

Overbites and Overjets

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This subject, "Overbites and Overjets", was selected as the author's main work project in 1938. At that time cephalometric analysis was not used, so all measurements were from plaster casts. The first approach was the inter-relationship of the upper and lower occlusal curve which was reported to this group in 1939.¹ Mention should be made that in that study there was reference to the definition which Count von Spee gave for the curve of Spee; he stated that the posterior portion of the curve is tangent to the anterior surface of the condyle while the anterior portion of this same curve is tangent to the occlusal surface of the teeth.² The condyle was not included in any of these studies so, for what is often mistakenly termed the "curve of Spee", the term "occlusal curve" is used, i.e., the curve of the occlusal surface of the teeth.

The sixteen different interrelations of the upper and lower occlusal curves illustrated in the study¹ included the incisors on the same curve as that of the buccal teeth, a situation which frequently is not so, because the curve of the upper anterior teeth is commonly a reverse of the curve of the upper buccal teeth.

A search for the cause of these variations produced another study entitled "Predetermining the Overbite and Overjet" in 1949.³

This second study showed a method of measuring the sum of the mesiodistal widths of the upper or lower anterior teeth.

When the sum of the uppers equalled the sum of the lowers, a normal over-

bite and overjet resulted; when the upper sum was greater than the lower, an excessive overjet occurred; when the upper sum was less than the lower, an end-to-end bite occurred; of course, the buccal segments must be in Class I relation. The difficulty then arose that, even though the sums of the widths of the upper and lower anterior teeth were equal, if the sum of the widths of the upper buccal teeth was greater than that of the lower buccal teeth, an overjet occurred and, conversely, when smaller than the lower, an end-to-end bite occurred (or spacing of the upper anterior teeth occurred) even in Class I cases. Seldom did an anterior segment discrepancy balance out a buccal segment discrepancy. So the relative sums of the widths of the upper and lower buccal teeth are a factor in producing an overbite or overjet. Bolton⁴ devised a method of comparing the sum of the widths of all upper teeth with that of all lower teeth that failed at times because of Class I or Class II basal tendencies, and especially because the relative inclination of the upper incisors to that of the lower incisors was another variable in the production of overbites and overjets. This was discussed in 1949² and recently substantiated in the cephalometric study of Herness et al.

These studies raised the question which should have been undertaken first, namely: just what is the mean and range of overbites, overjets and inter-incisal inclinations of good occlusions. A third paper "The Relation of Upper Anterior Teeth to Lower Anterior Teeth as Present on Plaster Models of a Group of Acceptable Occlusions" was presented in 1952.⁵ This range of norms gave a basis upon which to plan treat-

Read at the 1973 meeting of the Mid-western Component of the Angle Society.

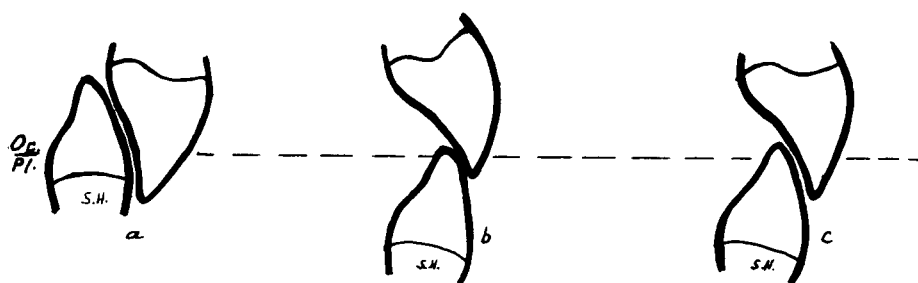


Fig. 1

ment and also to evaluate the results of treatment and retention.

DISCUSSION

All cases except the last (M. B.) had lower canine-to-canine retainers with extensions to the lingual of the lower first premolars. This was not removed until the third molars were fully erupted or extracted, preferably not until the patient was 22 years of age or older. There were no premolars extracted.

The criteria for extraction of the third molars were: 1) roentgenographic evidence of abnormal eruptive direction for a given dental age, 2) the beginning of tooth crowding in either one or both lower buccal segments (the retainer meanwhile prevented the lower anterior teeth from crowding), and 3) any crowding of the upper anterior or buccal teeth. Continuing retention until 22 years of age and longer maintained tooth alignment during the growth, development and facial maturation changes of the adolescent into the young adult.

