The Significance Of Clinical Evidence

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Critical appraisal of the orthodontic scene in America today may give one a vague feeling of uneasiness as to the directions in which the current concepts of therapy are flowing. A curious change has taken place in the literature, in clinical meetings, in seminars, in some study groups and in the halls of learning. In the early days of orthodontics the presentation of clinical results was paramount; today it seems neglected if not rejected. For example, our two leading orthodontic journals published but one case report between them in all of 1962. Analysis of program material of meetings and seminars in recent years shows a similar scarcity of purely clinical methods and material backed by solid clinical evidence. Indeed, the term "brag case" has become widely used by many to describe such evidence. The wise decision to place all orthodontic training under university control places great responsibility on these schools to assure a continual improvement in the broad scale results of orthodontic treatment. And indeed, how may we measure orthodontic results? By the descriptive phrases of the fluent writer describing his splendid successes, by the charts and graphs of the skillful manipulator of cephalometric measurements, by line drawings or tracings from headfilms, or appraisal of photographs whether intra or extraoral? As the old timers said, "Let's put the plaster on the table!."

Some believe that "brag cases" are the unusual and almost inexplicable by-products of orthodontic appliance manipulation which reveal a well-balanced face and dentition upon the unveiling of the teeth, i.e., the removal of all mechanical devices. Those holding this view deeply believe that any one can find several such cases in his office by a careful search. To many clinical orthodontists "brag case" is a term used to describe the clinical result of good orthodontic judgment and therapy. In the offices of skillful clinicians they may frequently be demonstrated in serial fashion. The real significance of these two viewpoints leads one to a fork in the road which must be carefully studied to discover the proper way.

It has become established policy in medical circles to require records of satisfactory, long-term results before a surgical procedure or medication is considered as a cure or even a satisfactory palliative measure. Indeed, time periods have been established; as for example, five year records on certain surgery is an accepted yardstick. For us in orthodontics the question is not so well defined. Some view records at the end of orthodontic treatment as being satisfactory evidence of good treatment techniques; some view these same records as merely flukes and valueless; and others like to see the results of treatment from three to five years out of retention as a more realistic evaluation of methodology.

Turning these thoughts around and going backward, the digital skill of the individual operator enters the equation. Thus, if several intelligent clinicians produce poor results following a given technique and no "brag cases" result, they may condemn the method. Such an event occurred a few years back when Graber[1] analyzed 150 cases treated by cervical traction and concluded that "certain untoward sequellae may be

seen in the use of extraoral force. These include incomplete correction of tooth malrelationship, excessive distal tipping of maxillary first molars, possible impaction of maxillary second or third molars, etc." In this situation I believe most of us would conclude that the clinical evidence was faulty—time has proven that this method does produce good results in the hands of many operators and much clinical evidence has accumulated to prove this.

Conversely, we find the really gifted orthodontist who can do a beautiful job with practically any tool he is given. And we must be equally careful in evaluating his work. Techniques which are highly satisfactory for a Crozat, a Jackson, a Tweed, or a Johnson may not be as good in the hands of other orthodontists. Thus, like it or not, clinical evidence is really highly significant. Those who cry out most strongly in opposition to case reports are simply not facing up to their very real value and necessity. The spoken and written words communicate our ideas successfully to student and practitioner alike. The more gifted the mendicant, the more successful his communication. So how may we discriminate between the purveyor of random ideas and the man who has a significant message?

The evidence speaks for itself. Case reports containing complete data will always remain the only valid means whereby we may judge orthodontic theory, concept and technique. The Bible, Mathew; Chapter 7, Verse 15, says "by their fruits ye shall know them."

Dr. Angle told his students that it was at the dental chair that they would show the world how well they had learned their lessons. I have reported[2] before how frequently orthodontic history repeats itself. The literature is replete with reports of appliances and techniques which have come and gone; methods which were glowingly reported and eagerly accepted, only to be rejected when clinical trial failed to substantiate the claims of the promoter. How much better it would be for all of the children placed in our hands for treatment if the clinical orthodontist would stay with the proven methods until sufficient evidence could be produced to prove the new methodology in the form of proper records, of even "brag cases" if you like.

Charles Tweed took the evidence of years of labor to the profession in the form of 100 consecutively treated cases before really trying to tell anybody that he had a better method. His students and followers are still required to submit proof of their efforts at every gathering. Biennially this display offers any interested party an opportunity to appraise the efforts of serious orthodontists from across this country and from other parts of the world.

Begg of Australia has shaken up orthodontic thinking by his ideas and also by his display of evidence. But here may be a case of the gifted orthodontist with his own technique. It at first appeared that this might again be another case of the virtuoso on one string; but now the evidence is starting to accumulate. Yes, other men can achieve the results related and displayed by Dr. Begg. As these case reports appear and are evaluated, the profession can judge the philosophy and technique from the *evidence*. Anton J. Carlson, the great physiologist, used to upset the men of his time by demanding to see the evidence. Surely the specialized dental field of orthodontics has advanced to Carlson's viewpoint of fifty years ago. This is a critical juncture for orthodontic philosophy; let us press on with the new, providing we see good proof, but let us not be too hasty to try out each new idea on some poor child until we are sure it is better.

The profession has wisely decided that control of orthodontic education shall be primarily vested in the dental schools. Yet, somthow, liaison must be maintained with the practicing orthodontist to insure the flow of solid clinical evidence back into educational channels to help guide the course of future clinicians. If the teacher views the operator as a "tinsmith" and his evidence as "brag cases," the walls of the ivory tower will soar higher and higher and the student and his potential patients will be the losers.

To use clinical evidence to illustrate a few points let us examine some treated cases. Strange as it seems, there are still those who argue strongly that the use of cervical traction is bad technique citing the angle of pull and some of the other reasons mentioned earlier.[1] The patient whose records are shown in Figure 1 had a Class II malocclusion of the severity seen by every practicing orthodontist daily. When this patient was first examined at five years of age, he exhibited marked protrusion which was partly caused by vigorous thumb sucking. The early visits were spent in counseling the child regarding the habit. Through clinical experience it has been learned that most children will respond to proper counseling and stop undesirable thumb sucking and finger habits which would otherwise distort their oral structures. As a result, no mechanical intervention to break habits has been used in my office for many years.

