Case Report: Four permanent second molar extractions

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This 15-year-old female presented to the Orthodontic Clinic at the School of Dentistry, Medical College of Virginia in February 1989 with a chief complaint of crowded anterior teeth. She was wearing a removable bite plate with a screw for anterior expansion which was inserted by a general practitioner in another state in August of 1988 (Figures 1A-E). In December of 1988 the general practitioner extracted the four permanent second molars for treatment of the crowding. At the same time the dentist also extracted a supernumerary right maxillary lateral incisor.

Apparently as a result of the crowding the adjacent right maxillary central incisor had minimal bone support since bonding material had been placed across the two maxillary central incisors for stabilization. The third molars were all present and developing.

The patient exhibited about 6 mm of anterior dental crowding in the mandible and 10 mm in the maxilla. Significant gingival recession had occurred on the facial of the maxillary right central incisor and the upper and lower dental midlines were to the right. Interarch relationships were 75% of a full Class II. Minimal anterior overbite and overjet were present (Figures 2A-G). The hand wrist film showed closure of the epiphyseal plates of the phalanges and radius leaving no expectation of significant future mandibular growth to assist in the Class II correction).

Treatment options

1. Continue present treatment
   - A. Move the maxillary dental arch sufficiently to the distal to both relieve crowding and correct the Class II molar relationships, or
   - B. Align both arches and perform a mandibular advancement to correct the Class II.
2. Perform additional extractions
   - A. Extract four first premolars or upper first and lower second premolars. Correct the Class II by differential anchorage control, or
   - B. Extract maxillary first premolars. Finish with Class I canines and Class II molars, or
   - C. Extract maxillary lateral incisors. Finish with maxillary canines substituted for lateral incisors and Class II molars.

The option of continuing the treatment plan begun with the extraction of the four permanent second molars was rejected based on the inability to move the maxillary arch far enough to the distal to both resolve the Class II buccal segments and the 10 mm of dental crowding present. The soft tissue facial contour angle and the anteroposterior skeletal relations were essentially average contraindicating a mandibular surgical option.

Correction of the Class II molar relationship by a four tooth extraction pattern also was rejected based on the absence of growth potential to assist in the interarch correction, the prior loss of four permanent second molars and the absence of any clear indication for extractions in the lower arch.

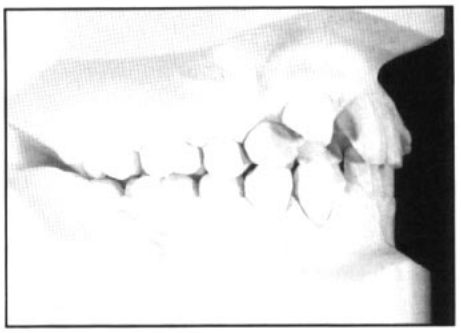


Figure 1A

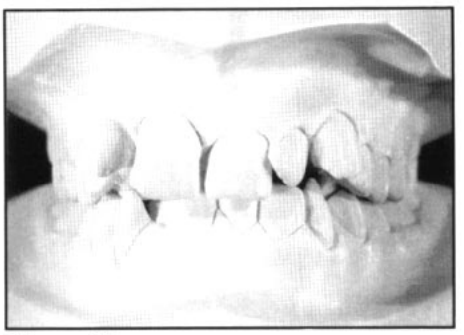


Figure 1B

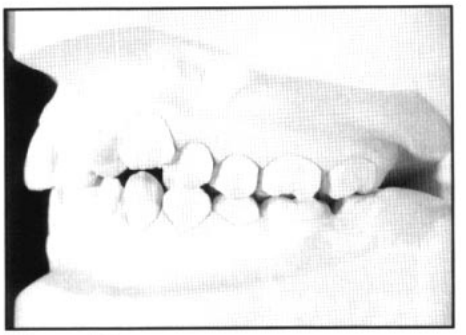


Figure 1C

Figures 1A-E
Pretreatment models, prior to the general dentist's treatment, August 1988.

Figures 2A-G
Models and facial photographs at the time of the start of treatment at the Orthodontic Clinic, May 1989. Four permanent second molars and the supernumerary lateral incisor have been extracted.

