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CASE REPORT – A COMPLEX CLASS II CASE WITH CROWDING AND MISSING TEETH

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The members of the Australasian Edgewise Study Club were invited to submit case reports to this Journal. The first case is submitted by Dr P. Schneider, winner of the Society's award at the biennial meeting on Norfolk Island in February, 1992.

Introduction

A 9-year-old female (M.B.) was referred by her general dentist with a presenting complaint of prominent upper anterior teeth and crowded lower incisors.

Medical and Dental History

The medical history revealed breathing difficulties since she was young, with upper respiratory tract obstruction. She had a tonsillectomy and adenoidectomy with ear tubes at the age of five, but this did not improve her ability to breathe nasally. There was no significant dental history.

Cephalometric Examination

Clinical examination revealed a long face with a prominent upper lip and incisors, a retrusive chin and incompetent, hypotonic lips.

The cephalometric radiograph showed a dolichofacial, divergent pattern with steep mandibular plane angle and increased lower anterior face height.

The mandible was rotated posteriorly and, therefore, horizontally deficient. The upper incisors were procumbent and the lower incisors retroclined.

Intra Oral Examination

The patient was in the early mixed dentition stage with the permanent first molars and all incisors, except the upper left lateral, erupted. The upper arch was well aligned with excess spacing between the anteriors. The lower arch was crowded with the right lateral incisor displaced lingually. The lower midline was 2 mm to the right. In occlusion, the overjet was increased at 9 mm and vertical overlap was normal, but there was an anterior open bite. The molar relationship was almost a full Class II. There was lip interposition between the incisors on swallowing and at rest.

Features of the Panoramic Radiograph

The panoramic film showed that four bicuspids were missing: the upper right second, upper left first and second and lower left first. The lower right first bicuspid was developing more slowly than the others that were present.

Diagnosis and Treatment Plan

The problems in this case were: a skeletal Class II relationship with posteriorly rotated mandible and long face, exacerbated by the proclined upper incisors and retroclined lower incisors; four missing bicuspids, two of which were in the upper left quadrant; were slowly developing mandibular right first bicuspid; and crowding in the lower right quadrant.

Functional appliance therapy was indicated at first to improve the relative maxillary and mandibular growth and improve lip posture. The Frankel appliance was chosen to try and improve lip posture and allow improved alignment of the lower anteriors. The treatment of the crowding in the lower right quadrant was to require extraction of the mandibular right first bicuspid. The extraction was to be delayed until the root was half to two-thirds formed so that it could be transplanted into the upper left quadrant where no bicuspids had developed. Limited fixed appliances were to be used during the period of transplantation to stabilise the transplanted tooth. Full fixed appliances were to be used when all permanent teeth had erupted.

Progress of Treatment

July 1984: Frankel delivered.

September 1984: Now wearing appliance 24 hours a day after a slow, interrupted start.

April 1985: Class I molars achieved but

there is still an anterior open bite. Lip exercises reinforced.

June 1985: Cephalometric film shows good mandibular growth.

August 1985: Overbite = 1 mm; overjet = 4 mm, Class I molars.

November 1985: Discontinue Frankel. Panoramic radiograph shows mandibular right first bicuspid developing slowly. Cephalometric radiograph shows adequate mandibular growth and improved skeletal relationship.

June 1987: Mandibular right first bicuspid transplanted to upper left bicuspid region. Brackets placed on transplanted and adjacent teeth to stabilise transplant in position.

December 1987: Fixed appliances stabilising transplant removed.

September 1988: Full fixed appliances placed, 0.022" edgewise Roth prescription. 0.155" braided archwire upper and lower.

October 1988: Transpalatal arch placed for anchorage.

November 1988: 0.018" Australian upper and lower.

December 1988: 0.020" Australian upper and lower.

January 1989: 0.018" x 0.025" upper with anterior chain.

March 1989: Upper double keyhole closing loop 0.019" x 0.025".

April 1989: Lower 0.018" x 0.025" steel.

September 1989: Upper 0.021" x 0.025" TMA.

November 1989: Upper and lower 0.021" x 0.025" stainless steel.

January 1990: Lower bonded retainer placed and positioner continued but gradually reducing frequency.

July 1991: Positioner discontinued.

January 1992: Final records.

Figures 1-9 show the initial records.

Figures 10-17 show the records at the completion of the Frankel stage.