In very extreme cases it is sometimes desirable to institute mechanical therapy to reduce protrusion while the deciduous incisors are still present, but it is usually preferable to await the eruption of the permanent incisors. In this case the incisors were in place at eight years of age. It will be noted in the illustrations that an anterior open bite suggestive of tongue thrusting was also present. Treatment was instituted at this time in accord with Kloehn's original concept by the method reported in 1958.[3] Seamless gold bands bearing single .040 tubes were placed on the maxillary first molars. Initially the outer bows were bent downward to exert a tipping force on the molars which was continued until spaces opened between the deciduous second and permanent first molars in the maxilla and the molar relationship corrected. The stops against the molar tubes were then moved mesially, the outer bows bent upward, and the force directed against the anterior teeth to reduce the protrusion.

In recent years one variation has proven highly effective; instead of permitting the inner bow to exert force directly on the anterior teeth in the second stage, tiny hooks are added near the cuspids and very light elastic force instituted to carry the anterior teeth lingually while employing reverse tipping on the molars.

When the anterior protrusion was reduced, a retaining plate was placed to hold the anterior teeth and pressure reapplied solely to the molars. When the molars were again overcorrected, the plate was removed and pressure reapplied to the anterior segment. The stops against the molars were adjusted to provide proper mesiodistal arch length; the face bow was worn until the bicuspids erupted and interdigitated properly. The period of active treatment was seventeen months.

During the active period the patient was seen at three-week intervals and the gear adjusted when necessary. Close attention to the direction in which the pressure is applied and to alternating the tipping forces eliminates many of the criticisms leveled at this type of traction. In addition, it should be recognized that this type of treatment is most effective when used to direct growth and not to overpower the teeth.

