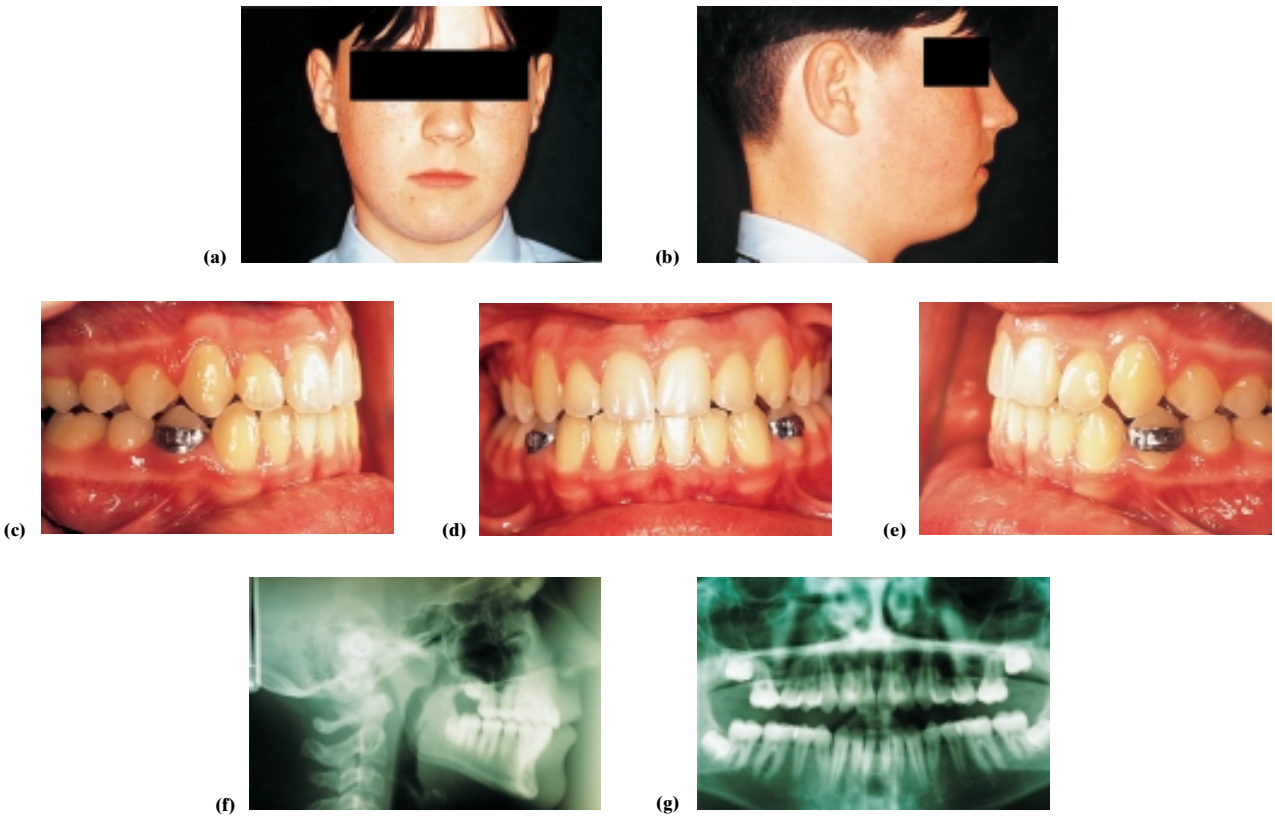

FIG. 2 (a–g) Case report 1: post-treatment records.

FIG. 3 Case report 1: cephalometric superimposition.

months before debond. Following debond, retention in the form of an upper Hawley retainer and lower fixed lingual arch was provided.

Case 1 Assessment

During treatment the overjet reduction and improvement in interincisal angle occurred principally as a result of upper incisor retraction to camouflage the skeletal discrepancy. The lower incisors were minimally proclined. Additionally, the cephalometric superimpositions revealed that there was considerable downward and forward growth of both the maxilla and mandible. Maxillary growth was a little less than that of the mandible and this resulted in a small reduction in ANB angle (Fig. 3).