Figures 18-25 show the final records. The transplanted bicuspid in the upper left quadrant has a calcified canal and short root; but the bone and periodontal ligament appear normal.

Figures 26 & 27 show the cephalometric tracings at the initial and final stages.

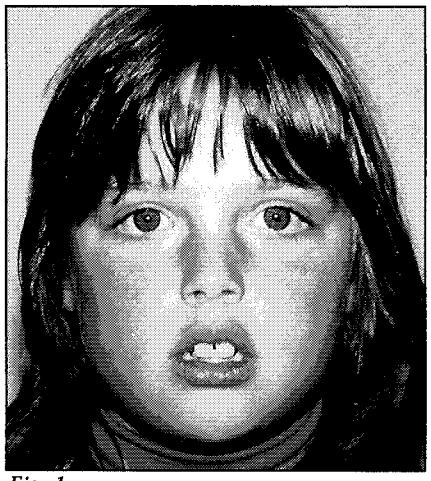

Fig. 1.

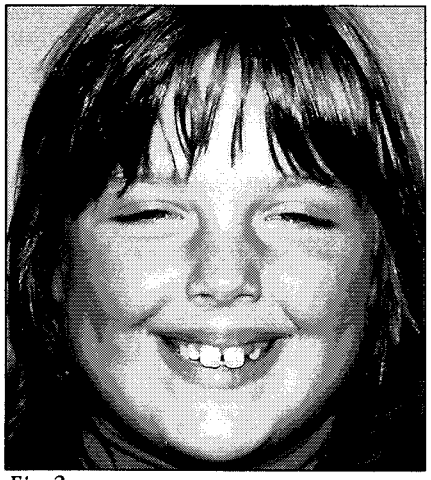

Fig. 2.

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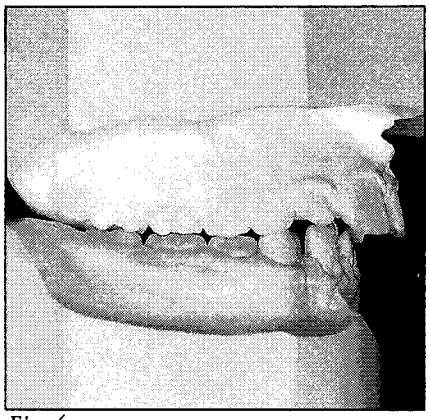

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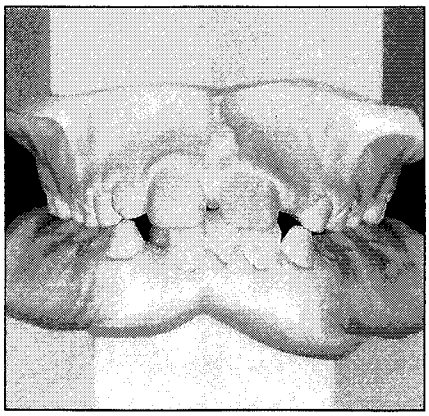

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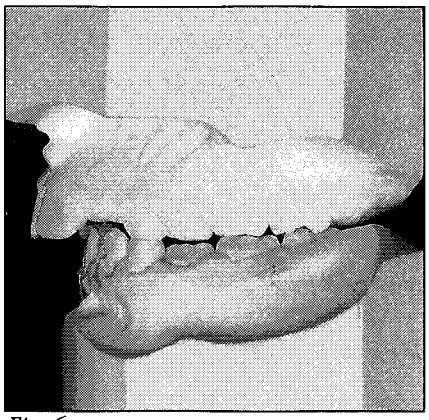

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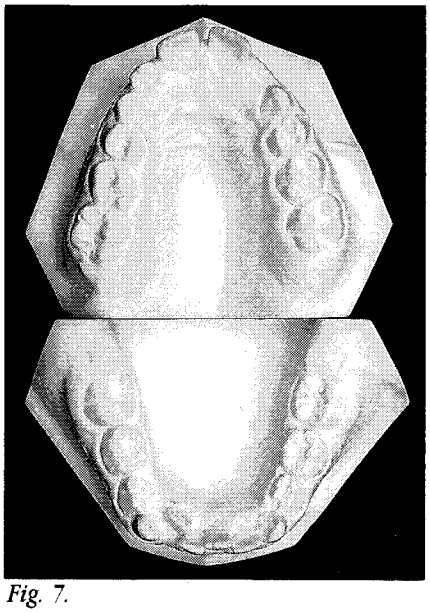