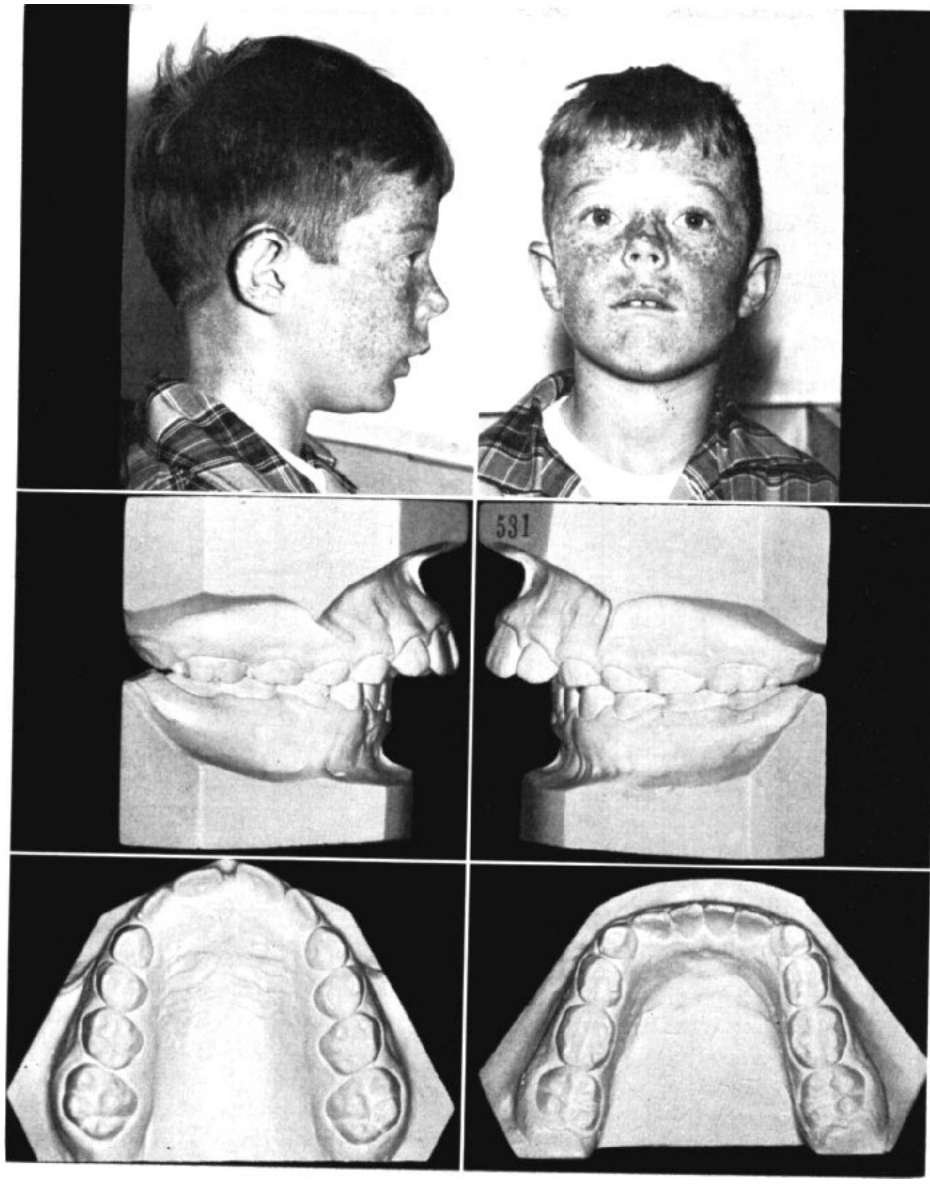

Fig. 1

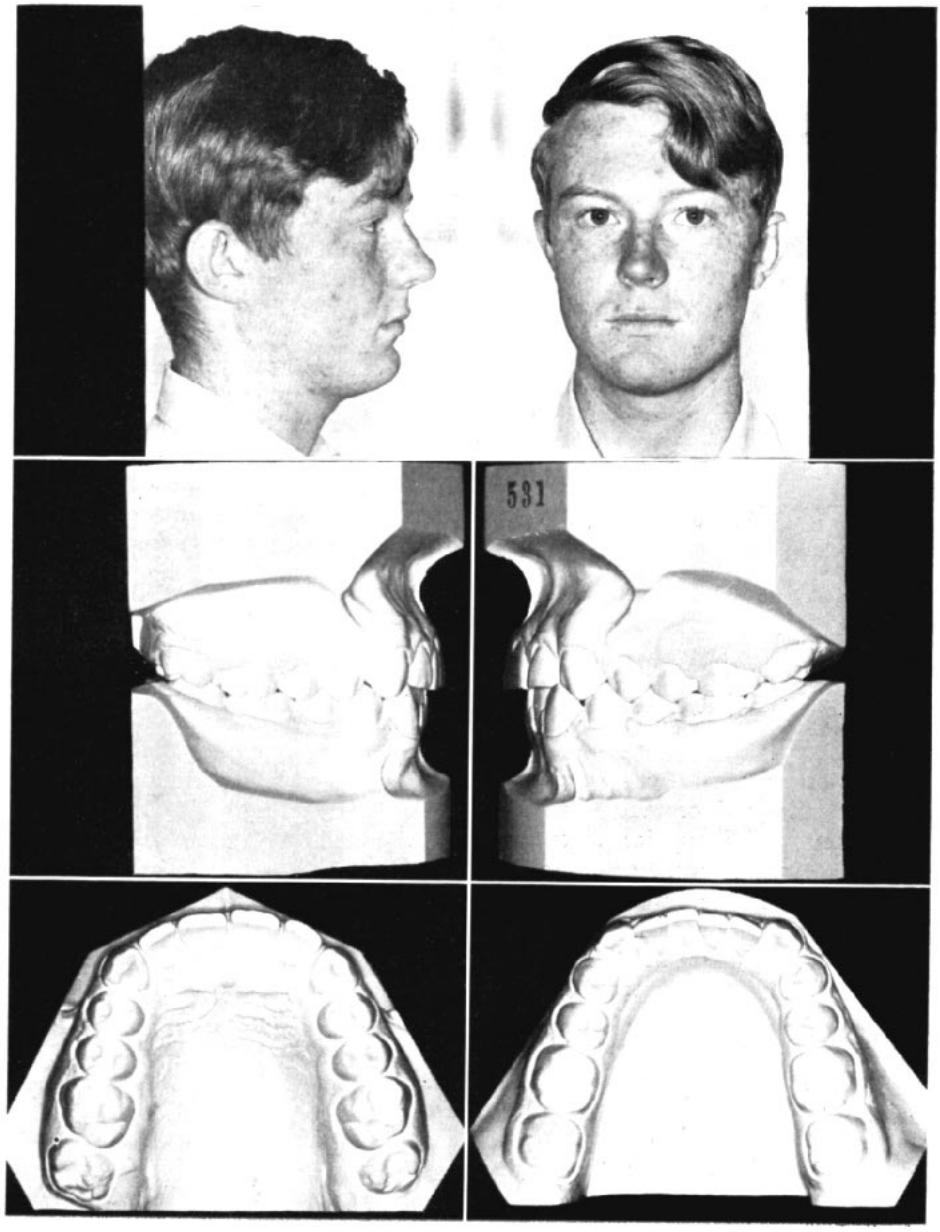

Fig. 2

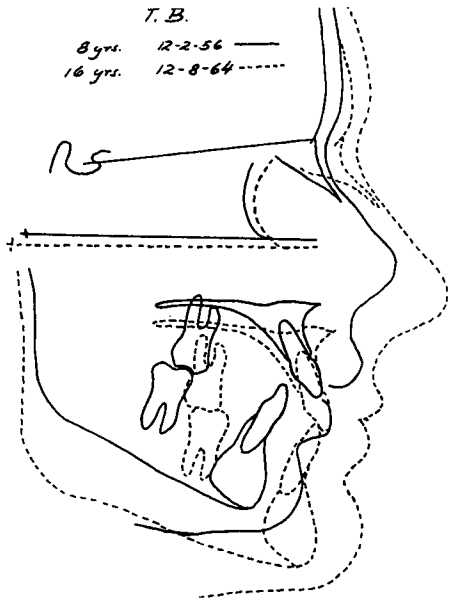

Fig. 3

Elastics are selected to apply approximately seven to eight ounces on each arm of the face bow. When elastics are used to retract the anterior teeth, a pressure of two to three ounces is used.

In this case the gear was worn only while sleeping to continue directing growth (or retention) for seventeen months. It was discontinued for eight months to observe growth tendencies and then worn for eight more months while sleeping. No retainers have been used and the most recent records shown here were made four years after the cessation of all therapy (Figs. 2 and 3). It is obvious to the trained observer (in retrospect) that he had a favorable growth pattern. As Kloehn has stated, our aim should be to help guide not to overpower the teeth.

It is frequently stated that we can make ANB changes of only three, four or five degrees; this is probably a safe generalization. Still, clinical evidence reveals that it is definitely possible to obtain greater changes. The records of another patient show changes far in excess of the usual but I should like you to observe them critically for I believe they illustrate an orthodontic limitation not previously reported. We are aware of the limitations imposed on us by the size of the bony structures of the jaws and their musculature; there are also limitations in the distance which teeth may be moved toward the palate. This girl had been observed for a number of years and study of her records seemed to indicate little possibility of favorable growth.

The patient was first examined at five years of age at which time she was sucking her thumb vigorously. Early treatment was considered and discussed at this time but, because of the persistence of the habit, efforts were made to help the child stop sucking her thumb prior to instituting corrective treatment. At seven years of age the child consented to wear a vestibular shield resulting in some improvement in facial form. When the lower second bicuspids began to erupt at ten years of age, it was apparent that they had no enamel so a lingual arch was placed to retain arch length till all the teeth had erupted. At eleven years of age new records were made as shown in Figure 4. The angle ANB was twelve degrees and GoGnSn was forty-three degrees. The faulty lower second bicuspids and the upper first bicuspids were removed. The maxillary teeth were banded, including the second molars, using edgewise brackets and, as soon as they were leveled off, a high-pull headgear was placed and worn twenty-four hours per day. The mandibular initial appliance did not include the second molars but they were banded as they erupted. Excellent patient cooperation was experienced throughout treatment. Space closure was effected with Bull-type closing arches and Class