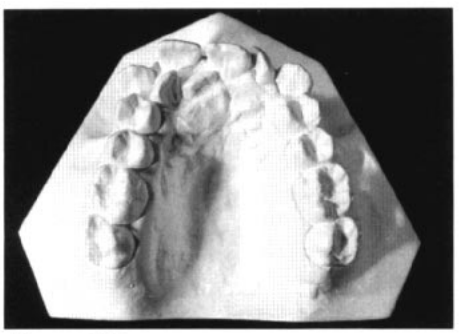


Figure 1D

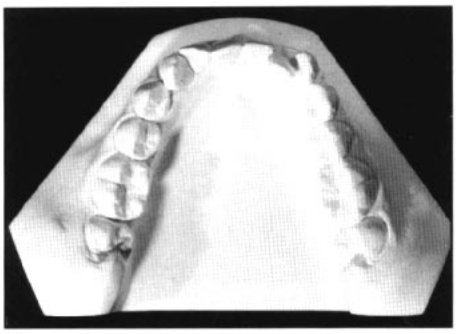


Figure 1E

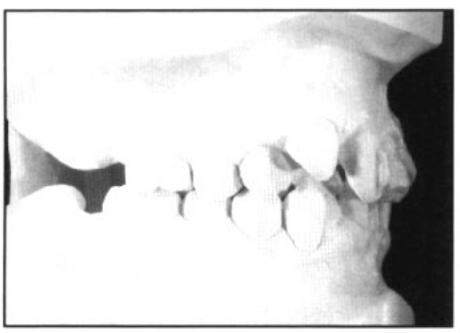


Figure 2A

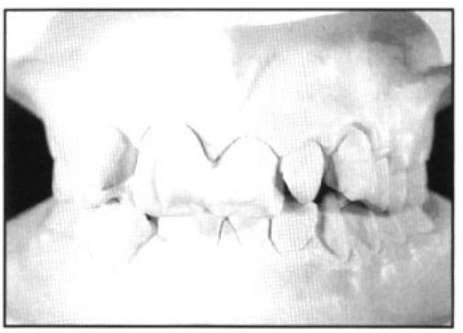


Figure 2B

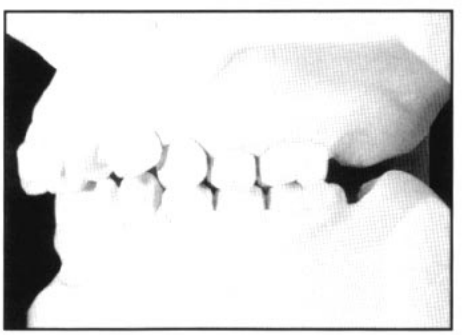
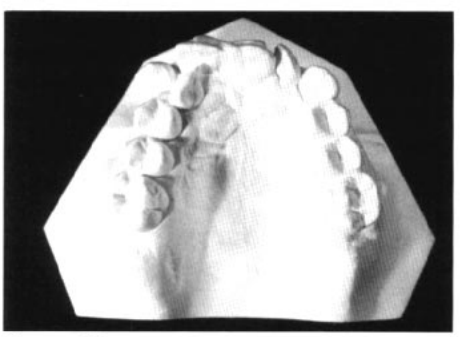


Figure 2C

Figure 2F

Figure 2G



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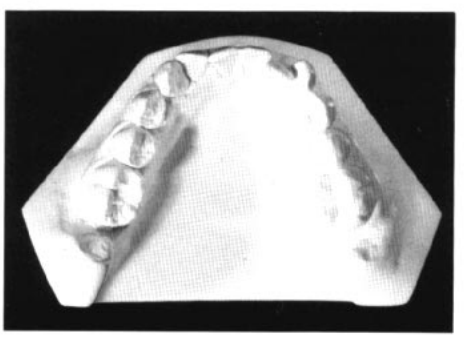