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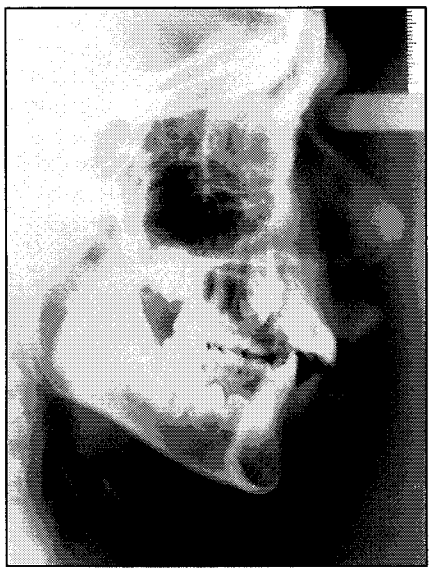

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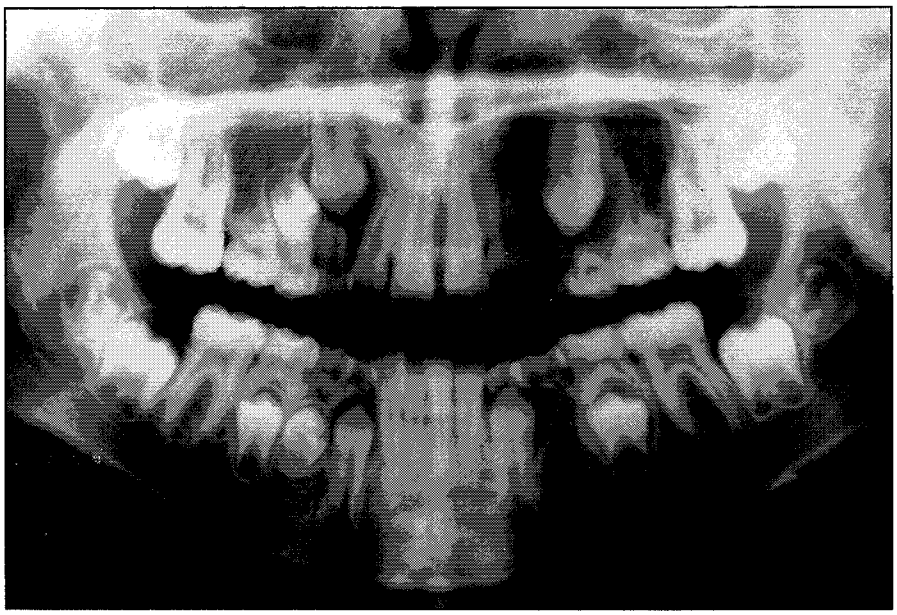
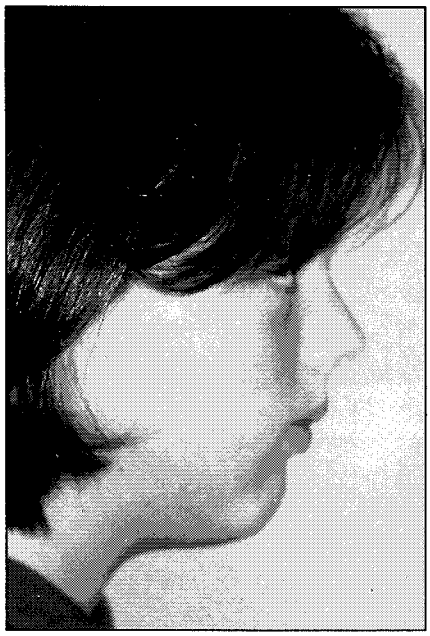


Fig. 9.

Fig. 10.