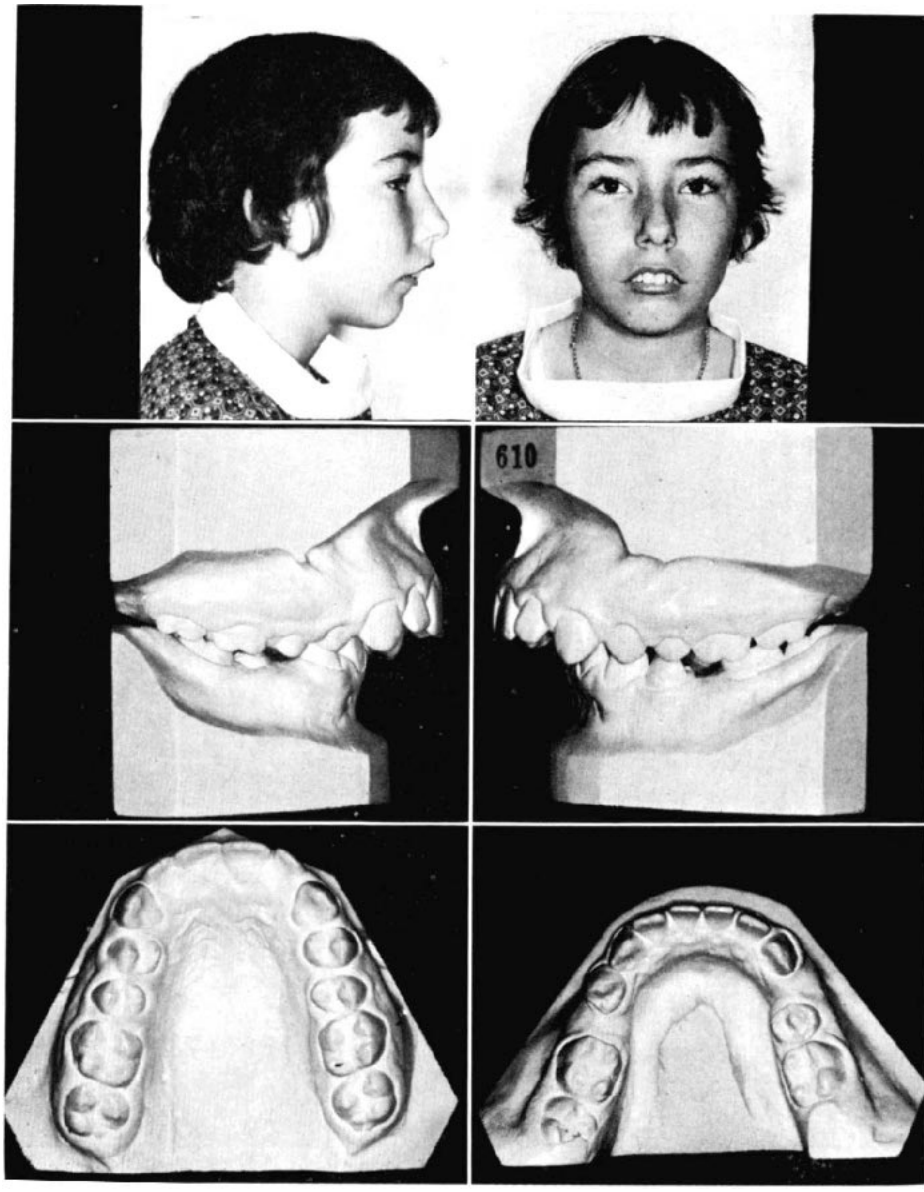

Fig. 4

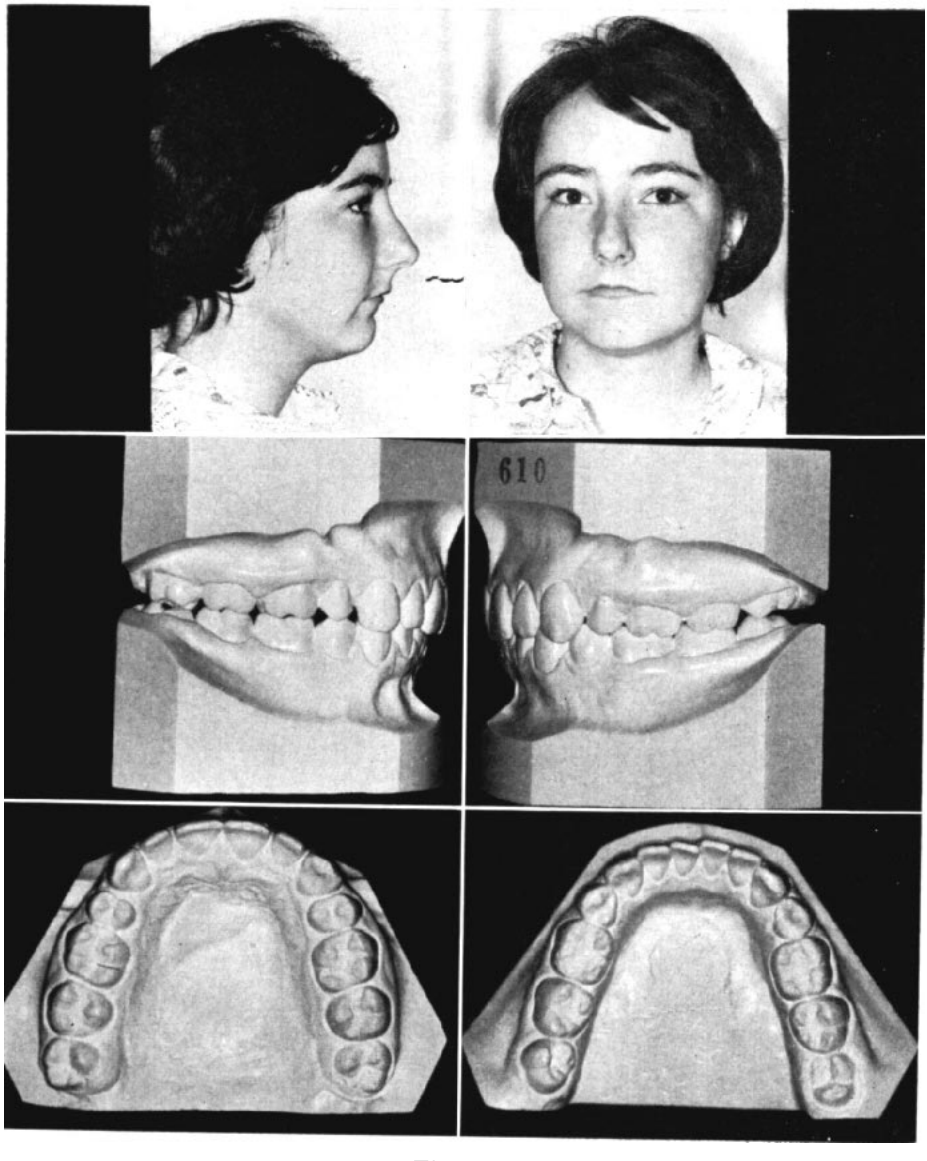

Fig. 5

II elastics. Active treatment continued for twenty-six months.

