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Case Report

An extended three-stage treatment to correct a severe skeletal and dental discrepancy

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This case report was one of the winners of the Australasian Edgewise Study Group awards for 1997.

A report of a case of extended treatment of a patient with severe mandibular retrognathism and an Angle Class II division I malocclusion. Initial fixed appliance treatment reduced incisor protrusion. A second phase utilising a Teuscher appliance achieved improved facial and dental relations through excellent mandibular growth. A third phase of fixed Edgewise treatment finalised dental relations.

Aust J Orthod 1999; 15: 320–4

Introduction

An extended three-stage treatment involving functional and fixed appliances to correct a severe skeletal and dental discrepancy.

Medical and dental history

The patient was a healthy female aged 8 years and 6 months. She was referred by her general dentist concerned about previous treatment with a Schwarz and Jackson appliance. The patient had a thumb-sucking habit.

Clinical examination

The patient (Figures 1a and b) showed good facial symmetry, with a retrognathic pattern due to severe mandibular retrusion. She had incompetent lips and a lower lip trap, producing significant incisor display.

Intra-oral examination (Figures 2a, b and c) showed an Angle Class II division 1 malocclusion in the mixed dentition.

A 3 mm to 4 mm diastema was evident between the upper central incisors, with the maxillary lateral incisors erupting with peg-shaped crowns. Within the mandibular arch, incisors were spaced; however, crowding of the unerupted canines was noted. Overbite was 4 mm and overjet 12 mm.

Radiographic examination

Cephalometric analysis (Figure 3, Table I) indicated a Class II skeletal pattern, with severe mandibular retrusion. Lower incisors were retroclined.

The panoramic radiograph confirmed the peg-shaped nature of the crowns of the upper lateral incisors.

Diagnosis and treatment plan

A severe Class II skeletal pattern, with mandibular retrusion. The occlusion in the mixed dentition was Class II division 1, with retroclination of the lower incisors associated with a thumb-sucking habit. A major diastema between the upper central incisors was associated with small central incisors and peg-shaped lateral incisor crowns.

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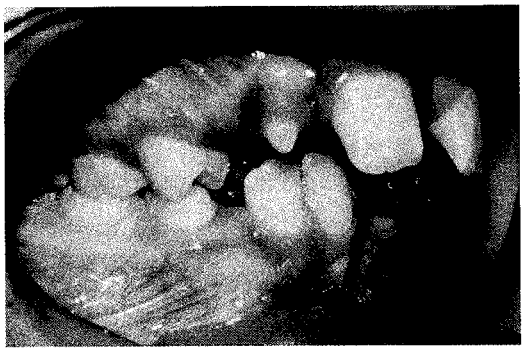
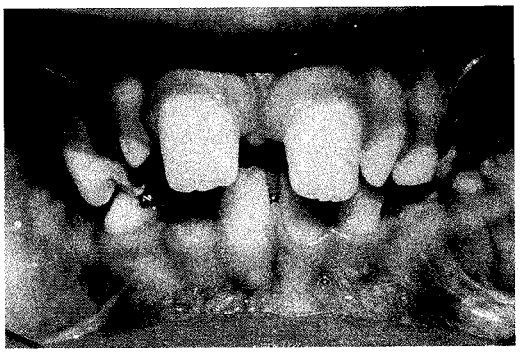
Figures 1a and b. Pre-treatment facial photographs.

Figure 1b.





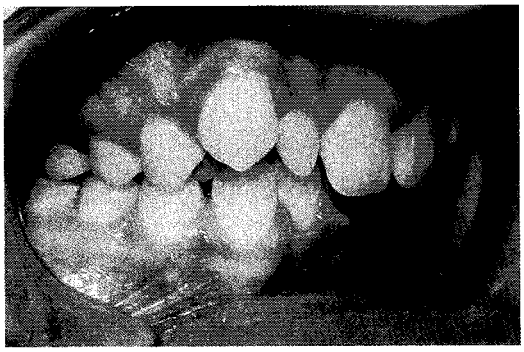
Figures 2a, b and c. Pre-treatment intra-oral photographs.

Figure 2b.

Figure 4. End of Stage I.

Figures 5a and b. Pre-Stage II.

Figure 5b.



Figures 6a, b and c. Pre-Stage II intra-oral photographs.

Figure 6b.

