Case Report

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This is a case report of a 14 year-old male who presented a Class II, Division 1, subdivision malocclusion in the early adult dentition. Intraorally, there were 11 mm of overjet and 100 percent overbite with the lower incisors impinging on the palatal tissues. The maxillary arch was symmetrically tapering and exhibited no arch length inadequacy. The tooth mass was generally large in the maxillary arch and a slightly-delayed eruption pattern was noted in the right buccal segment (Fig. 1).

The mandibular arch was symmetrically ovoid in form and had 5 mm of arch length inadequacy. The crowding was concentrated in the right canine area.

The patient had a symmetrically square facial type and a moderately convex facial profile. There was no interlabial gap at rest and the lips were slightly strained upon closure. The upper lip was protrusive, while the lower lip presented a deep labiomental groove. The lower facial profile was retrusive with a prominent soft-tissue pogonion. The facial profile was not acceptable.

Cephalometric assessment revealed a normal brachycephalic tendency, as evidenced by a 20° mandibular angle and a −1° facial axis measurement. The midfacial convexity was acceptably positioned; however, the A-B plane reading of −11° suggested retrusion of Point B (Fig. 1).

Diagnosis

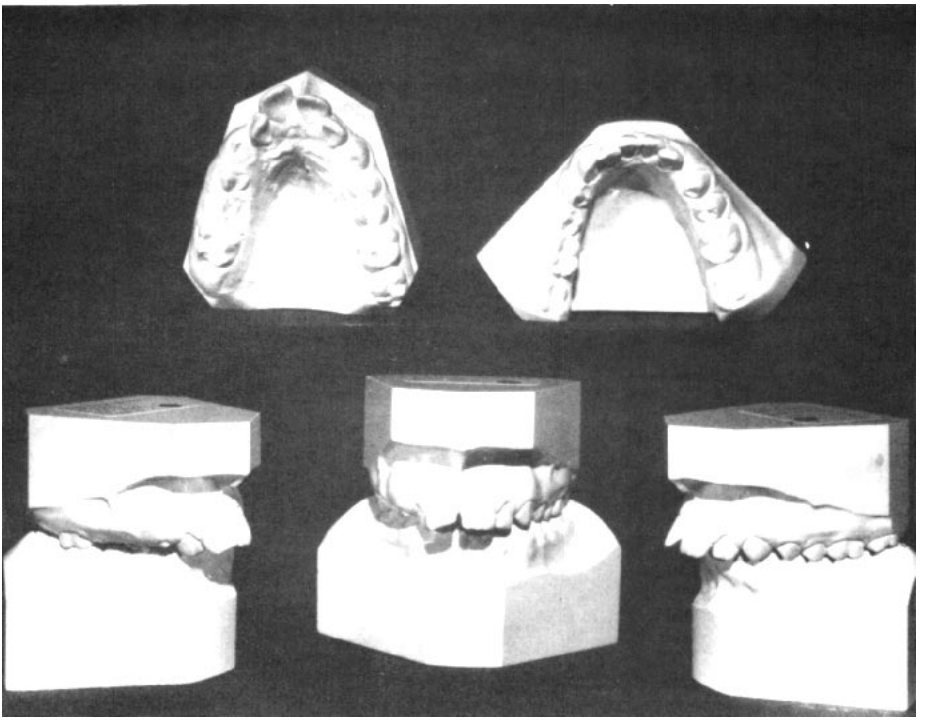
The mandibular incisors exhibited significant supraeruption when evaluated relative to the functional occlusal plane. The over-all impression of the skeletal and dental analyses was maxillary dental protrusion, supraerupted mandibular incisors, slight crowding due to a large tooth mass, and a generally well-balanced skeletal pattern.