The headfilm taken at that time showed that torque control had been so effective that the incisor roots were into the palate. Corrective measures were taken at once and the roots were moved back into alveolar bone. Observation of this case stimulated my interest on this point and other clinical records would indicate that this is indeed a factor worth considering during diagnosis and treatment. Although we have the mechanical means to move roots at will, we still are limited in the distance they will go in any given direction. This point is well understood regarding most other regions in the mouth but, somehow, the palatal area has seemed more amenable to change. But this too is a finite matter. The headfilm taken when appliances were removed showed the ANB angle to be three degrees for a net change of nine degrees which, of course, is far in excess of average possible change and certainly not necessary here as matters worked out. Figures 5 and 6 show records four years after removal of appliances. Retainers were worn night and day for six months, then nights only for six months. They were worn sporadically for another six months then not at all for six months. The lower left central incisor exhibited a tendency to rotate and a new retainer was constructed. For the last year they have been worn only when the patient felt they were required.

It is well understood that treatment after growth has stopped is not favorable and also that certain facial angles do not respond as well as others. Still it may be demonstrated that good results can be achieved in spite of these handicaps. Figure 7 is presented as evidence that we can treat such a case with satisfaction to the patient. The records reveal a Class II malocclusion with severe crowding of the teeth and

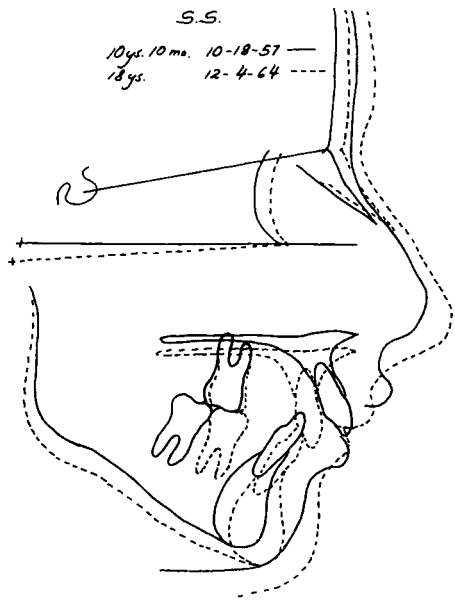

Fig. 6

a generally unsatisfactory dentofacial appearance. Not much future growth could be anticipated. Study of the tracings revealed the angle GoGnSn to be fifty degrees which this writer considers highly unfavorable when coupled with a short mandibular body as in this case. The angle ANB was eleven degrees. The treatment plan involved removal of the upper first bicuspids initially with the understanding that lower first bicuspids might be removed later if indicated. Seamless steel bands were placed on the maxillary first molars with single .045 buccal tubes. Kloehn face bow and neck strap were placed and worn twenty-four hours per day. The usual molar tipping, alternating with uprighting, was employed while elastics across the inner bow applied retracting force to the anterior teeth for six months. At this time the lower first bicuspids were removed and full edgewise appliances were placed except on the lower anterior teeth. The lower cuspids were retracted with sectional