The upper anterior tooth rotations were retained with bands and spurs for a year and a Hawley upper plate was worn, if necessary, to maintain buccal width, and/or overjet, or to prevent elongation of the lower anterior teeth. After a year the bands and spurs were removed and a Hawley plate given the patient to be worn full time as long as necessary to prevent relapse, and

then nightly if needed to maintain the correction. If upper and lower tooth mass discrepancies caused an overjet, the Hawley may need to be worn indefinitely especially if the patient has tight and/or hyperactive lips.

Case S. H. (Fig. 1) the prolonged treatment of the Class II, Div. 2 due to the retarded shedding of the upper right and left deciduous second molars and upper left deciduous cuspid, and the slow eruption of their permanent successors produced ample time for the patient to develop lateral function; before treatment, because of the deep overbite, he was able to function only vertically. His age of 11 to 14 years during treatment is the usual age for preadolescents to change from a mixed dentition function to a full permanent dentition function which includes both lateral as well as vertical function. The use of a Hawley upper plate, following removal of bands and spurs, full time for one year, then nightly, the prolonged retention for eight years for the lower anterior segment, along with the extraction of all third molars at 23 years of age prevented an anterior dental relapse. By 27 years of age he still had a fine occlusion, splendid upper and lower alignment, overbite and function stabilized as shown in the final records two years later. The overbite was reduced from 9.3 mm to 2.3; following retention, it returned to 4.1 mm, within the normal range of 0.5-4.3.

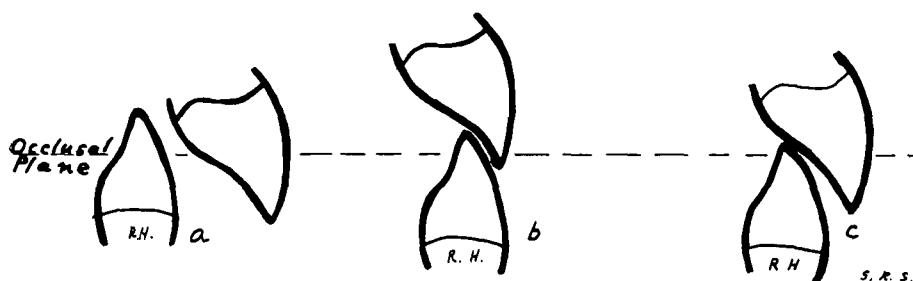


Fig. 2

There was no overjet before or after treatment.

Case R. H., (Fig. 2) This correction of a Class II, Div. 1 Stayed for the following reasons: 1: His good cooperation wearing a Hawley upper plate plus extraoral force kept all spaces closed during retention, prevented overjet recurrence and elongation of the lower anterior teeth into a deep overbite. 2. Fortunately, his growth pattern changed so that the upper and lower dentitions grew simultaneously and normally during the retention period of eight years. 3. He outgrew his slight tongue-thrusting habit and developed good lateral and vertical function together with a normal overbite and overjet, an excellent result at 26 years, three years following loss of the lower retainer. Third molars still unerupted and present, he did not wish to have them extracted. Treatment changed the overbite from 4.9 mm to 2.8; it returned to 4.6 mm. The overjet was re-

duced to 0.0 mm from 5.8, returning to 2.2 mm.

Case J. L., (Fig. 3) Prolonged retention of the lower anterior teeth, a Hawley upper plate for eight years, and the extraction of the upper and lower third molars at 21 years of age prevented dental rotation relapse. Development of good lateral and vertical function during the retention period produced a perfect overbite, no overjet, and excellent occlusion with no change in the final records four years after the lower retention was removed, a splendid esthetic, well-functioning dentition with perfectly aligned teeth at 26 years of age. A 1.1 mm overbite was closed to a normal 3.3 which reverted to the original overbite. Treatment reduced the overjet from 6.2 mm to 0.9. There was no overjet in the final records.

Case R. A., (Fig. 4) Upper and lower anterior alignment was maintained by prolonged lower retention and an upper

