

Cephalometric Appraisal of Orthodontic Management of Class I Malocclusions

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Introduction

The object of the appraisal of Class I cases was to determine the changes that took place in the denture and face during treatment and subsequent to the removal of the appliances. Of particular interest were the changes that took place in the mesio-distal and in the vertical dimensions, also the possible changes in the occlusal plane and in the mandible and maxilla.

Since Class I malocclusions embrace such a heterogeneous assortment of conditions, it is necessary to fit the plan of treatment to the individual case. The following six cases have been selected for illustration largely because the mechanics of treatment differed for each one. Obviously, the material is too limited to make any definite statement of the relationship between treatment and structural change; this will have to be deferred until a later date.

It was recognized early in this study that it would be difficult to determine with certainty the changes of the mandible and its teeth, because the mandible does not bear a fixed relationship to the point from which the measurements were being taken. Observation of untreated cases in the age range of the material being used in this study seemed to indicate that there was a relatively small change in the position of the posterior border of the ramus; in many cases it was not measurable.

Case D.D., Female

Age at beginning of treatment, 11 years, 9 months.

Fig. 2 represents casts of the case before treatment. This case was characterized by a marked lack of premaxillary development, three of the upper incisors and the left canine being locked lingually to the lower incisors. Both canines were partially blocked out of the line of the upper arch.

Objectives Sought in Treatment

(1) To carry the upper incisors to their normal labial relation to the lower incisors, thus permitting the mandible to assume a free functional position; (2) to establish correct upper and lower arch form; (3) to provide proper contact relations; and (4) to correct axial inclinations.

Analysis of Tracings

Fig. 3A represents the composite tracing of x-rays taken before treatment and seven months later. This reveals the following:

1. The angle BSN has closed $.5^{\circ}$, and there is evidence of anteroposterior growth of the cranium.
2. The nasal floor has descended 1.25 mm., while the angle between it and the Bolton plane has opened $.5^{\circ}$.
3. Gonion has gone backward 4.5 mm. and downward 3 mm.
4. Gnathion has gone downward 3.5 mm. and backward 2 mm.

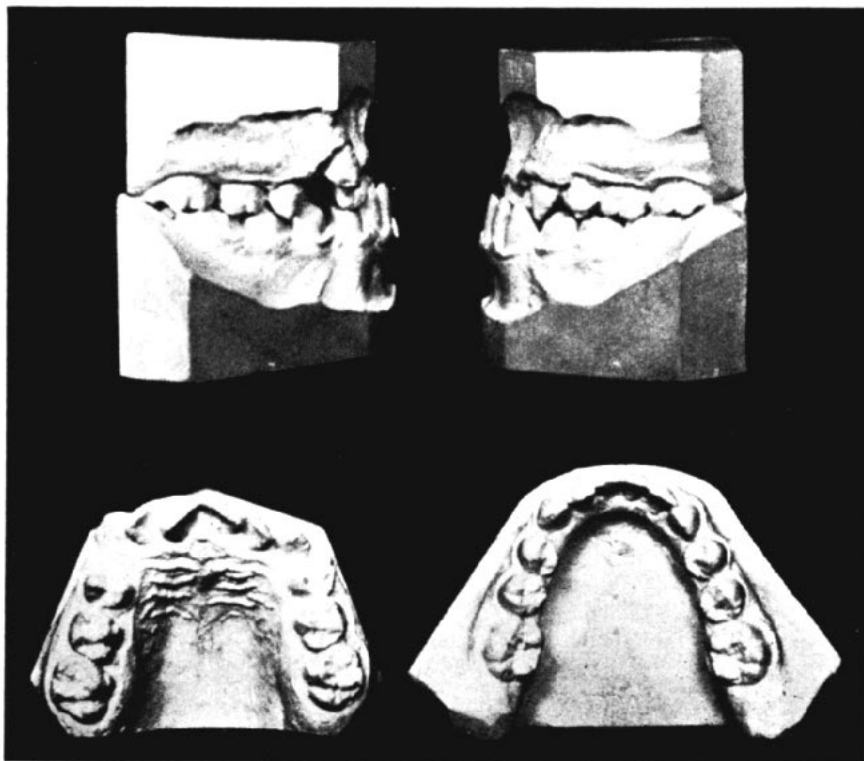


Fig. 2
Case D. D., female, before treatment. Age 11 years, 9 months.

5. The angle formed by the lower border of the mandible with the Bolton plane has opened 1.5° .
The last three readings probably indicate a change in the *position* of the mandible rather than any alteration in the bone itself.
6. Upper 6 has moved backward .5 mm. and downward 2 mm. It has tipped 2° .
7. Upper 1 has moved forward 4.5 mm., upward 1.5 mm. There has been a forward tipping of 9° .

8. The occlusal plane has tipped downward in back 2° .
9. Lower 6 has moved backward 2.5 mm. and downward 2 mm., with a slight change of axial inclination.
10. Lower 1 has moved forward .5 mm. and downward 1.5 mm., changing its axial inclination 3.5° .

Readings 9 and 10 have been influenced by an obvious positional change of the mandible. By mandibular superposition (Fig. 3c) we find that actually:

1. The only measurable change in the mandible is a slight increase in the length of the alveolar process.
2. That lower 6 changed very little (compare with 9).
3. That lower 1 moved forward 2 mm. and upward .75 mm., changing its axis 2.5° (compare with 10).

Fig. 3B represents the composite tracing of x-rays taken seven months after the start of treatment and thirty-two months later, which was two years after the end of active treatment. This reveals the following:

1. The angle BSN has opened $.5^{\circ}$, thus returning to the original angle. There has been a continued anteroposterior growth of the cranium.
2. The nasal floor has remained nearly constant. A slight drop at the anterior nasal spine has opened the angle $.25^{\circ}$.
3. Gonion has gone forward 2 mm. and downward 2.5 mm.
4. Gnathion has gone downward 1 mm. and forward 8.5 mm.
5. The angle formed by the lower border of the mandible with the Bolton plane has closed 2.5° , which is more than it opened between pictures 1 and 2. Fig. 3A.
6. Upper 6 has moved forward 7.5 mm., downward 2 mm., and changed its axis 6° .
7. Upper 1 has moved forward 6 mm. and downward 2 mm. There has been a further forward tipping of 12° .
8. The occlusal plane has continued to tip downward in back 3.5° .
9. Lower 6 has moved forward 8 mm., downward 2.5 mm., and has straightened up 5° .
10. Lower 1 has moved forward 4 mm., downward .5 mm. Its axis has become more vertical by 9° .

The composite (Fig. 3B) indicates that there has been less positional change of the mandible than there was between the first and second pictures and Fig. 3c reveals the following:

1. Lower 6 has moved forward 7 mm. and downward 1 mm. The inclination has changed only 4° (compare with 9).
2. Lower 1 has moved forward 2.25 mm. and upward 2 mm. The inclination has changed 9° (compare with 10).