Figure 2E

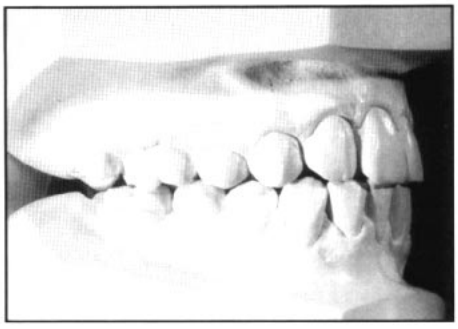

Figure 3A

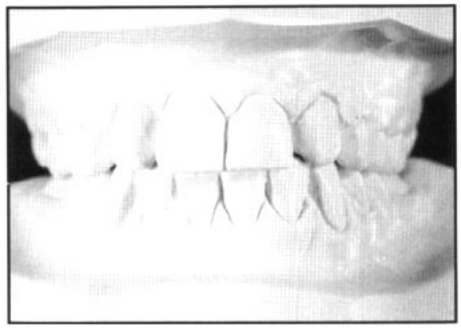

Figure 3B

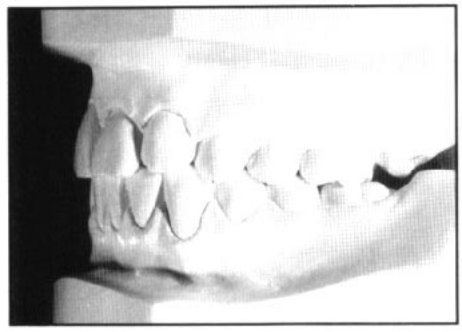

Figure 3C

Figures 3A-G
Models and facial photographs at completion of fixed appliance treatment, April 1991.

Figure 3D

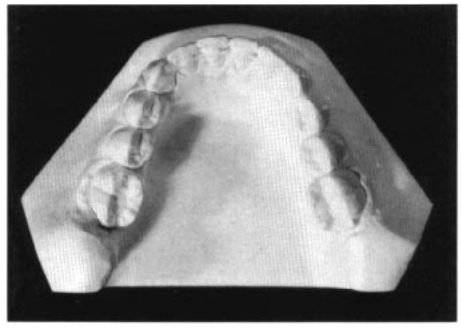

Figure 3E

Given a nonextraction lower arch, the maxillary crowding could be resolved by a maxillary two tooth extraction pattern involving either the premolars or a pair of more anteriorly located teeth. Given the retention problems associated with the incisor crowding and the need for posterior anchorage control, the maxillary lateral incisors were chosen for extraction.

Treatment

Full banded and bonded appliances were used for 23 months of active treatment. The treatment was uneventful and included lingual root torque of the maxillary central incisors. The canine substitution proved esthetically pleasing because the canines demonstrated existing favorable factors of i) relatively flat facial surfaces, ii) mesiodistal widths significantly smaller than the central incisors, iii) clinical crown heights significantly less than the central incisors and iv) the absence of dentin coloration showing through in the cervical region. It was also necessary to minimize overbite since the greater faciolingual dimension of the canines would not tolerate a deep overbite without accompanying adjustments in faciolingual tooth position. An attempt was made to keep mesial rotation on the canines and first premolars in order to provide a greater light reflective facial surface for optimal esthetics (Figures 3A-G).

The patient did experience some vertical growth during treatment in spite of her mature skeletal pattern at the onset of treatment. The amount and direction of the growth, however, was primarily vertical and not useful in correcting the interarch jaw relationship (Figure 4).

Figure 3F

Figure 3G

Since the extraction space was so close to the crowding, Class III elastics and Class I Energy Chains, closed-gray type (Rocky Mountain Orthodontics, Denver, Colo.) were used during space closure to secure mesial movement of the maxillary posterior teeth. The buccal segments moved into a full class II molar relationship with no additional mechanics involved.

The panoramic radiographs show the third molars migrating into improved and perhaps