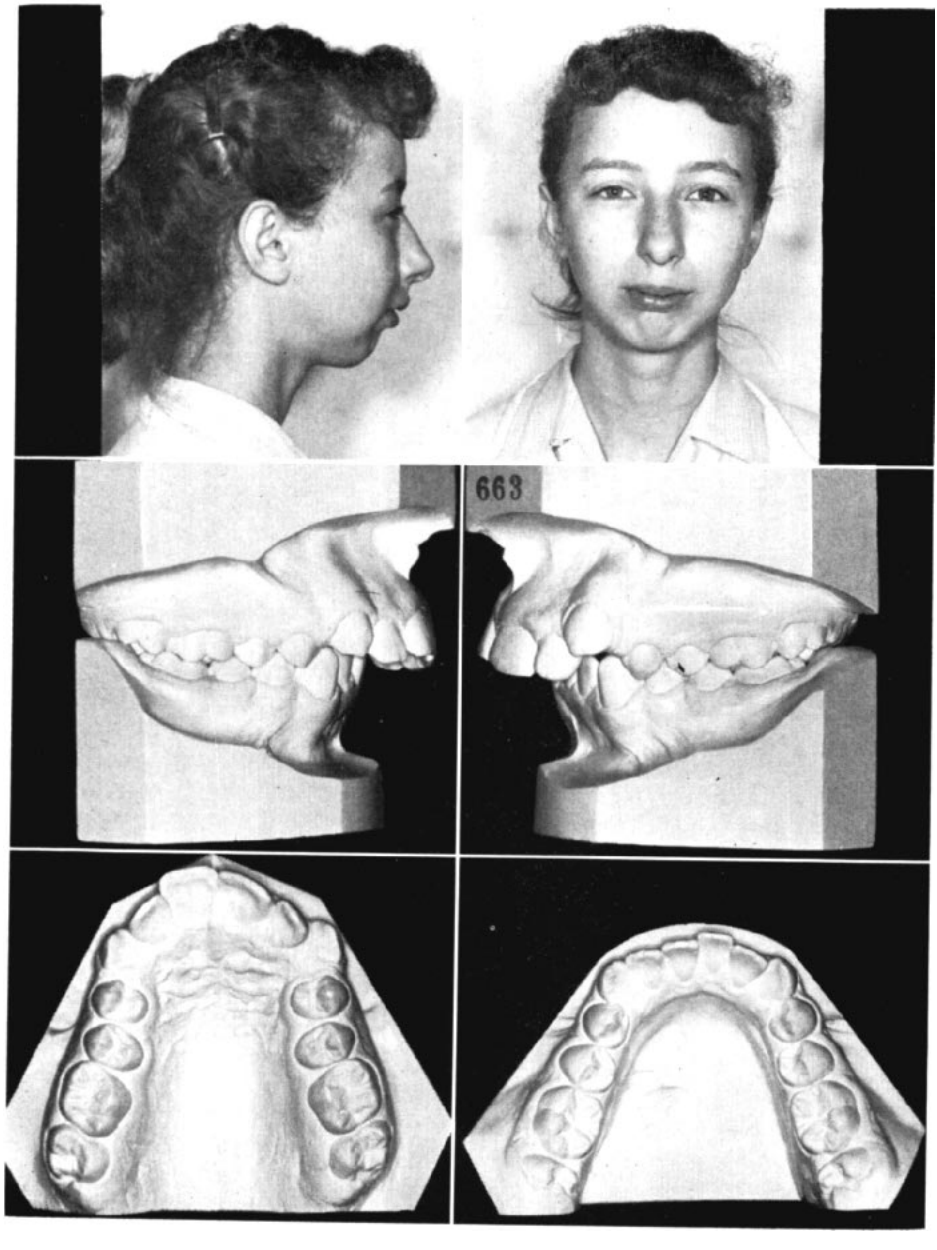

Fig. 7

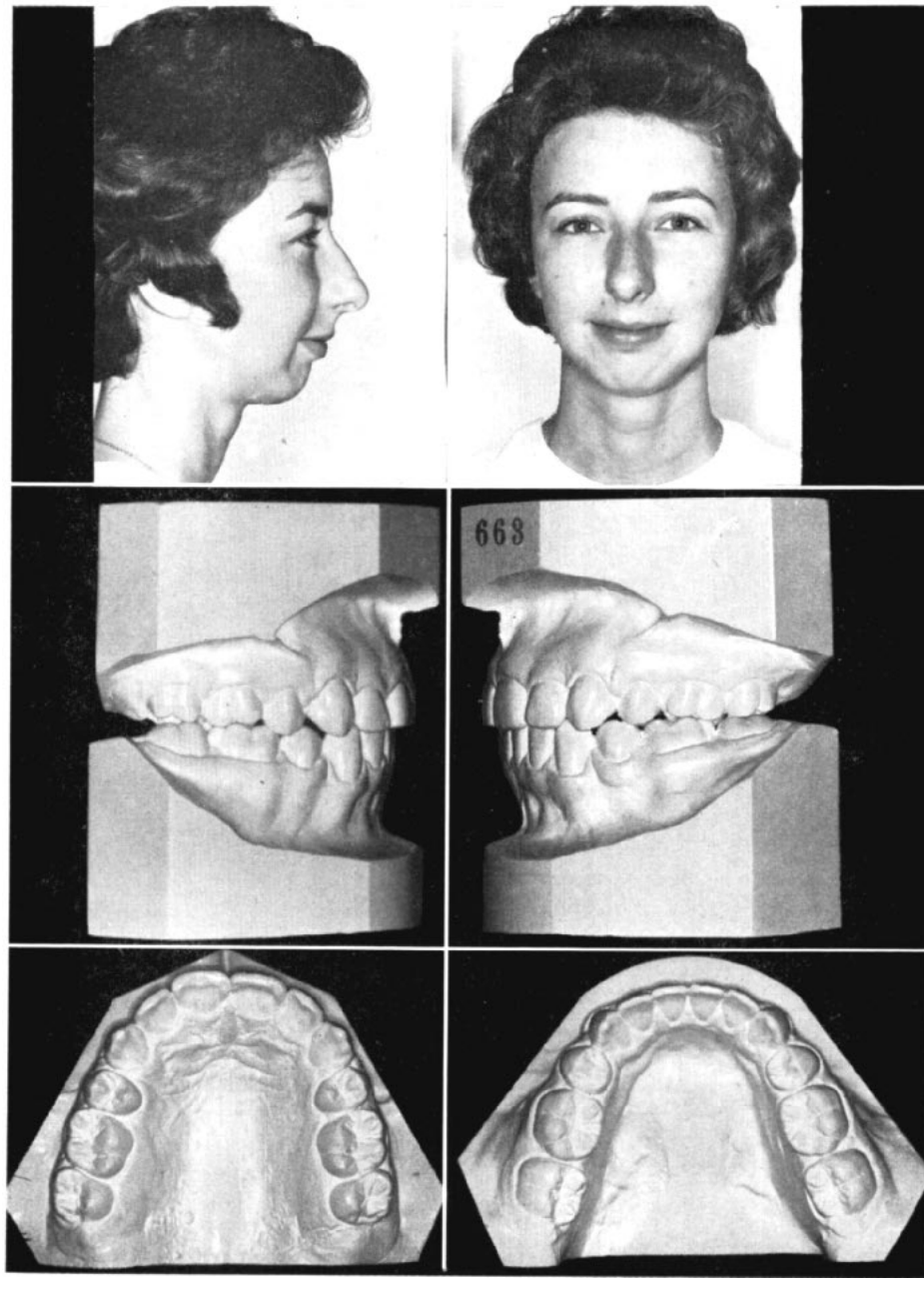

Fig. 8

arches, the upper cuspids with light push coils, while high-pull headgear was worn twenty-four hours per day. The Kloehn gear was discontinued and second molars included in the complete appliance.

When the cuspids were completely retracted in both arches, the lower anterior teeth were banded, .021 × .028 Bull-type closing arches placed and mild Class II elastics worn while correcting dental relationships and closing spaces. The closing arches were replaced with .021 × .028 ideal arches for final detailed positioning of the teeth. After treatment the angle ANB was seven degrees, a net reduction of four. Full appliances were used for twenty-six months of active treatment; in addition, the Kloehn gear was worn for five months making a total treatment time of thirty-one months.