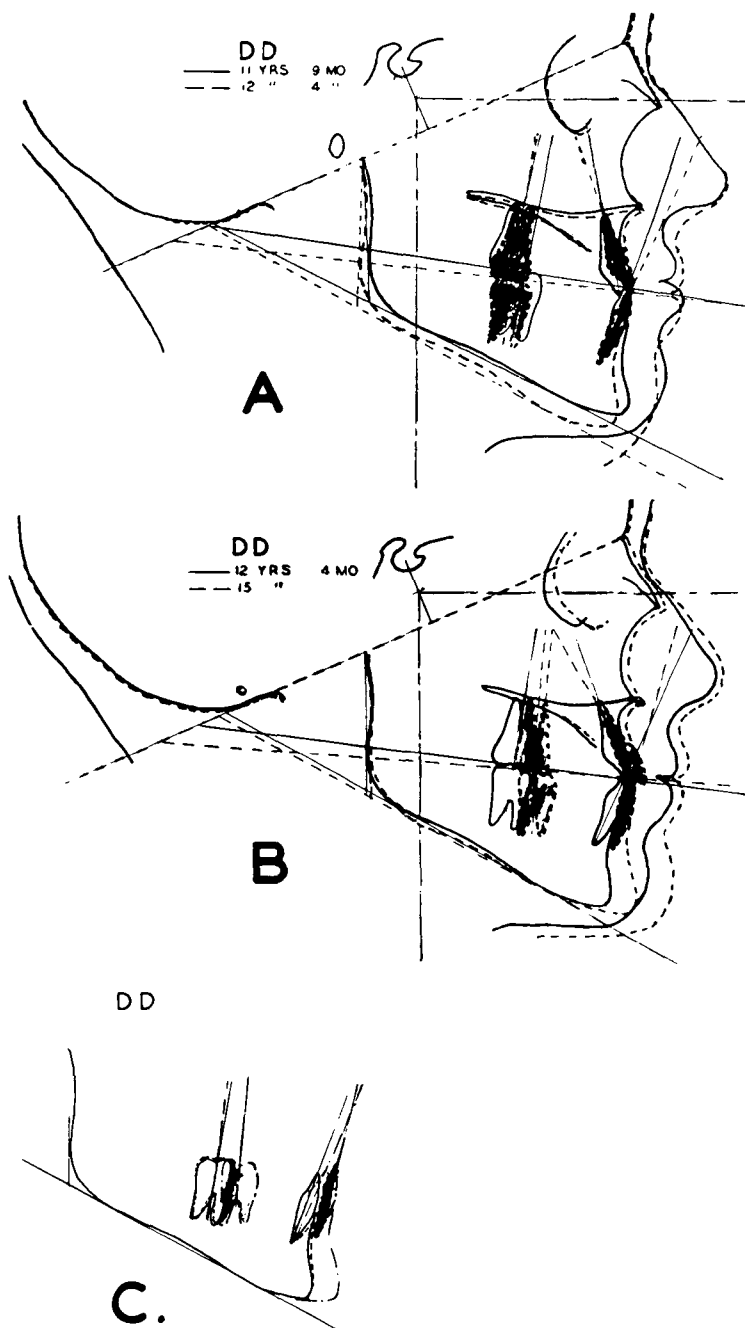


Fig. 3

A. Composite tracing of 1st and 2nd x-rays. A seven month interval elapsed between the two. B. Composite tracing of 2nd and 3rd x-rays. A thirty-two month interval elapsed between the two. C. Composite tracing of superpositions of mandible only.

—Original - - -End of Retention . . .Final

This case was considered clinically successful. The models (Fig. 4) were taken twenty-three months after treatment. The objective in treatment has been accomplished, but the manner in which it was done is questionable. The upper incisors were tipped forward, the angle of inclination being changed from 11° to 20° during the first 7 months of treatment. Two years after active treatment the angle of the incisors had increased to 32° . It should also be noted that the lower incisors have continued to straighten up. The axial inclinations of the upper and lower incisors in this case are characteristic of Class III malocclusions.

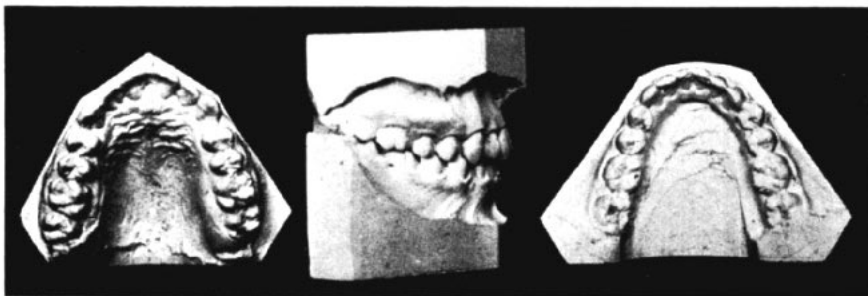


Fig. 4

Case D. D., twenty-three months after treatment. Upper retention has been out thirteen months. Lower retention removed at the time casts were made.

Case C.B., Male

Age at beginning of treatment, 12 years, 3 months.

Fig. 5 represents casts of the case before treatment. The case was characterized by a marked collapse of the upper arch, caused by a mesial drift of both buccal segments in relationship to their maxillary bases and some lack of forward development of the premaxilla. There has been an excessive distal drift of the upper left lateral and a delayed and perverted eruption of the left central due to prolonged retention of the deciduous central incisor. The lower arch shows good form and only a slight collapse.

Objectives Sought in Treatment

(1) To establish lower arch form; (2) to set the upper buccal teeth distally to gain adequate arch length; (3) to correct the mid-line and (4) to establish correct axial inclination of all the teeth.

Mechanics Used

(1) Lower ideal arch with vertical arch loop between left first bicuspid, and first molar. (2) Upper ideal arch with stops for advancement of the arch. (3) Second order bends and Class II elastics.

Treatment time: Upper arch 16 months. Lower arch 19 months.

Analysis of Tracings

Fig. 6A represents the composite tracing of x-rays taken before treatment and nineteen months later. This reveals the following:

1. The angle BSN has closed 2° . This has been accompanied by antero-posterior growth of the cranial base and an increase between sella turcica and the Bolton plane.

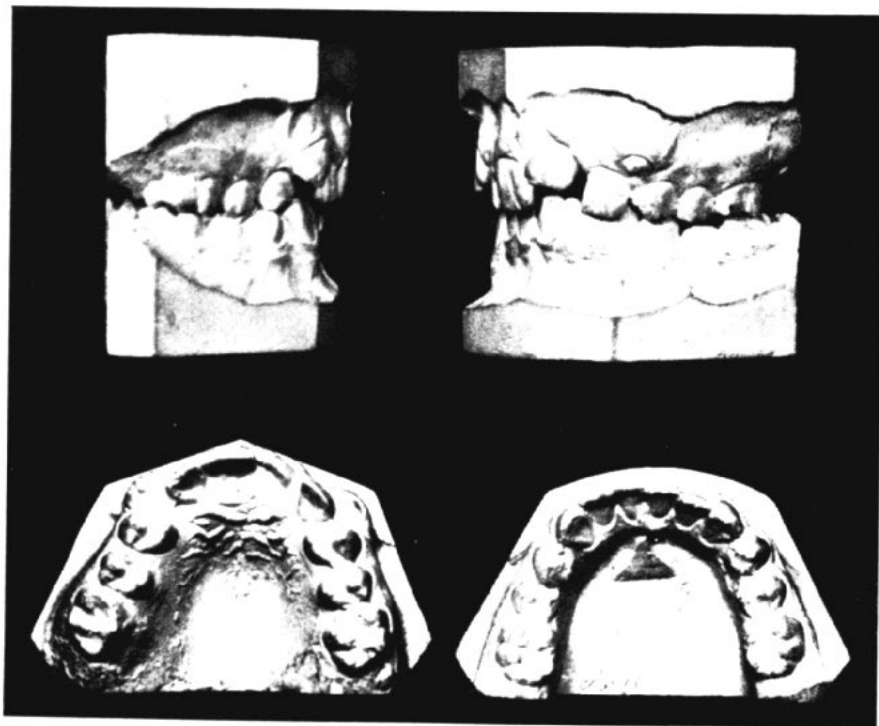


Fig. 5

Case C. B., male, before treatment. Age 12 years, 3 months.