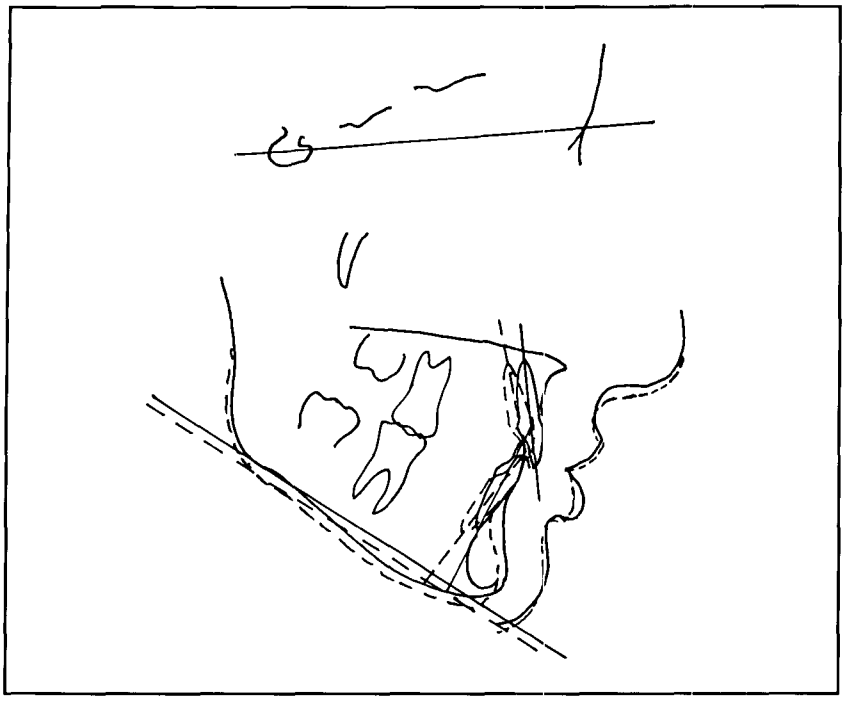

Figure 4

Figure 4
Superimposed tracings of cephalometric radiographs before and after treatment.

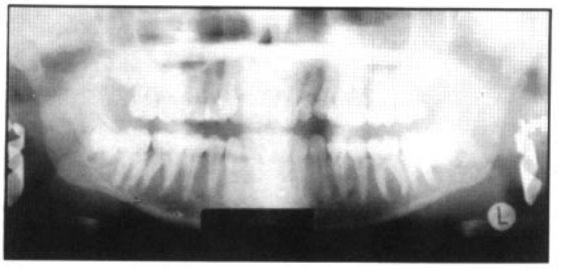

Figure 5A

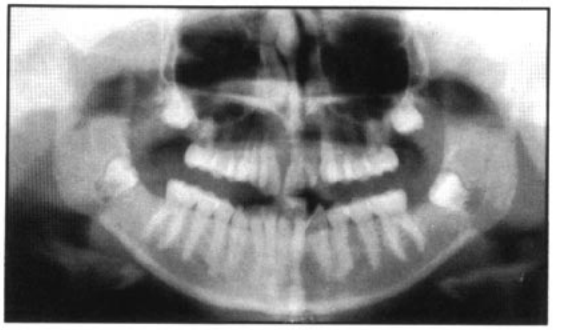

Figure 5B

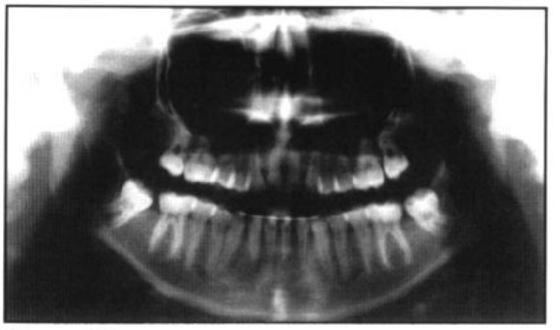

Figure 5C

Figures 5A-C
Panoramic radiographs prior to any treatment (August 1989), before the start of fixed appliance treatment (April 1990) and the conclusion of active treatment (May 1991).

ultimately acceptable positions in the arches. Reports in the literature suggest this was not readily predictable from the information available at the time of the second molar extractions in this patient (Figures 5A-C).[1,2]

The mandibular incisors were retained with a lingually bonded canine-to-canine retainer and a removable Hawley was placed in the upper arch.

Summary

A patient who had earlier undergone four second molar extractions and who demonstrated Class II buccal segments and major incisor crowding was treated with the relatively unusual extraction pattern of maxillary lateral incisors. The treatment resolved the crowding and created Class II buccal segments with maxillary canines substituted for extracted lateral incisors. Favorable tooth anatomy produced an acceptable esthetic result accomplished with a predictable outcome over a reasonable duration of treatment. The sequential panoramic radiographs show evidence of the third molars spontaneously progressing toward positions that may result in their successful substitution for the earlier extracted second molars. A relatively unorthodox treatment plan made possible resolution of a difficult existing clinical situation using relatively routine treatment procedures.

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References

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2. Bishara SE, Burkey PS. Second molar extractions: A review. Am J Orthod 1986;89:415-424.