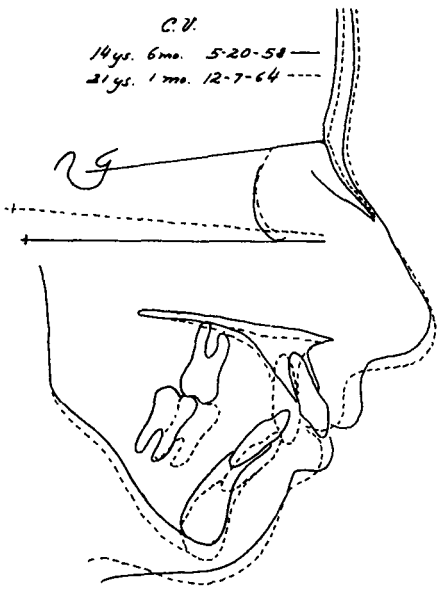

Fig. 9

Retainers were used continually for six months, then at night only for six months. Since that time retainers have been worn as indicated, usually several nights each week. The records in Figures 8 and 9 show the situation nearly four years after retainers were first placed. This case history shows the possibility of tooth movement after cessation of most growth in an unsatisfactory facial pattern. You must, of course, evaluate the treatment from the clinical evidence.

It is really quite true that orthodontists frequently fit their diagnoses to the appliance therapy they know best. Thus a man using labiolingual techniques will be understandably reluctant to remove teeth; the confirmed edgewise user will find it positively essential to remove teeth more frequently because the bands themselves need space.

The records of a patient (Figure 10) are presented to illustrate the possibilities inherent in fitting the appliance to the problem. In accord with the usual procedure in my office, this patient had been under regular observation since the parents first detected dental irregularity which was at four years of age. At the time these records were taken the patient was nine years old. The diagnosis and treatment plan were discussed with the parents with the distinct possibility that teeth would be removed, probably as serial extractions. But treatment was instituted with the further understanding that the response to treatment would be the guide to action, not a fixed plan dictated by appliance demands. The Kloehn face bow was placed to correct the molar relationship while a bite plate was used to relieve the palate and encourage vertical development. Concurrently a looped lower lingual was placed to hold arch length and even to increase it if possible. Only these four bands were used yet his teeth responded to this treatment with this result. Such a case does not disprove anything Nance[4] or Carey[5] have written. However, the use of precise numbers for biologic measurements should always be viewed with caution if