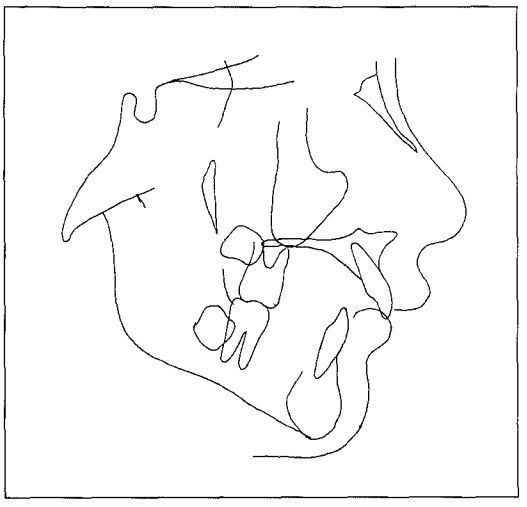


Figure 3. Pre-treatment cephalometric tracing.

Figure 2c.

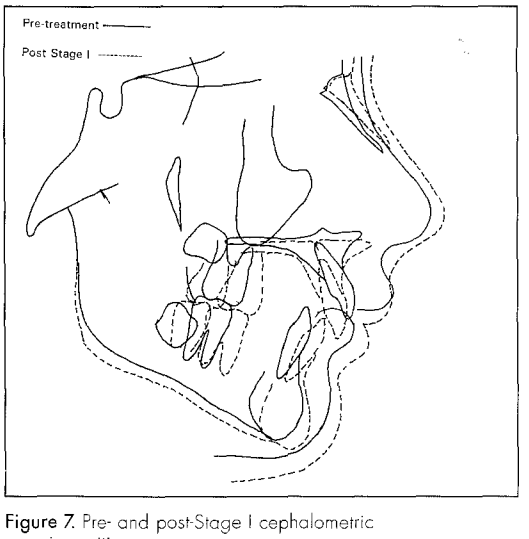


Figure 7. Pre- and post-Stage I cephalometric superimpositions.

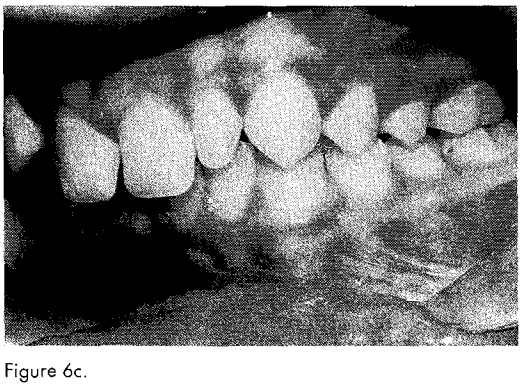


Figure 6c.

Treatment objectives

1. To resolve skeletal discrepancies, particularly mandibular retrusion.
2. To resolve the occlusal problem of an Angle Class II division 1 malocclusion type.
3. To resolve the crown form of the peg-shaped incisors.

Three stages of treatment were implemented.

Stage I: Part banding fixed appliances to retract the upper incisors and increase lower arch length.

Stage II: Functional appliances to resolve the skeletal discrepancy.

Stage III: Fixed appliances to align dentition prior to restoration of the peg-shaped lateral incisors.

Treatment progress

Stage I

February 1991 to April 1992:
Maxillary and mandibular arches banded for retraction of upper incisors and advancement of lower incisors to increase arch length.
Appliances removed April 1992 (Figure 4); upper and lower Hawley retainers.

Patient reassessed September 1993 (Figures 5a and b).

Cephalometric radiographic comparison (Figures 3 and 7) (1990-1993) indicated a favourable growth pattern.

Stage II

September 1993: Intra oral photographs indicated Class III buccal relations, retroclined maxillary incisors and favourable mandibular arch length (Figures 6a, b and c).

November 1993: maxillary arch banded.

January to April 1994: incisors proclined.

April 1994 to April 1995: Teuscher appliance and headgear.

Stage III

May 1995: mandibular arch banding.

August 1995: 0.018" archwires and Class II elastics.

October 1995: 0.020" archwires.

July 1996: 0.021 x 0.021" archwires and torque 11, 21 (Figures 8a and b).

September 1996: appliances removed, and maxillary Hawley and mandibular Dohner splint fitted. (Figures 9a and b, and 10a, b and c). Composite build-up of lateral incisors (Figures 11a, b and c).

Figures 8a and b. Stage III intra-oral photograph.

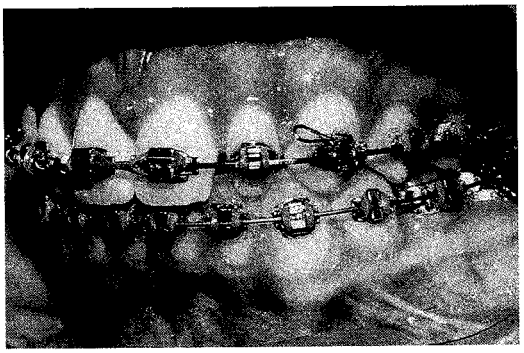
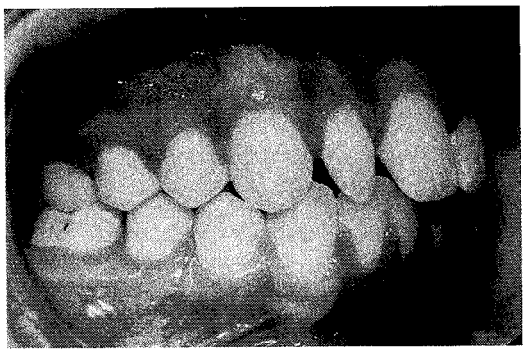


Figure 8b.