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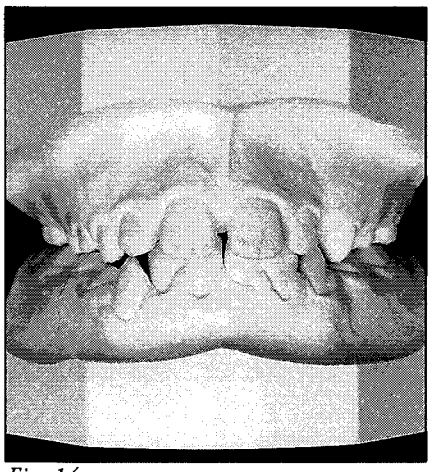
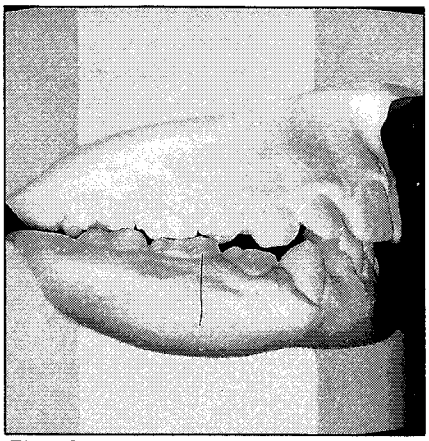


Fig. 14.

Fig. 11.



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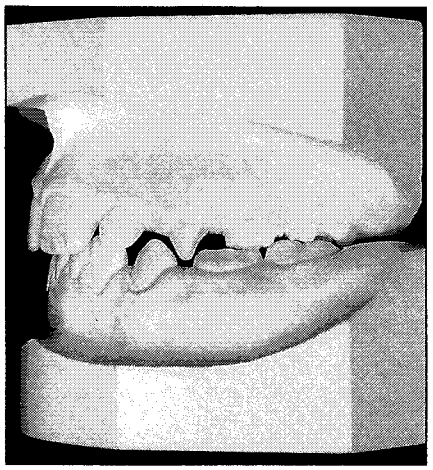

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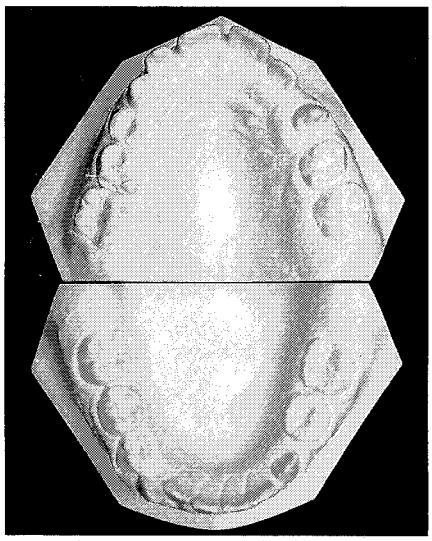


Fig. 16.

Fig. 19.

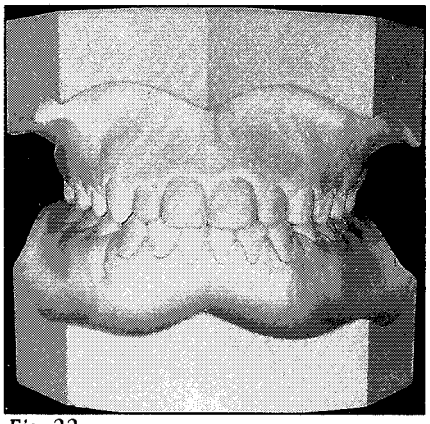
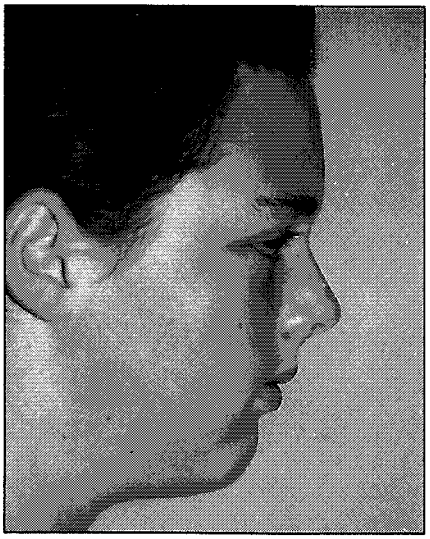


Fig. 22.

Fig. 17.