Plan of Treatment

The main objectives of orthodontic therapy for this Class II, Division 1 malocclusion were as follows: 1) correction of the maxillary dental protrusion to harmonize with the maxillary and mandibular denture bases; 2) significant reduction of the traumatic overbite; 3) elimination of the slight arch length inadequacy in the mandibular arch; 4) improvement of the contour and balance of the lower facial profile; and 5) harmonization of the dentition to the existing facial pattern.

A nonextraction growth approach was recommended to accomplish all of the above treatment goals. The case analysis revealed that the malocclusion was basically a dental, and not a skeletal, growth discrepancy. The facial development forecast for this adolescent male was believed to be favorably downward and forward. The growth potential was also evaluated as being sufficient to accommodate all permanent teeth.

Due to the procumbency of the lower incisors, no lower arch advancement was indicated. The basic tenet of treatment was to hold the maxillary teeth and the maxillary complex while mandibular growth occurred. The keys to successful nonextraction treatment were good patient cooperation with headgear and favorable facial growth and development. A tentative treatment plan was instituted with yearly evaluations of this approach and its feasibility.



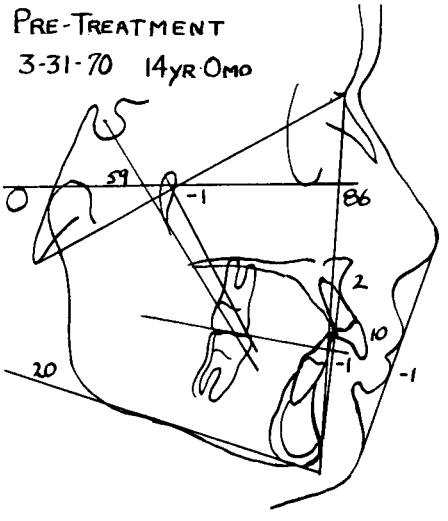


Fig. 1

Biomechanical Treatment Summary

An upper and lower two by four .018 × .030 nontorqued, but angulated, strap-up was placed. A low-pull cervical traction headgear was worn daily for 14 hours with a low force (480 to 960 gms). This was used to accomplish molar symmetry and to initiate buccal segment distalization. A .016 × .016 blue Elgiloy depressive base archwire was utilized to begin incisor depression in the mandibular arch. As eruption permitted, the maxillary and mandibular buccal segments were banded and stabilized with individual, heavy-rectangular segmented archwires.

The basic plan of overbite correction was to accomplish mandibular incisor depression and buccal segment eruption concurrently with vertical growth of the alveolar bone and facial areas. Final arch form and harmony were gained by ideal and coordinated .016 × .022 finishing arches. Light Class II elastics (200 gms per side) were worn during the daytime to gain overcorrection of the Class II problem.

The case was progressively debanded and retained after 17 months of active treatment.

Results

Significant improvement in the soft tissue contour was achieved during retraction of the maxillary incisors. The protrusive upper lip was reduced and the deep labiomental groove of the lower lip eliminated (Fig. 2).

Intraorally, the buccal occlusion was a corrected Class I with improved interarch harmony. The overjet/overbite relationship was nearly ideal with improved arch form and alignment. The supraerupted lower incisors were aligned properly with centric stops on the lingual surfaces of the maxillary incisors. The incisor angulation appeared normal and markedly improved dental esthetics were observed.

Cranial base superpositioning registering on the sphenoethmoidal triad revealed primarily vertical growth changes of the mandibular position (Fig. 2). The mandibular and palatal planes descended nearly parallel. The facial angle increased only 1° to an acceptable 87°. The midfacial convexity was reduced 2° to a mature +1°.