2. The nasal floor has descended and its angle with the Bolton plane has closed 1.5° .
3. Gonion has gone forward 1.5 mm. and downward 3 mm.
4. Gnathion has gone forward 5.5 mm. and downward 4 mm.
5. The angle of the lower border of the mandible with the Bolton plane has remained constant.
6. Upper 6 has moved forward .5 mm. and downward 1 mm., changing its inclination 4.5° .

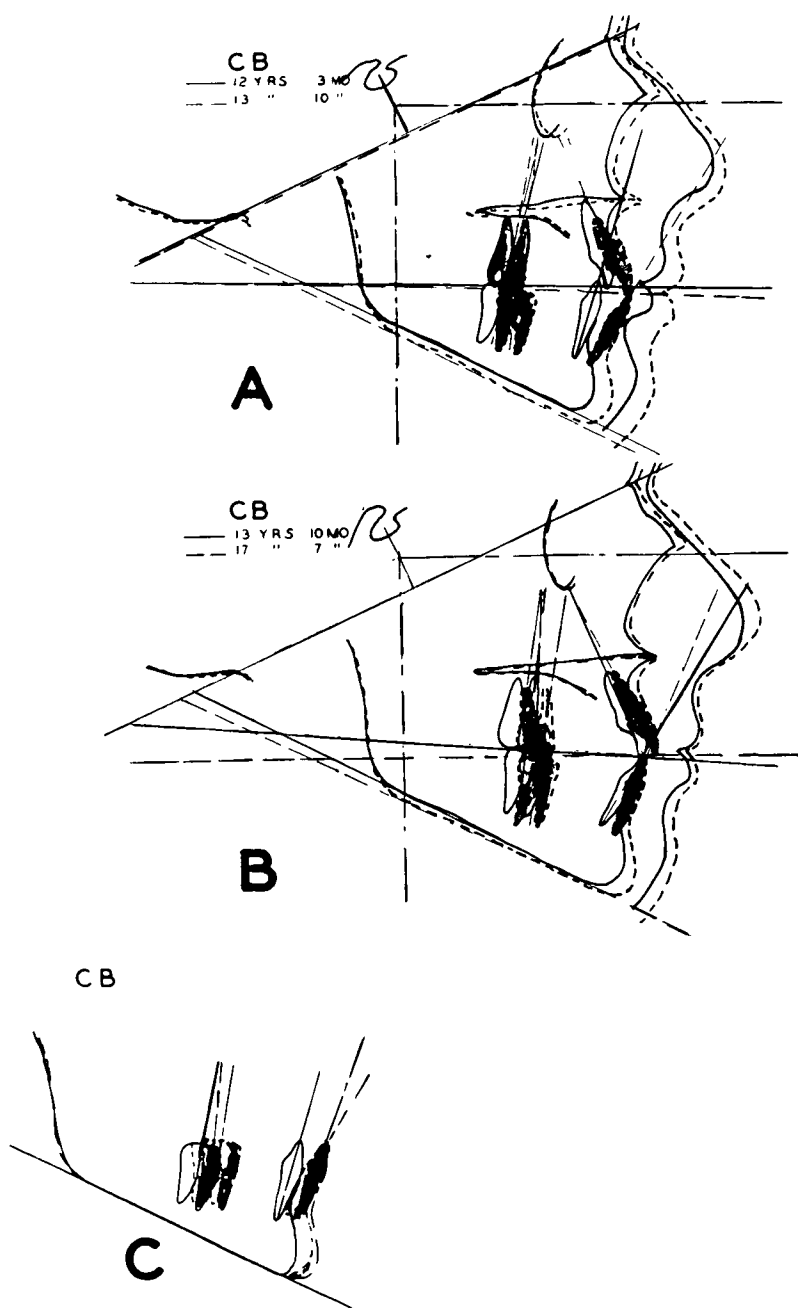


Fig. 6

A. Composite tracing of 1st and 2nd x-rays. A nineteen-month interval elapsed between the two pictures. B. Composite tracing of 2nd and 3rd x-rays. A forty-five month interval elapsed between. C. Composite tracing of superpositions of mandible only.

—Original - - -End of Treatment - . -Final

7. Upper 1 has moved forward 6.5 mm. and downward 2.5 mm. and increased its axial inclination 8.5° .
8. The occlusal plane has tipped downward in front opening its angle with the Bolton plane 3.5° .
9. Lower 6 has gone forward 4.5 mm., downward 1.5 mm. and has decreased its axis of inclination 8° .
10. Lower 1 has gone forward 10 mm., and downward 3.5 mm. increasing its axial inclination 14° .

The composite tracing of the mandibles (Fig. 6c) shows:

1. A 7.5 mm. increase in mandibular length.
2. Lower 6 has gone forward 4 mm. and upward 2 mm. (Compare with 9).
3. Lower 1 has gone forward 6 mm. and has maintained its vertical position (compare with 10).

Fig. 6B represents the composite tracing of x-rays taken nineteen months after treatment and forty-five months later. This reveals the following:

1. The angle BSN has opened 2° to return to its original angle. This has been accompanied by continued anteroposterior growth along the Bolton plane, but at a much reduced rate.
2. The nasal floor has descended slightly and its angle has opened 1.5° , thus returning to its relation to the Bolton plane.
3. Gonion has gone forward .5 mm. and downward 1.75 mm.
4. Gnathion has gone forward 2.5 mm. and downward 2.5 mm.
5. The angle of the lower border of the mandible with the Bolton plane has closed 1.5° .
6. Upper 6 has gone forward 6.5 mm., downward 2.5 mm. and straightened up 2.5° .
7. Upper 1 has gone forward 2.5 mm., downward 2.5 mm. and has increased its angle of inclination 2.5° .
8. The occlusal plane has tipped down at the distal end, closing the angle 3° , which is $.5^{\circ}$ beyond its original position.
9. Lower 6 has gone forward 2.4 mm., downward 2 mm. and has tipped forward 4° .
10. Lower 1 has not gone forward at all and only .5 mm. downward. It has straightened up 8.5° .

Mandibular superpositions (Fig. 6c) reveal:

1. An increase in the length of the mandible, but at a much reduced rate as compared with the first composite.
2. Lower 6 has moved forward 2.25 mm. and maintained its vertical posi-

tion (compare with 9).

3. Lower 1 has moved forward .75 mm. and maintained its vertical position (compare with 10).

This case was fairly successful clinically. Some difficulty was experienced in holding anterior rotations as is shown in Fig. 7.

The objective in treatment was considered to have been only partially accomplished, as the upper molar was not moved distally; however, it was held stationary while the rest of the face and denture moved forward. Treatment was accompanied by considerable growth and development.

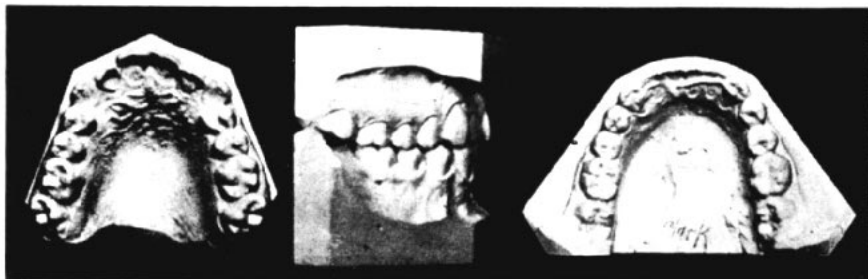


Fig. 7

Case C. B., forty-six months after treatment and twenty-six months after upper retention was removed. Band and spurs still in place on lower cuspids.

Case C.N., Female

Age at beginning of treatment, 12 years, 9 months.