The upper first molar extraction spaces were closed, partly by bodily forward movement of the upper second molars. The crossbite tendencies were also corrected. At the completion of treatment the upper incisors had been brought within lower lip control and, consequently, it was anticipated that the improved incisor relation would remain relatively stable following retention.

Case Report 2

This 12-year-old girl, at boarding school locally, was referred by her General Dental Practitioner. She was unhappy about the appearance of her top front teeth. On examination she presented with a Class II division 2 malocclusion on a Class II Skeletal base. There was mild mandibular retrognathia. The Frankfort-mandibular planes angle and lower anterior face height proportion were average. The lips were competent. There was no history of digit sucking or other habits.

Examination of the dentition revealed the permanent teeth, with the exception of the third molars and upper second molars to be erupted. The teeth were caries and restoration free, and the oral hygiene and gingival condition were good. There was mild generalized fluorosis. The lower arch was well aligned with mild spacing in the lower premolar regions. The lower labial segment was at a normal inclination. The anterior segment of the upper arch was crowded with 2 | 2 proclined. The upper central incisors were retroclined. The overjet was increased to 7 mm, measured to | 2. The overbite was increased to 7 mm and was complete to the palatal mucosa at the gingival margin 21 | 12. Both upper and lower centrelines were coincident with the midfacial plane. The molar relationship was ¾ unit Class II on the right and Class II on the left (Fig. 4a–g).

The Panoramic radiograph showed the presence of all unerupted teeth, including third molars. There was no radiographic evidence of caries. The lateral cephalogram (Table 3) demonstrated the patient's mild skeletal II base and average maxillary-mandibular planes angle. The upper central incisors were retroclined with respect to the maxillary plane, while the lower incisors were within the normal range relative to the mandibular plane. The interincisal angle was increased.

The aims of treatment were:

(1) provision of space for upper arch alignment;
(2) levelling of both arches for overbite reduction, minimizing lower incisor proclination as far as possible;
(3) torquing of upper central incisors to improve interincisal angle;
(4) obtain Class I molar and incisor relationships.

The treatment plan was as follows:

(1) headgear to 6 | 6 for distal movement;
(2) upper removable appliance with flat anterior bite-plane to reduce the overbite and springs to encourage distal movement of 6 | 6;
(3) lower fixed appliance to level lower arch;
(4) upper fixed appliance for upper arch alignment, and torquing of 1 | 1.

TABLE 3 *Case 2: pre- and post-treatment cephalometric analysis*

	Pretreatment	Post-treatment
SNA (°)	81	80
SNB (°)	75	77
ANB (°)	6	3
MMPA (°)	26	25
UI to Mx (°)	90	107
LI to Mn (°)	95	97
Interincisal angle (°)	149	131
LI edge to UI centroid (mm)	−2	+3
SN to LI (°)	77	80
Lower face height (as % of total)	53·5	54
LI to APog plane (mm)	−2	0
Lower lip to E plane (mm)	−4	−5

TABLE 4 *Case 2: pre- and post-treatment occlusal changes*

	Pre-treatment	Post-treatment
Overjet (mm)	7	2
Overbite (mm)	7	3
Incisor relationship	Class II div 2	Class I
Molar relationship	¾ Class II/Class II	Class I
IOTN aesthetic component	5	1
IOTN dental health component	4a	1
Weighted PAR score	22	1
% reduction in PAR		95
Category of improvement		Improved

FIG. 4 (a–g) Case report 2: pretreatment records.