Figure 9a. Post-treatment facial

Figure 9b. Post-treatment profile.

Final radiographic records not taken.



Figures 10a, b and c. Post-treatment intra-oral photographs.

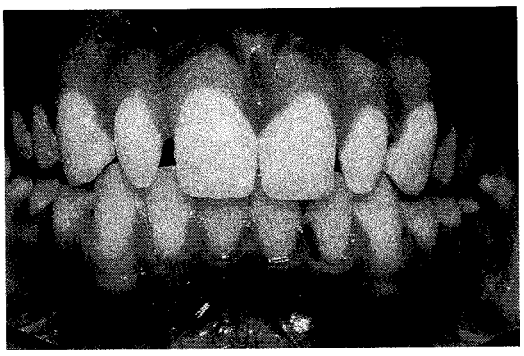
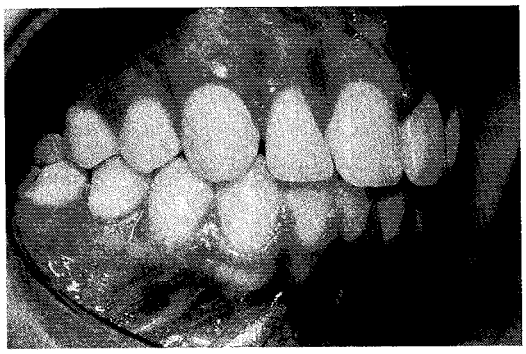


Figure 10b.



Figures 11a, b and c. Post-treatment lateral incisor build-ups.

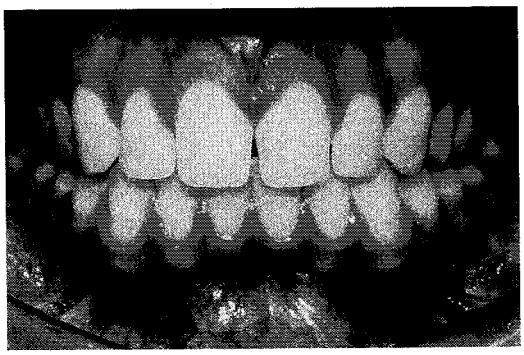


Figure 11b.

Comments

Initial treatment with partial banding concentrated on reducing overbite/overjet discrepancies and improving lip competence (8 years 10 months to 10 years).

The second stage involved maxillary arch banding to align the maxillary dentition. The Teuscher appliance and headgear improved skeletal and dental buccal relations (11 years 7 months to 13 years).

The third stage with mandibular banding improved inter-arch relations and positioned the lateral incisors (13 years 2 months to 14 years 5 months).

Excellent mandibular growth aided correction of severe mandibular retrusion with improved facial and dental relations.

Opening of the space between the central incisors after removal of appliances indicated the need for a frenectomy.

Unfortunately, the patient's parents would not consent to final radiographic records.

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Table I. Cephalometric measurements.

	Norms	1990	1993
FMA	22	25	24
FMIA	68	68	59
IMPA	90	87	97
SNA	82	80.5	82
SNB	80	72.5	76
ANB	2	8	6
OP	9	3	8.5
$\underline{1}$-$\overline{1}$	131	132	132.5
$\underline{1}$-NA	22	24	16
$\underline{1}$-NAmm	4	4	2
$\overline{1}$-NB	25	16	24
$\overline{1}$-NBmm	4	1	4
$\overline{1}$-APo	0	4	1
Po-NB	3	2.5	3.5
Y axis	59	58.5	60.5
HSN	73	53	60

Figure 10c.

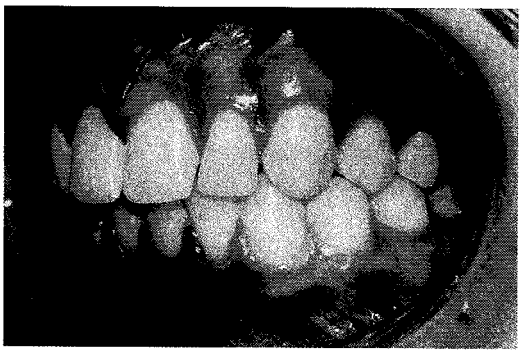

Figure 11c.