Fig. 8 represents casts of the case before treatment. There is a mild collapse of the upper arch, partially blocking out the cuspids. The mesial drift of the upper left buccal teeth is sufficient to cause a cusp-to-cusp occlusion on this side. There is a slight associated collapse in the lower arch, causing crowding of the incisors.

Objectives Sought in Treatment

(1) To reestablish lower arch form and length by expansion through the cuspid area; (2) to move the upper buccal teeth distally to permit normal occlusion and space for the cuspids.

Mechanics Used

Lower ideal arch with molar stops. Upper ideal arch with second order adjustment and stops for arch advancement. Class II elastics.

Treatment time: 18 months.

Analysis of Tracings

Fig. 9A represents the composite tracing of x-rays taken before treatment and twenty months later. This reveals the following:

1. The angle BSN has closed 2° .
2. The nasal floor has descended 1.5 mm. and its angle with the Bolton plane has opened .5 mm.
3. Gonion has gone forward .5 mm. and downward 2.5 mm.
4. Gnathion has gone forward 1 mm. and downward 6 mm.
5. The angle of the lower border of the mandible with the Bolton plane

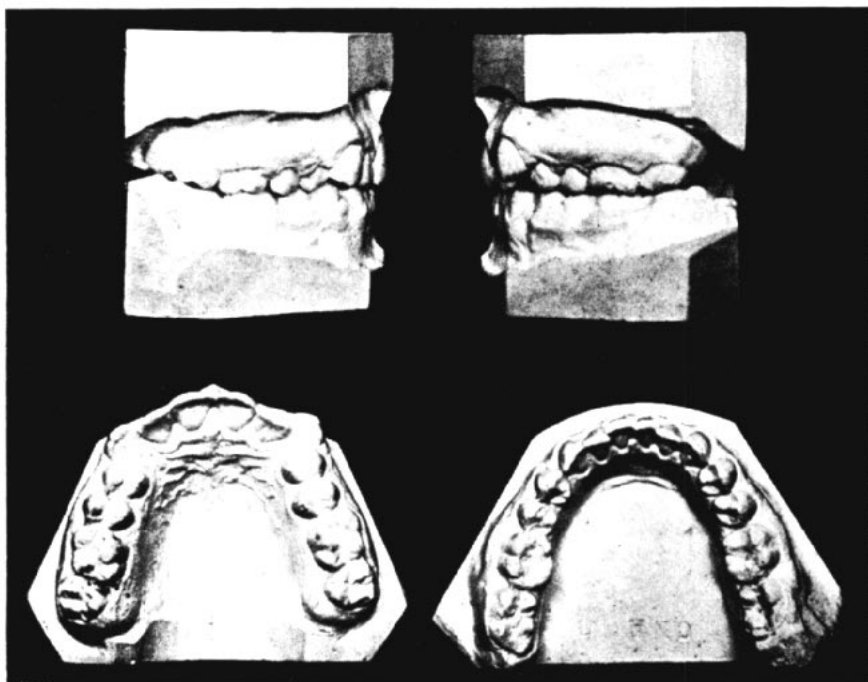


Fig. 8
Case C. N., female, before treatment. Age 12 years, 9 months.

has opened 1.5° . Readings 3, 4, and 5 are evidence of opening of the bite.

6. Upper 6 has gone backward 1 mm., downward .5 mm. and has tipped distally 3.5° .
7. Upper 1 has gone forward 2.5 mm., downward 1.5 mm. and has tipped forward 2° .
8. The occlusal plane has opened 2° because of the elevation of the incisors.
9. Lower 6 has gone forward 2.5 mm., downward .5 mm. and has straightened up $.5^{\circ}$.

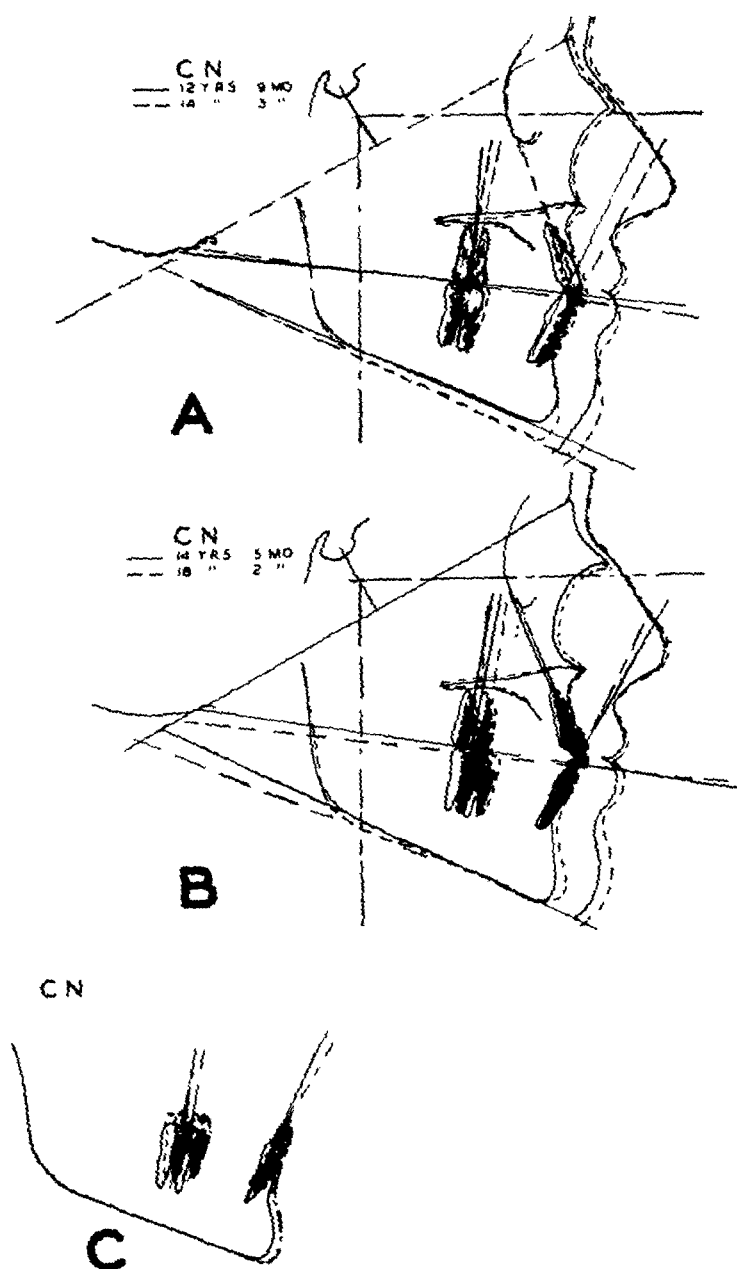


Fig. 9

A. Composite tracing of 1st and 2nd x-rays. A twenty month interval elapsed between the pictures. B. Composite tracing of 2nd and 3rd x-rays. A forty-five month interval elapsed between the two. C. Composite of tracing of superpositions of mandible only. —Original - - -End of Treatment . . .Final

10. Lower 1 has gone forward 3 mm., downward 3.5 mm., and has tipped forward 3° .

The mandibular composite (Fig. 9c) shows quite different changes than do 4, 9, and 10, and is evidence of a positional change of the mandible. It reveals that:

1. The mandible has increased in length 2.5 mm.
2. Lower 6 has gone forward .75 mm., upward 3.5 mm. and has straightened up 1.5° (compare with 9).
3. Lower 1 has gone forward 2 mm., upward 3 mm. and has tipped forward 4.5° (compare with 10).