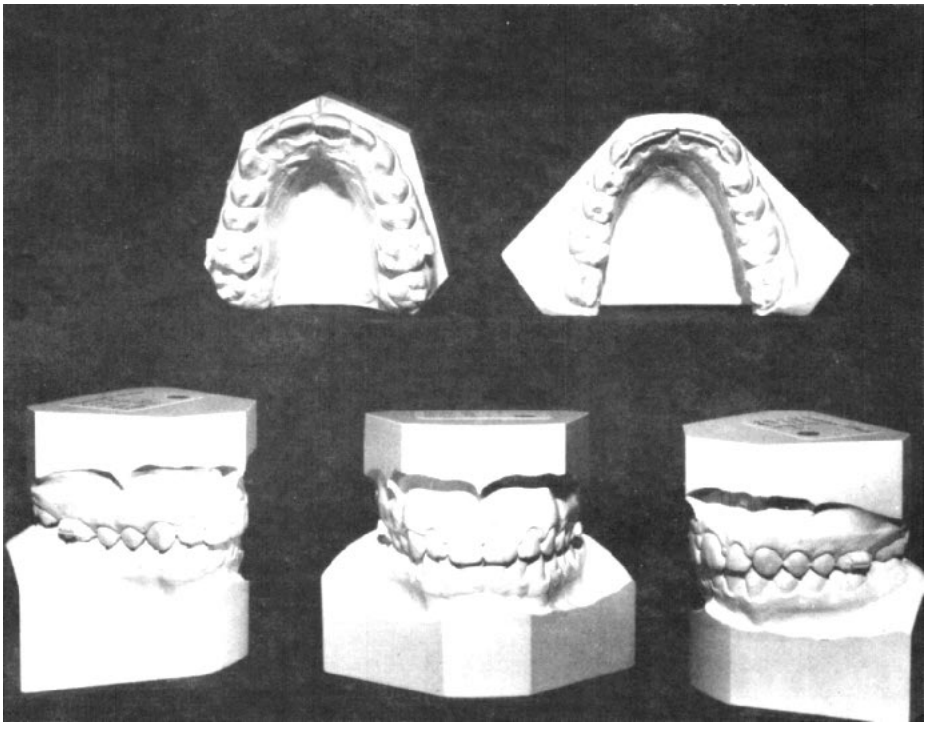
Secondary Treatment

A removable maxillary Hawley retainer with a round labial wire, but without posterior clasps, was worn full time for the two years of retention. A biteplane was incorporated to maintain correction of the incisor overbite and to prevent mandibular incisor relapse. Posterior clasps were not placed in order to permit functional eruption of the second molars during latent maxillary growth. The maxillary first molar bands were left in place to allow rapid re-establishment of headgear therapy, if needed. These bands were removed at the first three-month retainer check when stability of the Class II correction was observed. The main purpose of the maxillary retainer was to maintain intra-arch alignment and overbite correction during latent facial growth.

A fixed mandibular first premolar to first premolar retainer was also utilized during the two-year retention period. It was designed to maintain arch form, support incisor intrusion, and maintain proper canine to canine width. Posterior rather than anterior teeth were selected for retainer placement for esthetic reasons.

Final Evaluation

Final records were taken 46 months after all retention had been terminated (Fig. 3). The patient was 21