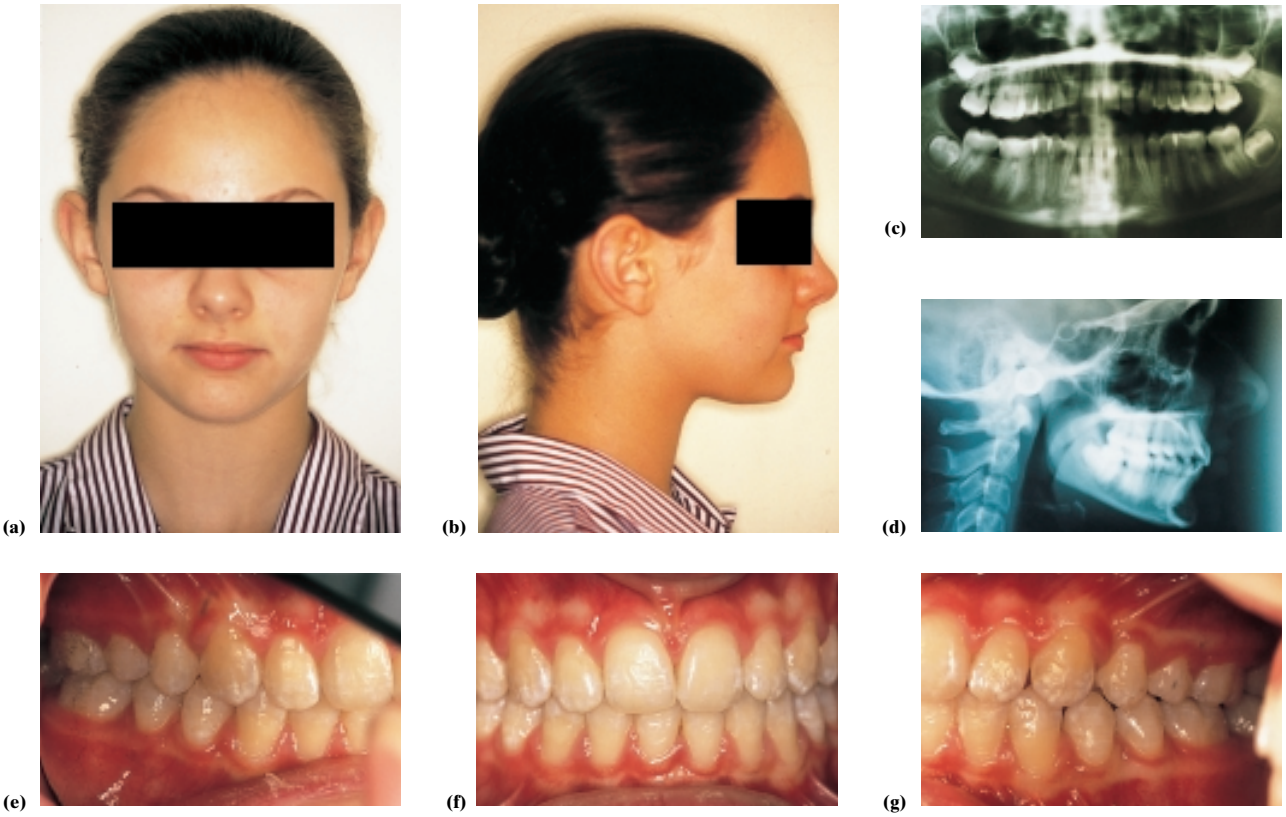

FIG. 5 (a–g) Case report 2: post-treatment records.

FIG. 6 Case report 1: cephalometric superimposition.

Treatment was completed with 15 visits over a 19-month period. It was started with combination safety headgear to Roth prescription bands 6 | 6, together with the upper removable appliance. After 4 months the molar relations were nearing Class I and a lower pre-adjusted Edgewise fixed appliance (Roth prescription bands and brackets, lower incisor brackets with 6-degree lingual crown torque) was provided. Two months later, a lower 0·018-inch stainless steel archwire was placed, and the upper removable appliance was discontinued to permit spontaneous movement of upper premolars and canines into the available space. At the subsequent appointment Roth prescription brackets were placed on the upper premolars and canines, with supertorque (17-degree palatal root torque in 1 | 1) brackets to the upper incisors. Once upper and lower 0·019 × 0·025-inch stainless steel working arches had been placed, upper arch space was closed by means of elastic chain in the 3 months prior to debond. Combination headgear continued throughout treatment. A unilateral Class II intermaxillary elastic was worn for two months towards completion. Following fixed appliance removal an upper removable Hawley retainer was provided. Retention was not used in the lower arch (Fig. 5a–g).

Case 2 Assessment

Excellent co-operation with headgear and appliance wear enabled treatment to be completed in 19 months despite the restriction on appointments to term-time only. The cephalometric superimpositions revealed that there was little growth of the maxilla but favourable downward and forward growth of the mandible during treatment. This contributed to a reduction in ANB angle. The upper incisors were torqued considerably. This was the principal cause of the improved interincisal angle. The lower arch was levelled by upward and mesial movement of the lower first permanent molars with intrusion and a little proclination of the lower incisors (Fig. 6).