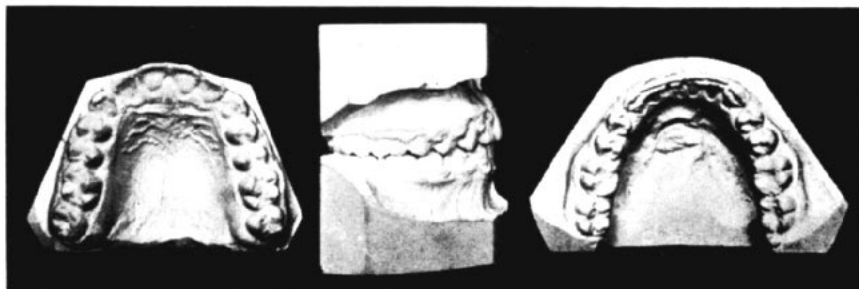


Fig. 10

Case C. N., forty-seven months after treatment. Upper retention has been out 35 months. Lower cuspid-to-cuspid removed at time models were taken.

This case shows slight changes in tooth position except in a vertical direction.

Fig. 9B represents the composite of the x-rays taken twenty months after the start of treatment and those taken forty-five months later. This reveals the following:

1. Angle BSN has opened 2° , thus returning to the original angle.
2. There has been little change in the maxilla and in tooth position.
3. All of the axial inclinations have straightened.
4. The mandible has increased very little in length (Fig. 9c).
5. The occlusal plane has closed 3.5° by a downward movement of its posterior end. This is 1.5° beyond its angle at the beginning of treatment.
6. The angle of the lower border of the mandible with the Bolton plane has closed 3.5° by a marked downward movement of gonion. This is 2° less than the original reading.

The models of this case taken forty-five months after treatment are

shown in Fig. 10. Clinically this case was considered excellent. The objectives sought in treatment were considered to have been accomplished. While the molar was not actually moved distally, it was held in a stationary position during a period when it normally would be moving forward.

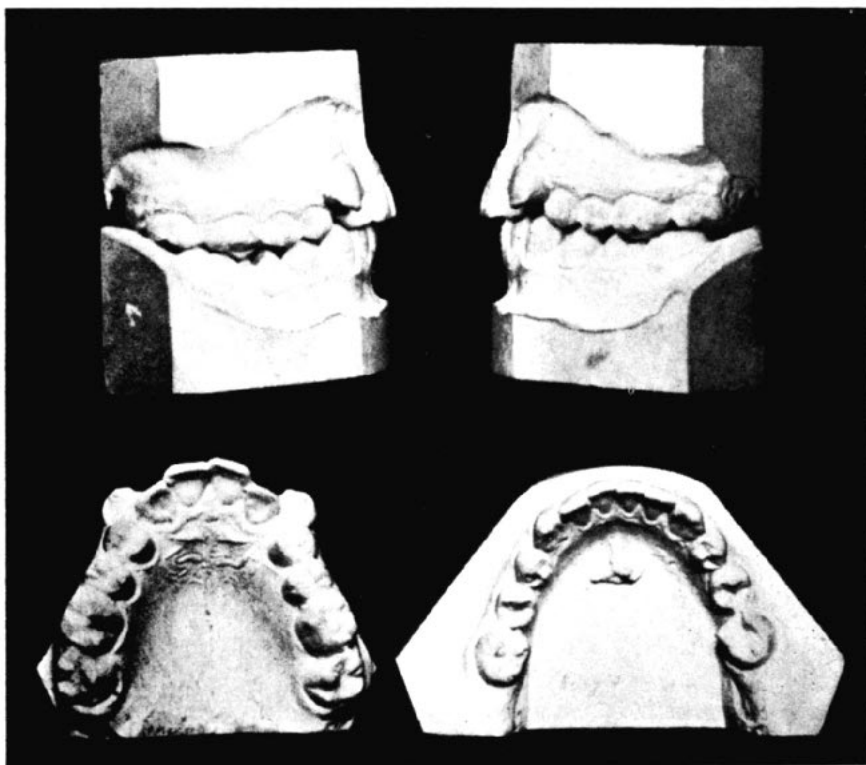


Fig. 11
Case C. X., male, before treatment. Age 13 years, 11 months.

Case C.X., Male

Age at beginning of treatment, 13 years, 11 months.

Fig. 11 represents casts of the case before treatment. In the upper arch there is a marked mesial drift of both buccal segments to the maxillary base, but probably not to cranium, and some lack of forward development of the incisors. This has resulted in a blocking out of the cuspids. The lower arch has suffered an early loss of both six-year molars. The second molars have tipped mesially and the second bicuspids have rotated and tipped distally into contact with the molars.

Objectives Sought in Treatment

(1) To move the upper buccal segments distally in order to open space for the cuspids; (2) in the lower arch, it was decided not to open the space for the missing first molars, but to correct axial inclinations and rotations so that the second molars would take the place of the first molars.

Mechanics Used

Ideal upper arch, modified to pass over the permanent cuspids and stops for arch advancement. Second order bends and Class II elastics were used for twenty months. In the lower arch the posterior contacts were closed by ligature ties; auxiliary rotating springs were used for the bicuspids.

Treatment time: 25 months.

Analysis of Tracings

Fig. 12A represents the composite tracings of x-rays taken before treatment and twenty-seven months later. This reveals the following:

1. The angle BSN has opened 1° . There is considerable anteroposterior growth along the Bolton plane.
2. The nasal floor has descended 2 mm. without a change in its angle to the Bolton plane.
3. Gonion has gone backward 1 mm. and downward 3 mm.
4. Gnathion has gone backward .5 mm. and downward 5 mm.
5. The angle of the lower border of the mandible with the Bolton plane has opened $.5^{\circ}$.
6. Upper 6 has gone backward 1.5 mm., upward .5 mm. and has tipped backward 4° .
7. Upper 1 has gone forward 1.5 mm., downward 4 mm. and has straightened up 2° .
8. The occlusal plane has opened 8° , mainly because of the downward movement of the incisors.
9. Lower 7 (6 is missing) has gone forward 5 mm., downward 2.5 mm. and straightened up 2° .
10. Lower 1 has gone forward 3 mm. and downward 5 mm. without any change in its axial inclination.

The composite of the mandibular tracings (Fig. 12c) reveals that:

1. The mandible has increased 3.5 mm. in length.
2. Lower 7 has gone forward 5.75 mm. but has not gone downward as indicated in 9.
3. Lower 1 has gone forward 5.5 mm. but not downward.

Fig. 12B represents the composite tracing of the x-rays taken twenty-seven months after treatment and those taken four months later. This reveals the following:

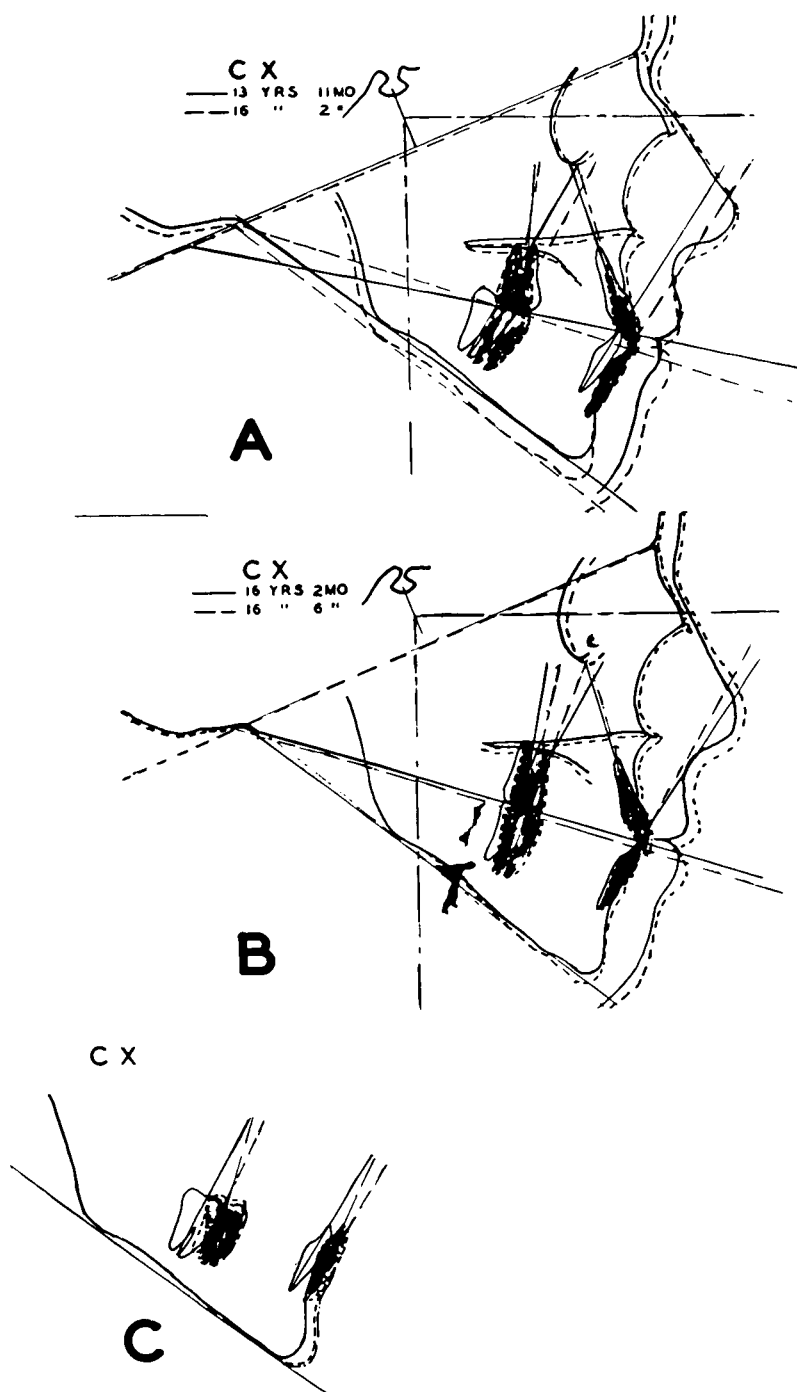


Fig. 12

A. Composite tracing of 1st and 2nd x-rays. A twenty-seven month interval elapsed between the two pictures. B. Composite tracing of 2nd and 3rd x-rays. A four month interval elapsed between the two. C. Composite tracing of superpositions of mandible only.

—Original - - -End of Treatment - . -Final

1. Angle BSN has closed 1° , returning to its original angle.

Even in this short period, the pictures show definite downward and forward development of the maxilla.

2. The nasal floor continues to drop without changing its axis.
3. Gonion has changed very little while gnathion continues to go downward.
4. The angle of the lower border of the mandible with the Bolton plane has opened 3.5° .
5. Upper 6 has moved forward 2.25 mm. and downward 2 mm.
6. Upper 1 has moved downward 2.25 mm., forward .5 mm. and has changed its axis of inclination very little.
7. The occlusal plane has dropped 2 mm. and opened its angle $.5^{\circ}$.
8. Lower 7 has moved forward 1.5 mm., downward 2 mm. and straightened up 8° .
9. Lower 1 has changed very little, but has straightened up 3° .

The mandibular composite (Fig. 12c) reveals:

1. A .75 mm. increase in the length of the mandible.
2. No forward movement of the molar, but this tooth has gone downward 1.5 mm. (compare with 8).
3. Lower 1 has gone backward 1.5 mm., downward .5 mm. and has straightened up 5° (compare with 9).

The clinical result of this case is only fair, considerable difficulty being experienced in maintaining the upper anterior contacts and the arch form.) No second models are available for this case.

The objectives sought in treatment were accomplished in that the upper molars were tipped distally, and the lower molars moved forward bodily.

Case D.V., Female

Age at beginning of treatment, 14 years, 2 months.

Fig. 13 represents the casts of the case before treatment. They show a mesial drift of all four buccal segments in relationship to the maxillary and mandibular bases. The patient showed a marked lack of development of the face, particularly of the mandible. The breaks in the lower arch occurred at the lateral-cuspid contacts, permitting the cuspids to tip forward markedly. In the upper arch both cuspids are two-thirds blocked out, and there is crowding of the incisors.

Objectives Sought in Treatment

(1) To gain adequate arch length by setting all four buccal segments distally; (2) to maintain the axial inclinations of the lower incisors, and (3) to tip the cuspids distally to good axial inclinations.

Mechanics Used

The lower arch was made passive from cuspid-to-cuspid and space was opened between the first bicuspid and cuspids by means of vertical arch loops. The cuspids were then tipped distally, after which an ideal arch was placed. In the upper arch second order bends and Class II elastics were used to increase arch length.

Time of treatment: 26 months.

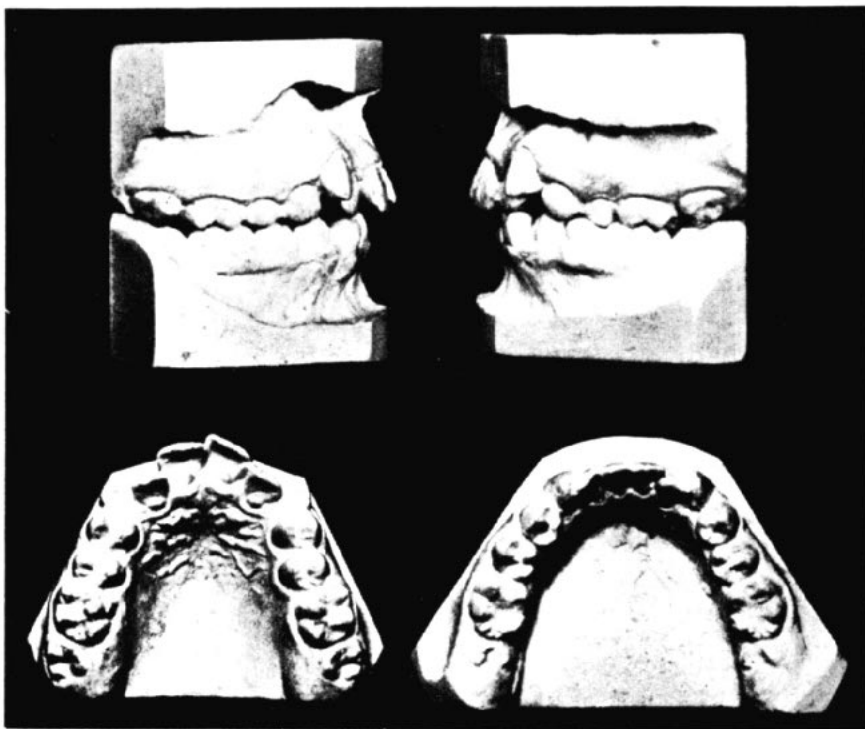


Fig. 13
Case D. V., female, before treatment. Age 14 years, 2 months.

Analysis of Tracings

Fig. 14A represents the composite tracing of x-rays taken at the beginning of treatment and twenty-seven and a half months later. This reveals the following:

1. Angle BSN opened 1° . There was very little anteroposterior growth along the Bolton plane.
2. The nasal floor has descended 1.5 mm. and the angle between it and the Bolton plane has opened $.5^{\circ}$.