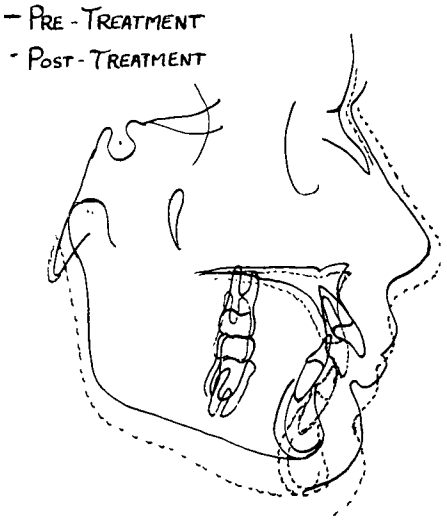
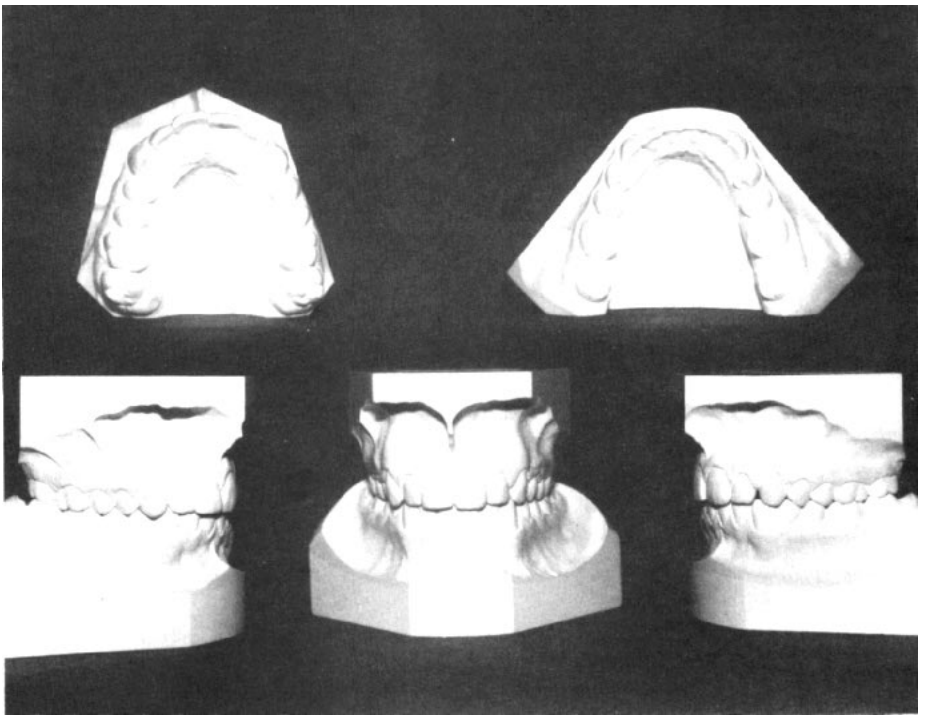