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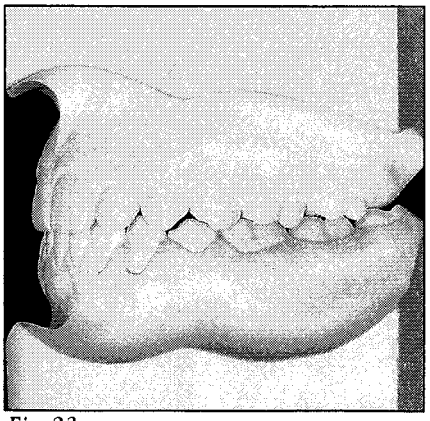

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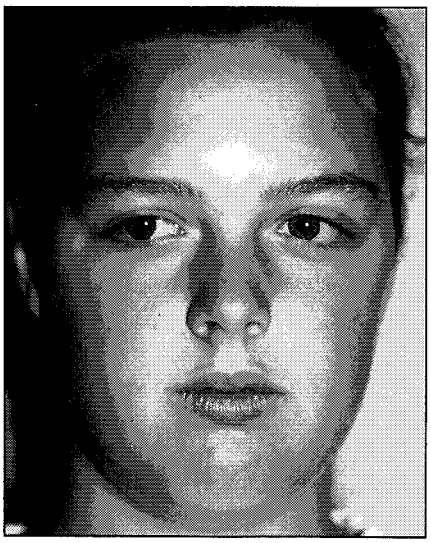

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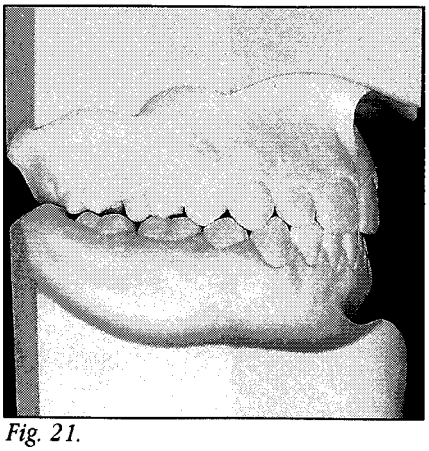

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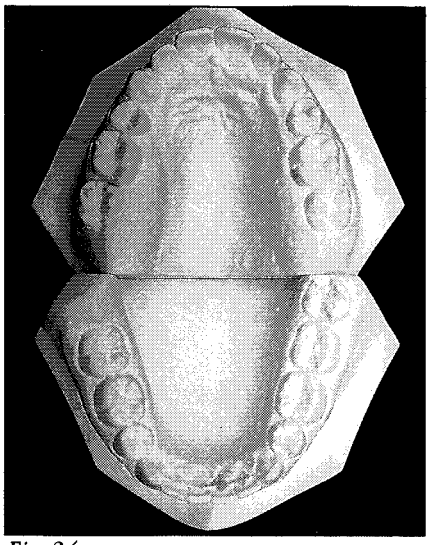


Fig. 24.

Comment

The successful conclusion of this case demonstrated two important principles in planning the treatment for cases such as this. The first: that in complex cases, the development of a problem list is a useful way of isolating the various problems from one another, and also co-ordinating them into an overall plan; the second: that in mixed dentition treatment, deciding on the timing of treatment is at least as important as deciding on what form of

treatment to use. In this case, the timing of Class II correction had to be coincident with the most likely rapid skeletal growth phase. The timing of the transplant was determined by the root formation of the mandibular right first bicuspid. The root of this tooth was developing more slowly than those of the other bicuspids.

It has been shown that the root length of a transplanted tooth is likely to be reduced following transplantation[1], and that this reduction in length is greater when the root length is shorter at the time of transplantation. It is therefore advisable to have most of the root formation complete prior to transplantation to improve the chances of near normal root length after treatment is complete.

Pulp vitality is more likely to be retained when root formation is incomplete at the time of transplantation. Therefore the ideal timing for a transplant is when root formation is largely complete but the apical foramen is still wide open.

Endodontic treatment was not performed on the transplanted tooth. Andreasen *et al*[2] found that when bicuspids with incomplete roots were transplanted, more than 90% maintained pulp vitality and did not develop necrosis. They did, however, find pulp canal obliteration in almost all transplanted teeth giving a positive response to pulp testing. The transplanted tooth in this study showed pulp canal obliteration; but it was not pulp tested according to the method of Andreasen *et al.* It also showed some root shortening as measured on the panoramic radiograph.

Full fixed appliance treatment needed to wait until the viability of the transplant had been determined and all other teeth had erupted.

The Class II skeletal correction has been maintained although the patient does have a long face. The crowding has been relieve and the transplant has been successful. The lower lingual bonded retainer will be left in place until it causes problems and then will be removed.