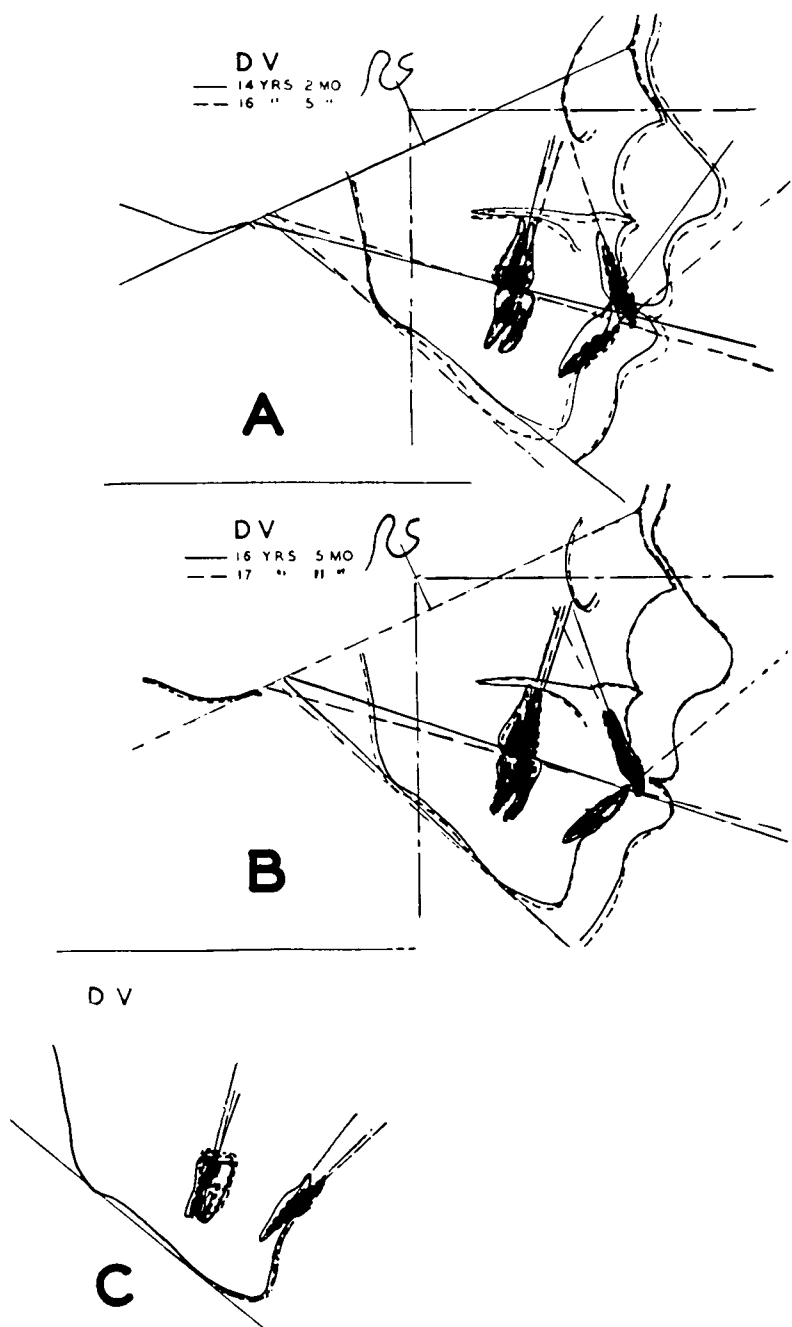


Fig. 14

A. Composite tracing of 1st and 2nd x-rays. A twenty-seven and a half month interval elapsed between the two. B. Composite tracing of 2nd and 3rd x-rays. An eighteen month interval elapsed between the two. C. Composite tracing of superpositions of mandible only.

—Original - - -End of treatment . . . -Final

3. Gonion has gone backward .75 mm. and downward 1.5 mm.
4. Gnathion has gone backward 1.5 mm. and downward 3 mm. This probably indicates a positional change of the mandible.
5. The angle of the lower border of the mandible with the Bolton plane has opened 4°.
6. Upper 6 has gone backward 1 mm., with no change in vertical position. It has tipped distally 2°.
7. Upper 1 has gone forward 2 mm., downward 2.5 mm., and has tipped forward 2.5°.
8. The angle of occlusion to the Bolton plane has opened 3°, almost entirely by elevation of the upper incisors and depression of the lowers.
9. Lower 6 has gone forward .75 mm., downward .5 mm. and has tipped forward 2°.
10. Lower 1 has gone forward 2.5 mm., downward 6 mm. and has tipped forward from 36.5° to 50°, an increase of 13.5°.

The composite of the mandibular superposition (Fig. 14c) reveals that:

1. There has been a 1.75 mm. increase in mandibular length.
2. Lower 6 has not changed anteroposteriorly but has elevated 2.5 mm. (compare with 9).
3. Lower 1 has gone forward 4 mm. and downward .5 mm. (compare with 10).

Fig. 14B represents the composite tracing of x-rays taken twenty-seven and a half months after treatment and those taken eighteen months later. This reveals the following:

1. Angle BSN has opened 1° more.
2. Facial changes have been very slight.
3. Changes in tooth position have been very slight. (It may be significant that the angle of inclination of upper 1 has increased 7°, and that lower 1 has straightened up only 1°.)

Fig. 15 represents the casts of the case taken sixteen months after treatment at which time the lower retention was removed. Clinically this case was not considered successful. It has relapsed, particularly in the upper arch.

The objectives sought in treatment were not attained. Distal movement of the buccal teeth was not accomplished to a sufficient degree. The increase in arch length was obtained almost entirely by a labial tipping of the upper and lower incisors. The small amount of facial growth might have been a complicating factor.

Case C.F., Female

Age at beginning of treatment, 16 years, 3 months.

Fig. 16 represents casts of the case before treatment. The case presented a good upper arch with mild rotations. The collapse of the lower arch was concentrated in the buccal segments. There was a lack of development in the mandible.

Objectives Sought in Treatment

- (1) To set lower molars distally in order to gain adequate arch length;
- (2) to correct mesiodistal relations.

Mechanics Used

Ideal upper arch. Ideal lower arch with ribbon arch end-section and friction nut to move the left second molar distally. Arch loops on the right

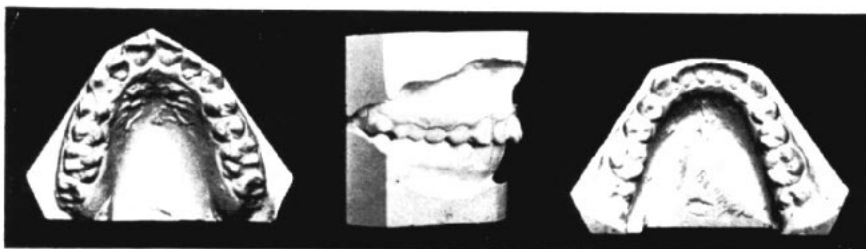


Fig. 15

Case D. V., 16 months after treatment. Retention removed at time casts were made.

side to open space for the second bicuspid. Second order bends and Class II elastics to move the upper teeth distally.

Time of treatment: 18 months.

Analysis of Tracings

Fig. 17A represents the composite tracing of x-rays before treatment and eighteen months later. This reveals the following:

1. The angle BSN has opened 1° . There is very little anteroposterior growth along the Bolton plane.
2. The nasal floor has changed very little, the tendency being to go downward. The anterior nasal spine has moved forward 2 mm.
3. Gonion has gone forward 1 mm. and downward .5 mm.
4. Gnathion has gone forward .75 mm. and downward 2 mm.
5. The angle of the lower border of the mandible with the Bolton plane has opened 4° .
6. Upper 6 has gone backward .5 mm. and downward 1 mm. It has straightened up 3° .
7. Upper 1 has gone forward 1 mm., upward 1 mm. and has uprighed 2° .
8. The angle of occlusion to the Bolton plane has closed 3° by a drop at its distal end.