Fig. 2



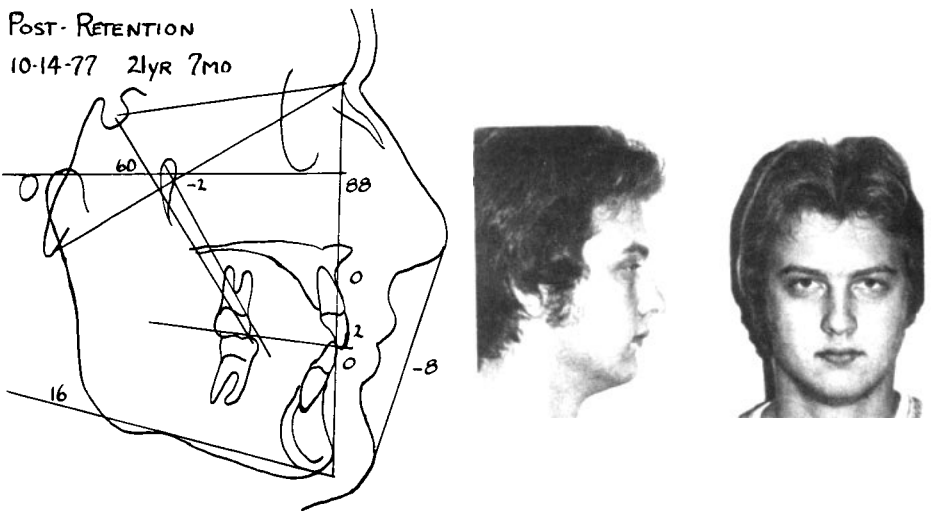


Fig. 3

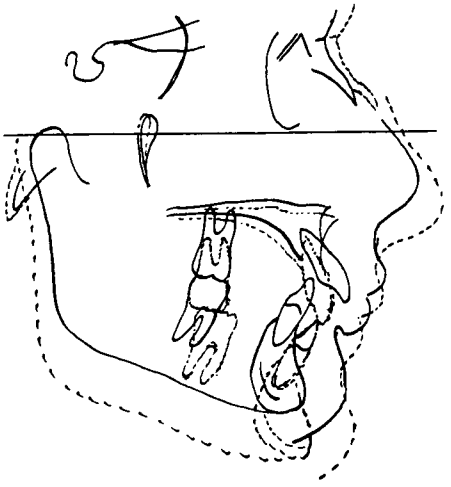


Fig. 4

years and 7 months of age. The Class I buccal segment interdigitation was most stable with marked improvement in the position of the second molars. The overjet/overbite relationship showed little change with only slight maxillary incisor instability. No arch length inadequacy was recorded in either dental arch.

The curve of Spee was nearly flat and the overbite correction was holding well. Arch form and harmony were acceptable, and functional checks revealed only a minor incisal interference in protrusive movements. The oral tissues and the teeth remained healthy due to the patient's continued good oral hygiene.

Figure four denotes the cephalometric changes from 14 years of age to final records at 21 years and 7 months.

Upper facial superpositioning, utilizing SN line and registering at nasion, revealed posterior movement of Point A and PTM. This supported the belief that holding of the maxillary complex was achieved (Fig. 5).

The maxillary molars and incisors were significantly more vertically and posteriorly positioned. Orthodontic

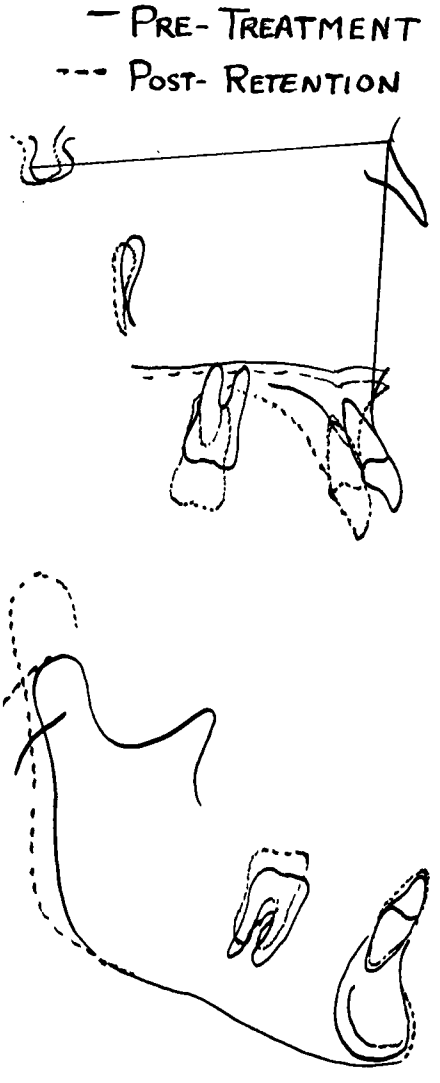


Fig. 5

treatment had successfully held the buccal segments, retracted the incisors, and orthopedically held the maxillary complex.

Mandibular superpositioning revealed no A-P change and only slight depression of the mandibular incisors. Significant vertical eruption was observed for the molars. The conclusion drawn from this observation was that the traumatic overbite was reduced through a combination of vertical growth, eruption of the buccal segments and slight depression of the mandibular incisors.

All treatment objectives had been met except maximum esthetic harmonizing of the A-P position of the dentition to the soft-tissue profile. Denture stability, however, was preferred to possible mandibular incisor instability that would be anticipated if the lower dentition had been advanced by Class II elastic mechanics. Active treatment had accomplished a reduction of the maxillary dental protrusion and eliminated the traumatic overbite. The arch length inadequacy problem was solved without removing any premolars and the dentition had been harmonized with the facial growth pattern.

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