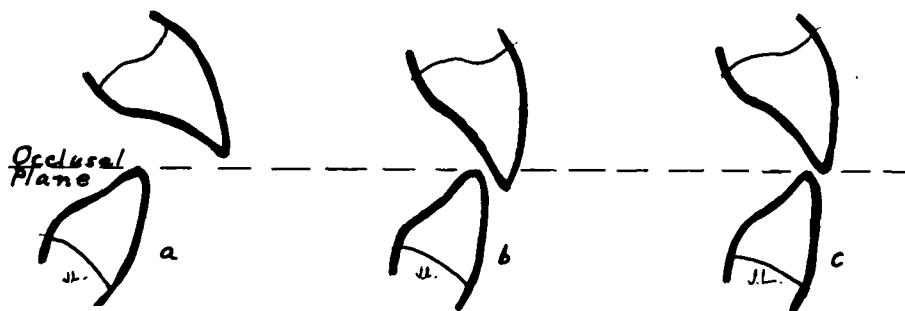


Fig. 3

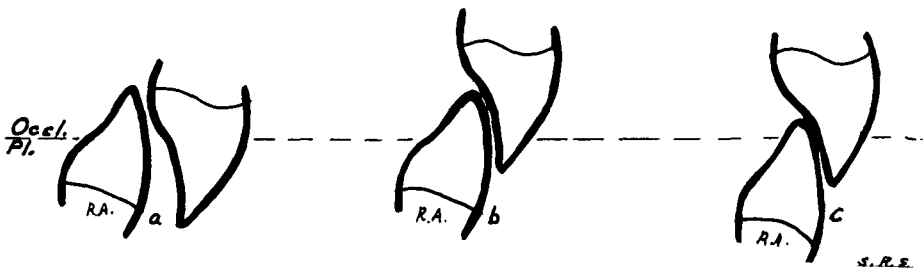


Fig. 4

Hawley plate worn nightly for eight years. The boy had a Class I malocclusion. Extractions of all third molars at 20 years of age maintained perfect alignment of all teeth. Cusps of teeth very high and fossae very deep prevented any lateral function. The lower incisors occluded with the lingual of the upper incisors (no cingula) and prevented further deepening of the bite and produced a stable occlusion with rather deep overbite and slight overjet in final records taken at 22 years of age. The overbite was changed to 4.1 mm from 8.7. Nine years later it had deepened to 5.1 mm, outside the normal range. His overjet was reduced from 3.2 to 1.0 mm where it remained.

Case S. O., (Fig. 5) Seven years retention with lower retainer, no Hawley upper plate necessary, and extraction of all third molars at 20 years of age permitted the upper and lower dentitions to maintain perfect alignment and grow into fine occlusion from a Class I. The cusps and fossae were

of moderate size so that good lateral and vertical function produced a fine overbite with no overjet. This is a splendid, functional, perfectly-aligned esthetic occlusion at 25 years of age, four years following removal of the lower retainer, a product of good growth, development and function during treatment and retention. Treatment reduced the overbite from 5.1 to 4.2 mm; after retention it decreased to 4.1. A 3.6 mm overjet changed to 1.2; from there it became 1.3.

Case M. K. (Fig. 6) Eight years retention of lower anteriors and extraction of all third molars at 20 years of age maintained the perfect alignment as corrected for this Class I. No upper retention was necessary. Meanwhile, the dentition with supporting structures grew and developed producing a fine occlusion. The normal overbite and slight overjet were maintained by the good lateral and vertical function which developed during treatment and continued during retention, a perfectly

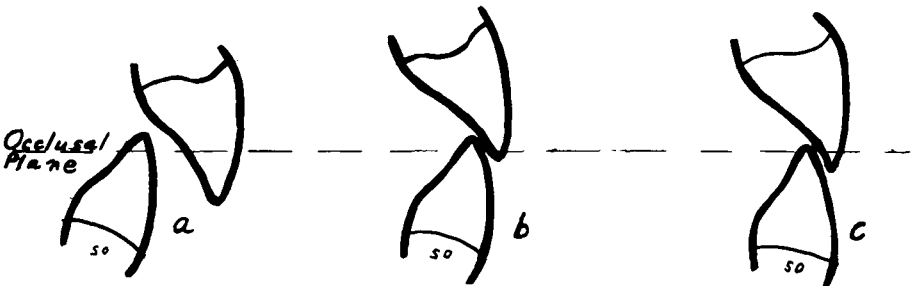


Fig. 5

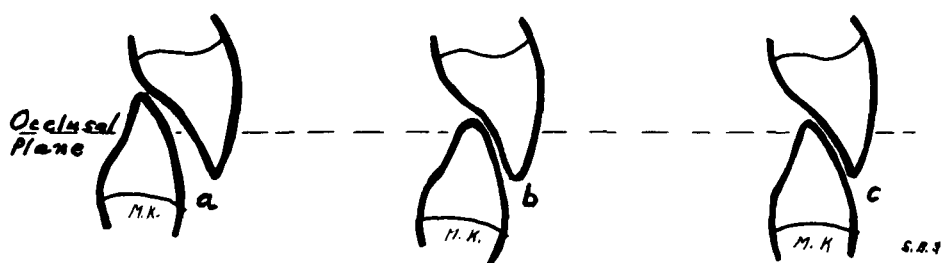


Fig. 6

aligned, functional, esthetic occlusion at 27 years of age, six years following removal of lower retention. An overbite of 6.4 changed to 4.0 mm and ended at 4.1. His overjet went to 1.8 from 1.1 mm and later to 0.7 mm.