9. Lower 7 (6 is missing) has gone backward 1.5 mm. and upward 1.25 mm. This has been accomplished by a tipping of 3.75° .
10. Lower 5 has been tipped forward 14° . (The crown has gone forward 3 mm. and the root has gone backward 1.5 mm.)
11. Lower 1 has gone forward 1 mm. and downward 1.5 mm., changing its inclination 1° .



Fig. 16
Case C. F., female, before treatment. Age 16 years, 3 months.

The composite of the mandibular superpositions (Fig. 17c) reveals the following:

1. The mandible has increased 2.25 mm. in length.
2. The tooth positions are almost the same as in Fig. 17A.

Fig. 17B represents the composite tracings of x-rays taken eighteen months after the start of the case and forty-six months later. These reveal:

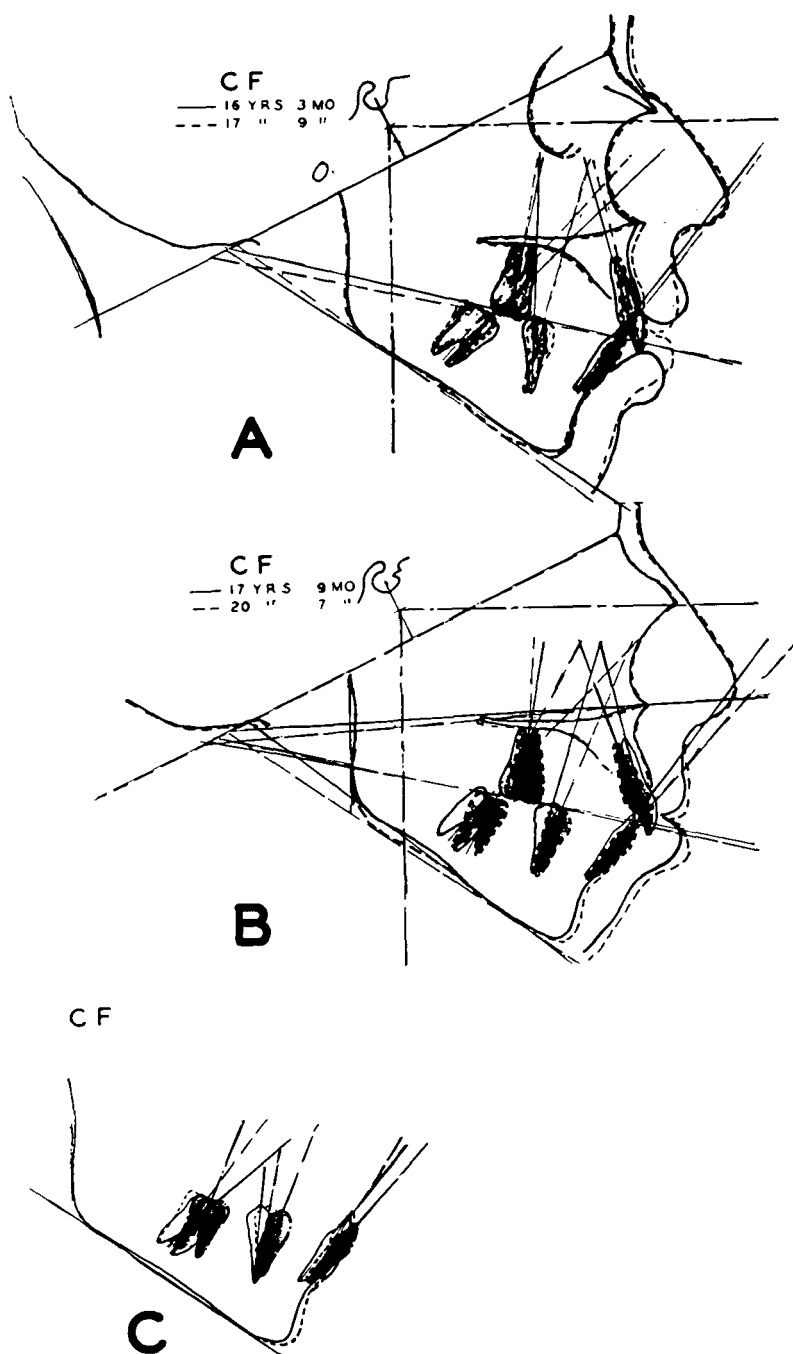


Fig. 17

A. Composite tracing of 1st and 2nd x-rays. An eighteen month interval elapsed between the two. B. Composite tracing of 2nd and 3rd x-rays. A forty-six month interval elapsed between the two. C. Composite tracing of superpositions of mandible only.

—Original -- -End of treatment - . -Final

1. The angle BSN has opened 1° more. Facial and cranial changes are very slight.
2. Gonion has gone backward .5 mm. and downward 4 mm.
3. Gnathion has gone forward 2 mm. and downward 1 mm.
4. Upper 6 has gone forward 2 mm., downward 1 mm., and straightened up 6.5° .
5. Upper 1 has gone backward 1 mm., downward 1.5 mm. and increased its angle of inclination 6° .

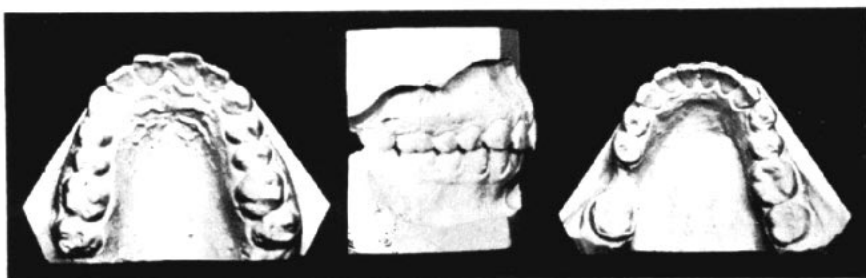


Fig. 18
Case C. F., forty-six months after treatment. Retention of lower left molar space still in place.

6. The occlusal plane has opened 2.5° , mostly by a change at its anterior end.
7. Lower 7 has gone forward 1.5 mm. at the crown and 6 mm. at the root apex. It has straightened up 13.75° .
8. Lower 5 has tipped forward 2.25 mm. Its inclination has changed 7° .
9. Lower 1 has gone forward .5 mm., downward 3.5 mm., and increased its inclination 5° .

The composite of mandibular superpositions (Fig. 17c) shows no increase in the length of the mandible, excepting a slight amount in the alveolar process. The tooth readings are essentially the same as in Fig. 17b, and the marked drop of gonion is probably due to mandibular growth in this area.

Fig. 18 represents the casts of this case taken forty-six months after treatment. It was not considered clinically successful. There has been some relapse in the mesiodistal relationship of the arches. It is evident that sufficient space has not been gained for the missing six-year molar.

The objectives sought in treatment were only partially obtained as lower 7 was not carried far enough distally.

Summary

This preliminary cephalometric survey of reactions to orthodontic treatment is enlightening in that it tends to verify certain clinical observations and to throw doubt upon others.

1. They seem to bear out the clinical deduction that the use of inter-maxillary elastics changes the occlusal plane, doing so by excessive elevation of the teeth at both ends of the elastic traction.

2. In all of the cases shown, except one (D.D.), the occlusal plane tends to return to its original position subsequent to treatment.

3. Tooth movement does not seem to be as great as clinical observation has led us to believe. Apparently, growth and development account for a considerable part of the changes which take place during orthodontic treatment.

A comparison of the intended object of treatment and mechanics used with the tooth movement accomplished should give us a keener appreciation, and lead to a more careful study, of anchorages.