Case Report 3

This 12-year-old boy was referred by his General Dental Practitioner. He was concerned that his top teeth stuck out. On examination he presented with a Class II division 1 malocclusion on a Class II Skeletal base. The Frankfort-mandibular planes angle and lower anterior face height proportion were average. The lips were incompetent, apart at rest, with the upper central incisors lying on the lower lip. There was no history of digit sucking or other habits.

Examination of the dentition revealed the permanent teeth, with the exception of the third molars to be erupted. The oral hygiene and gingival condition were good. Caries was controlled with small occlusal amalgam restorations in all four first permanent molars. The lower arch was well aligned with a small space in the lower left premolar region. The lower labial segment was at a normal inclination. The anterior segment of the upper arch was spaced and a little proclined. The overjet was increased to 8 mm. The overbite was increased to 5 mm and was complete to the palatal mucosa at the gingival margin 1 | 1. The upper centreline was coincident with the midfacial plane. The lower centreline was 3 mm to the left. The molar relationship was Class I on the right and Class II on the left. There was a scissors bite involving the premolars on the right side. There was a mandibular displacement on closure, with initial contact on the right premolars, followed by displacement of 1 mm to the left on closure into the intercuspal position (Fig. 7a–g).

The Panoramic radiograph showed the presence of third molars. There was no radiographic evidence of caries. The lateral cephalogram (Table 5) demonstrated the patient's mild skeletal II base and average maxillary-mandibular planes angle. The upper central incisors were a little more proclined with respect to the maxillary plane than the average, but within the normal range. The lower incisors were normally inclined. The interincisal angle was average.

The aims of treatment were:

1. Restrain the maxillary dentition and forward maxillary growth, while maintaining the lower incisor inclination. Together with mandibular growth, aim to create Class I incisor and molar relations.

TABLE 5 *Case 3: pre- and post-treatment cephalometric analysis*

	Pretreatment	Post-treatment
SNA (°)	84	82
SNB (°)	78	79
ANB (°)	6	3
MMPA (°)	25	23
UI to Mx (°)	113	111
LI to Mn (°)	94	94
Interincisal angle (°)	128	132
LI edge to UI centroid (mm)	−1	+3
SN to LI (°)	82	82
Lower face height (as % of total)	56	57·5
LI to APog plane (mm)	+2	+3
Lower lip to E plane (mm)	+2	+1

TABLE 6 *Case 3: pre- and post-treatment occlusal changes*

	Pre-treatment	Post-treatment
Overjet (mm)	8	3
Overbite (mm)	5	2
Incisor relationship	Class II div 1	Class I
Molar relationship	Class I / Class II	Class I
IOTN aesthetic component	6	1
IOTN dental health component	4a	1
Weighted PAR score	34	1
% reduction in PAR		97
Category of improvement		Greatly improved