Case B. H., (Fig. 7) Six years of retention of the lower anterior teeth and two years wearing a Hawley upper plate nightly following removal of bands and spurs, along with extraction of all third molars at 16 years of age maintained perfectly aligned upper and lower anterior teeth during the growth and development period. The Class II to Class I stayed corrected because the upper and lower dentitions and bases grew simultaneously following treatment. Moderate cusp and fossa size permitted good lateral and vertical function to continue following treatment and retention, thus maintaining the normal overbite and no overjet. There is a fine alignment of all teeth, well-functioning occlusion, and esthetic appearance at 18 years of age, two years following retention. The overbite

was reduced to 3.2 mm from 4.7 where it remained. Her 6.6 mm overjet went to 1.2 and later to 0.0.

Case M. B., (Fig. 8) Splendid cooperation of this 9 year-old girl wearing a plastic mouth shield during the mixed dentition stage counteracted the tongue thrust and mentalis muscle habits which had produced the overjet and open bite. As the permanent dentition completed its eruption, the incisors repositioned themselves into a normal overbite and no overjet because the abnormal tongue and muscular habits were eliminated. It is interesting to note that all third molars erupted normally into good occlusion. Fortunately there was normal growth, development and eruption so that at 20 years of age she has perfect alignment of all teeth, normal overbite, no overjet, fine lateral and vertical functional occlusion and a most esthetic result. No fixed appliances or retainers were used. The open bite was closed from -3.7 mm to $+1.9$, and to 2.0. The overjet was reduced to 1.1 mm from 5.7.

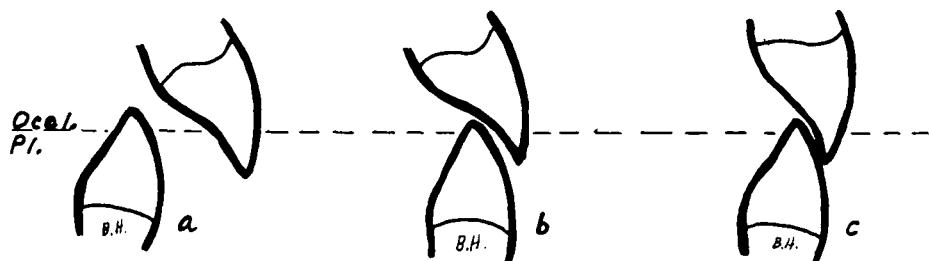


Fig. 7

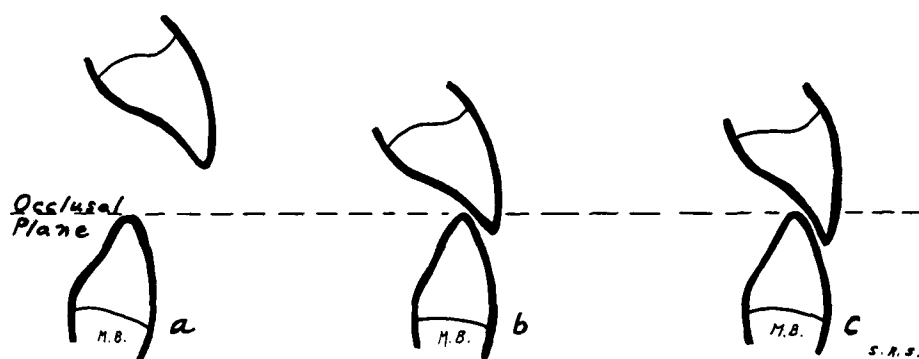


Fig. 8

CONCLUSIONS

1. The overbite and overjet can be treated orthodontically to within the normal ranges.
2. Prolonged retention seems to permit the face to grow to support the dentition as treated.
3. Restoration of normal tongue function during the mixed dentition can permit the permanent teeth to erupt and settle into perfect occlusion.
4. Lack of facial growth, ectopic eruption, or unfavorable muscle habits may cause a perfectly treated case to collapse during or following retention. This has occurred in some cases not reported here.
5. For the young adult the ultimate overbite and overjet cannot be accurately predicted before orthodontic treatment in the early teenage. It does seem that among the author's cases the overbite, overjet, alignment, and occlusion are the finest in those having a prolonged retention period, i.e., at least until

all third molars are fully erupted or extracted, and preferably until the patient has stopped growing at about twenty-two years of age.

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