Summary

Frankel appliance treatment was used from the age of 9 years 3 months to 10 years 7 months, which is 16 months overall. At 12 years 2 months, the mandibular right first bicuspid was transplanted to the upper left bicuspid region. At 14 years 5 months, fixed appliances were placed for a period of 16 months. A positioner was used from 14 years 8 months until 16 years 3 months, which is an 18 month period.

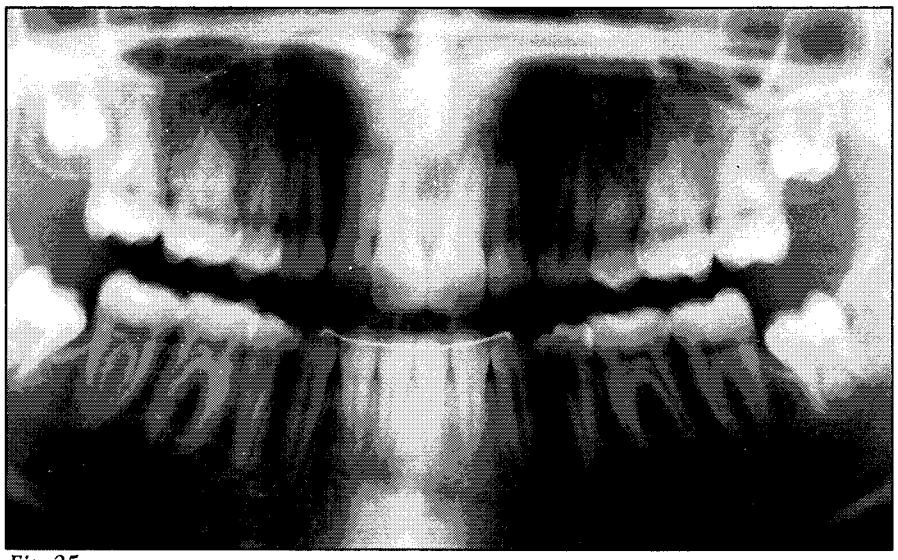
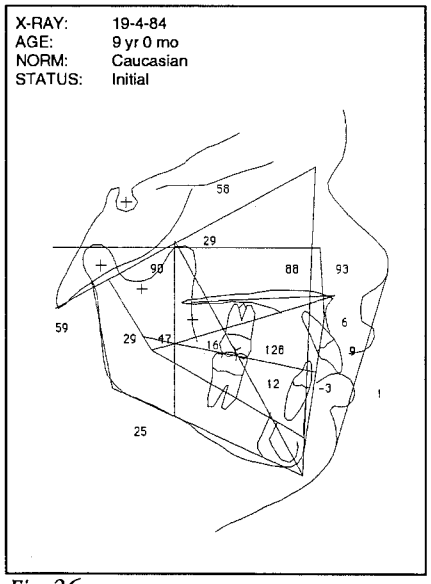


Fig. 25.



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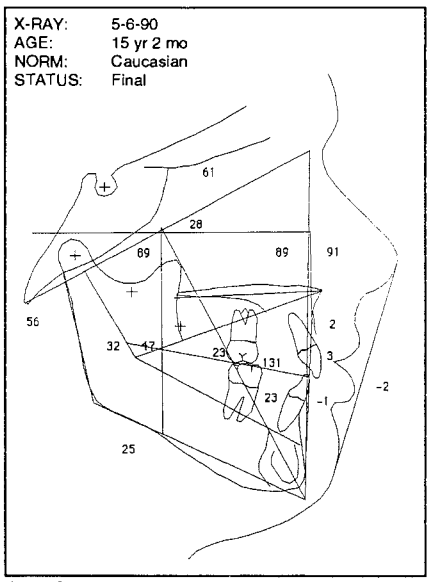

Fig. 27.

References

1 Andreasen JO, Paulsen HU, Yu Z *et al.* A long-term study of 370 autotransplanted premolars. Part IV. Root development subsequent to transplantation. Eur J Orthod 1990; 12: 38-50.

2 Andreasen JO, Paulsen HU, Yu Z *et al.* A long-term study of 370 autotransplanted premolars. Part II. Tooth survival and pulp healing subsequent to transplantation. Eur J Orthod 1990; 12: 14-24.

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