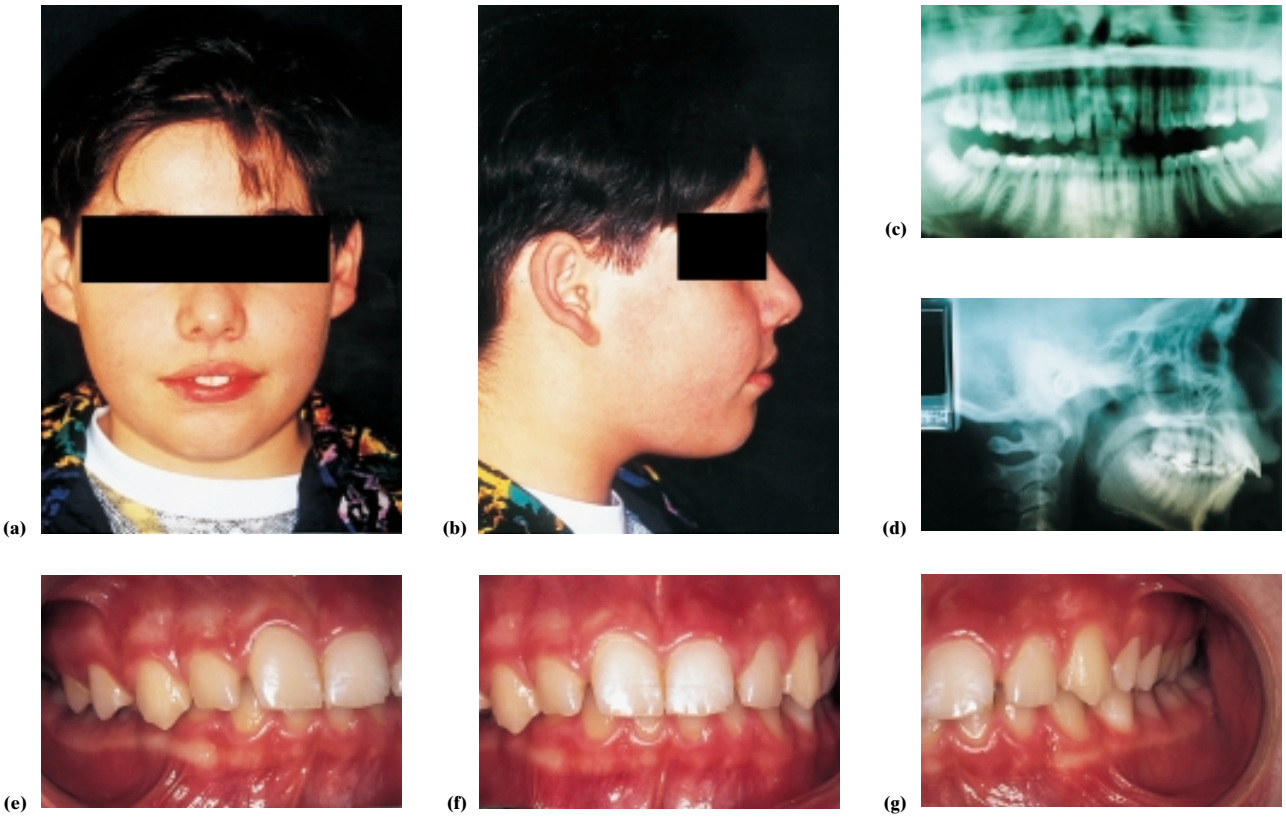

FIG. 7 (a–g) Case report 3: pretreatment records.

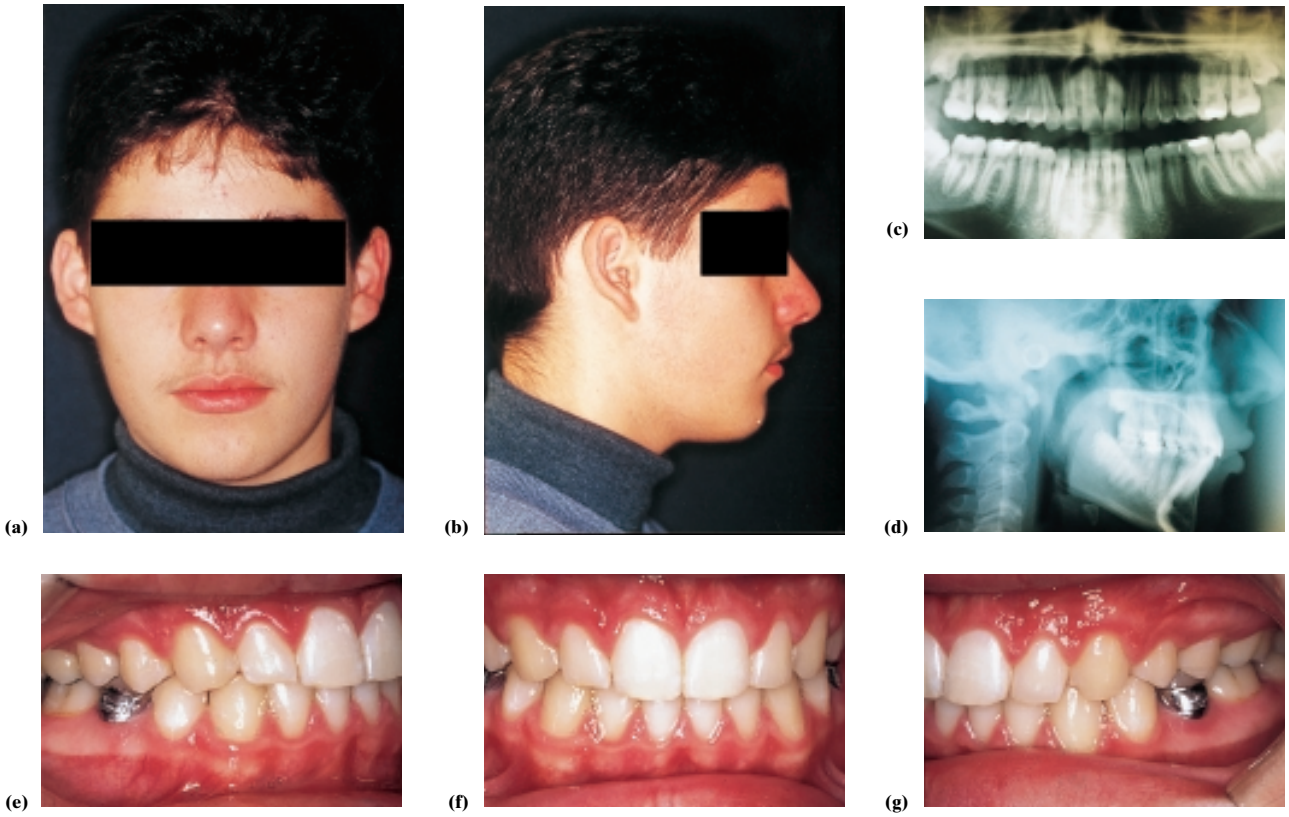

FIG. 8 (a–g) Case report 3: post-treatment records.

FIG. 9 Case report 3: cephalometric superimposition.

2. Alignment and levelling with co-ordination of both arches, correcting the scissors bite and mandibular displacement on closure.
3. Space closure.

The treatment plan was as follows:

1. Headgear to upper removable appliance with cribs to upper first molars and upper first premolars, and a flat anterior bite plane.
2. Review regarding extraction of $\frac{7 \mid 7}{}$ depending on progress.
3. Lower fixed appliance for alignment, levelling, and arch co-ordination.
4. Upper fixed appliance with continued headgear support to retract the upper labial segment, align, and co-ordinate the upper arch and close space.

Treatment was completed with 22 visits over a 27-month period. It was started with safety high-pull headgear to an upper removable *en-masse* appliance (cribs $\frac{4 \mid 4}{}$, cribs with tubes for extra-oral traction $\frac{6 \mid 6}{}$, and a flat anterior bite plane. After 3 months the molar relations were improving and a lower pre-adjusted Edgewise fixed appliance (Roth prescription bands and brackets) was provided. The lower archwires were gently expanded in the lower premolar regions to reduce the scissors bite. A second upper removable appliance with an increased bite plane and a T-spring to expand $\frac{6 \mid}{}$ was provided 10 months into treatment.

By 13 months into treatment, the right molar relation was Class III, the left Class I. An upper pre-adjusted Edgewise fixed appliance (Roth prescription bands and brackets) was then provided. Thereafter, headgear was continued as required to maintain the molar anchorage. Once in an upper 0·019 × 0·025-inch stainless steel working arch space was closed and the upper labial segment retracted using nickel titanium closing springs the upper incisors. Correction of the molar relation on the right and of the centreline relationships was by means of a right unilateral Class III intermaxillary elastic together with an anterior cross-elastic from upper right canine to lower left canine, which were worn for 5 months towards completion. Following fixed appliance removal an upper removable Begg-type retainer was provided together with a fixed lower lingual arch to bands on the lower second premolars (Fig. 8a–g).

Case 3 Assessment

Excellent wear of extra-oral traction to the maxillary arch resulted in little maxillary growth during treatment. Together with substantial mandibular growth, this resulted in an improved skeletal pattern, and enabled the creation of a Class I incisor and molar relationship. There was little change in incisor angulation and the extraction of upper second molars was not required.

The scissors bite of the right premolars was corrected principally by contraction of the upper arch, but also by a little lower premolar expansion. The centreline discrepancy and asymmetric molar relationships were corrected partly by elimination of the scissors bite and mandibular displacement, and partly by unilateral Class III elastic and anterior cross-elastic wear.

At the completion of treatment the upper incisors had been brought within lower lip control and consequently it was anticipated that the improved incisor relation would remain relatively stable following retention (Fig. 9).

Acknowledgements

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