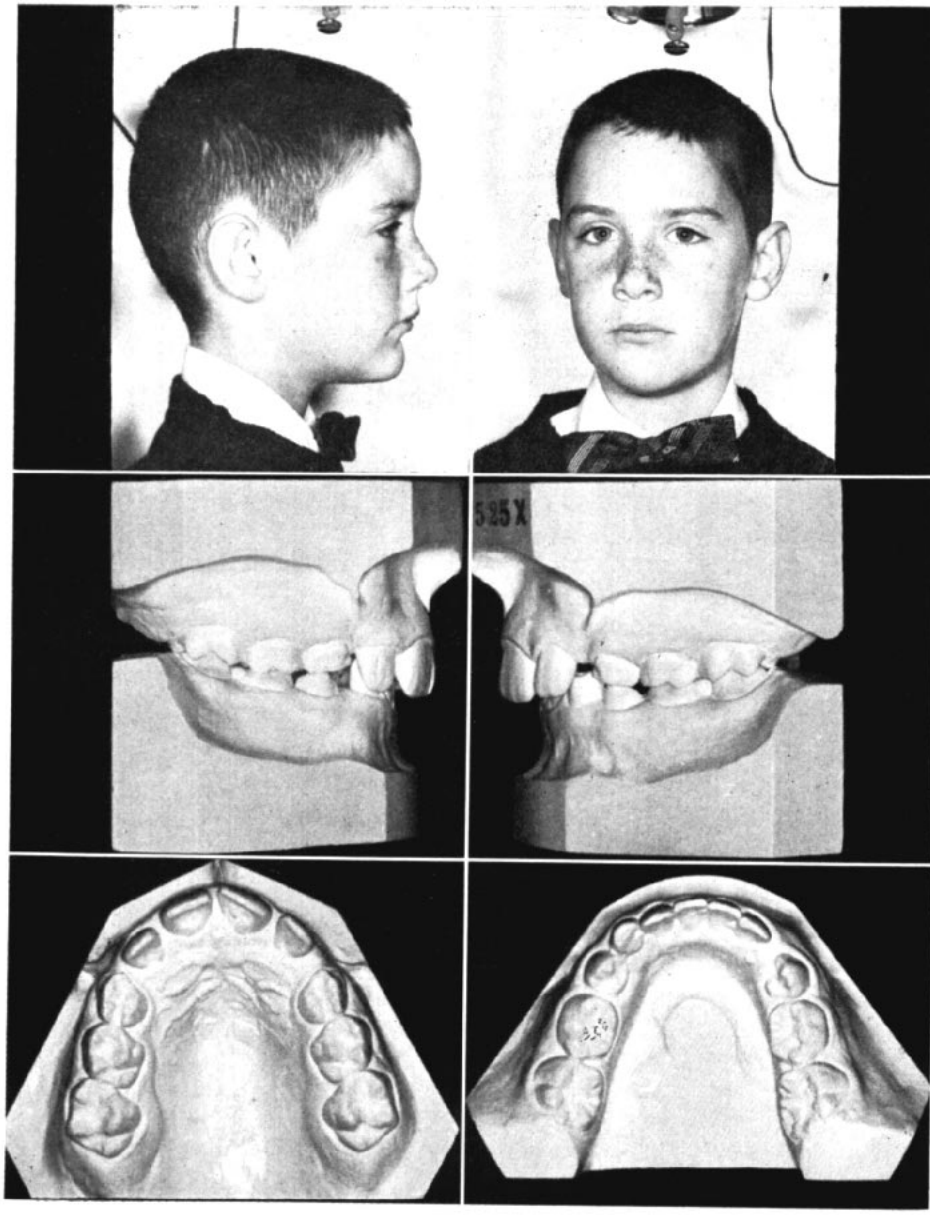

Fig. 10

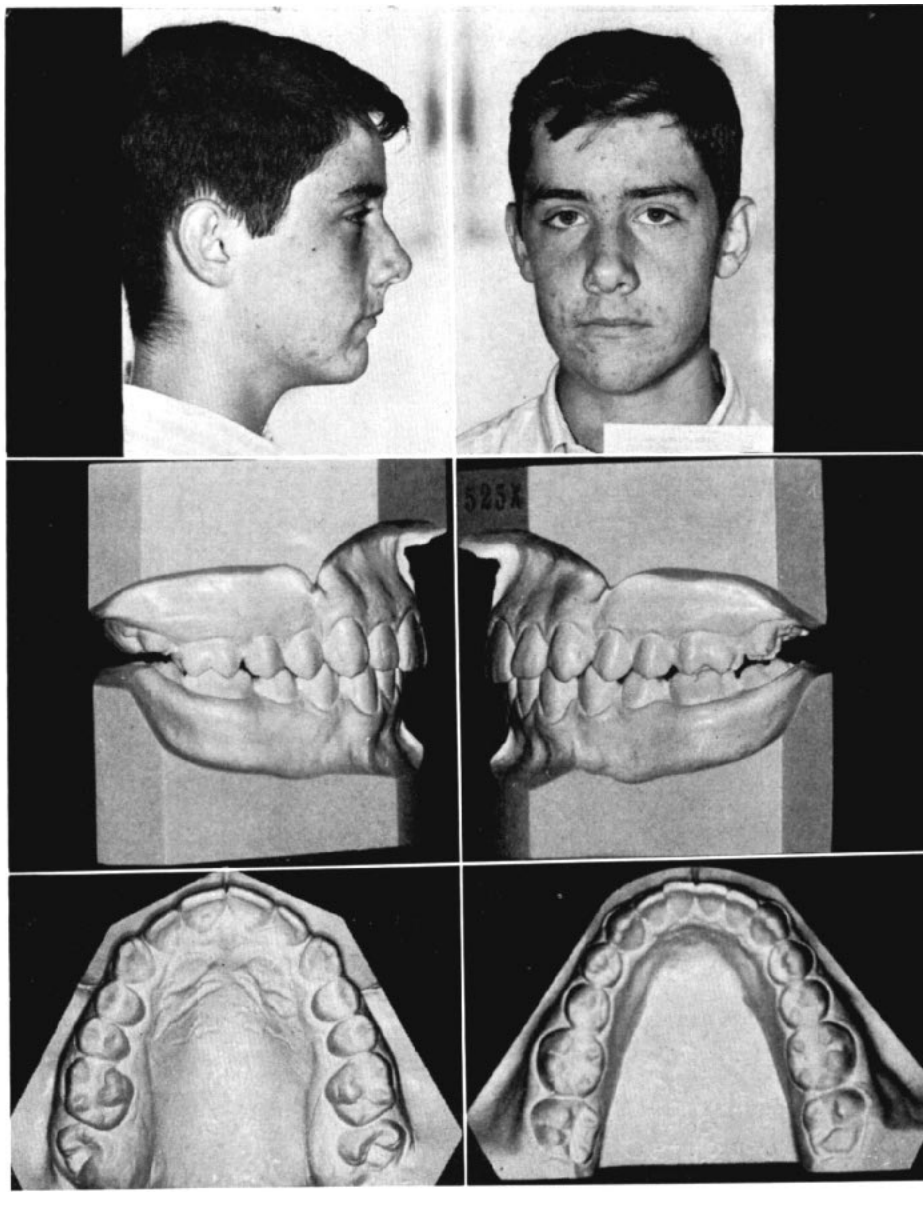

Fig. 11

not skepticism. When measured out, this mandible is somewhat short of enough room for all the teeth. Study of cases treated early with the Kloehn gear reveals that the lower first molars frequently move slightly distally, although not always. As a result, certain cases which appear to be ideal for serial extractions finally appear with too much space when the Kloehn gear is used concomitantly.

This observation has in turn led to the procedure applied to this patient, i.e., prepare the family for possible serial extractions, but go ahead with vigorous headgear and lingual arch therapy to salvage all possible space potential. Along with this concept goes the realization that bands themselves utilize precious space, hence their use is avoided. The most recent records (Figs. 11 and 12) are shown two years after the appliances were removed. Because the patient is only fourteen years old and still growing, retainers are worn nightly.

As mentioned earlier, Charles Tweed and his students have long been proponents of the logic of evaluating clinical evidence. Perhaps review of a case treated in accord with his basic teachings would illustrate one indication for this type of therapy. The patient, a twelve-year-old girl, had a very acceptable occlusion with mild crowding of the lower anterior teeth (Fig. 13). The reason for consulting the orthodontist was the protrusive character of the lips and teeth. To do justice to such a patient it is absolutely necessary to maintain complete control of anchorage units lest the extractions be for naught. It is certainly not necessary to explain the steps of the Tweed therapy at this date.

In this case all teeth were banded with edgewise brackets except the lower anterior teeth. Following leveling off, Class III mechanics were employed

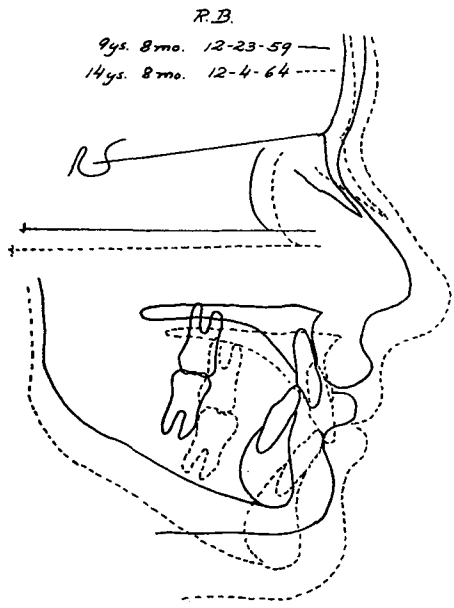

Fig. 12

until mandibular buccal segments were far back in anchorage-prepared positions. The cuspids were then retracted, the anterior teeth banded and retracted with a Bull-type .021 × .025 arch with continued Class III elastics. High pull headgear was worn fourteen hours per day throughout treatment. The .022 × .028 lower stabilizing arch was then placed and the mechanics reversed.

Coils were used to retract the maxillary cuspids; an .021 × .025 arch with Bull loops was then used to retract the anterior teeth while maintaining torque control to insure proper final root-angulation of these teeth. Final arches of .021 × .025 were placed for artistic positioning and detailing of individual teeth. Eighteen months of active treatment were rendered. Following removal of the bands, retainers were placed. Patient cooperation with the retainers was poor so that three months later a cuspid to cuspid retainer was cemented in the mandible. This was removed one year later.

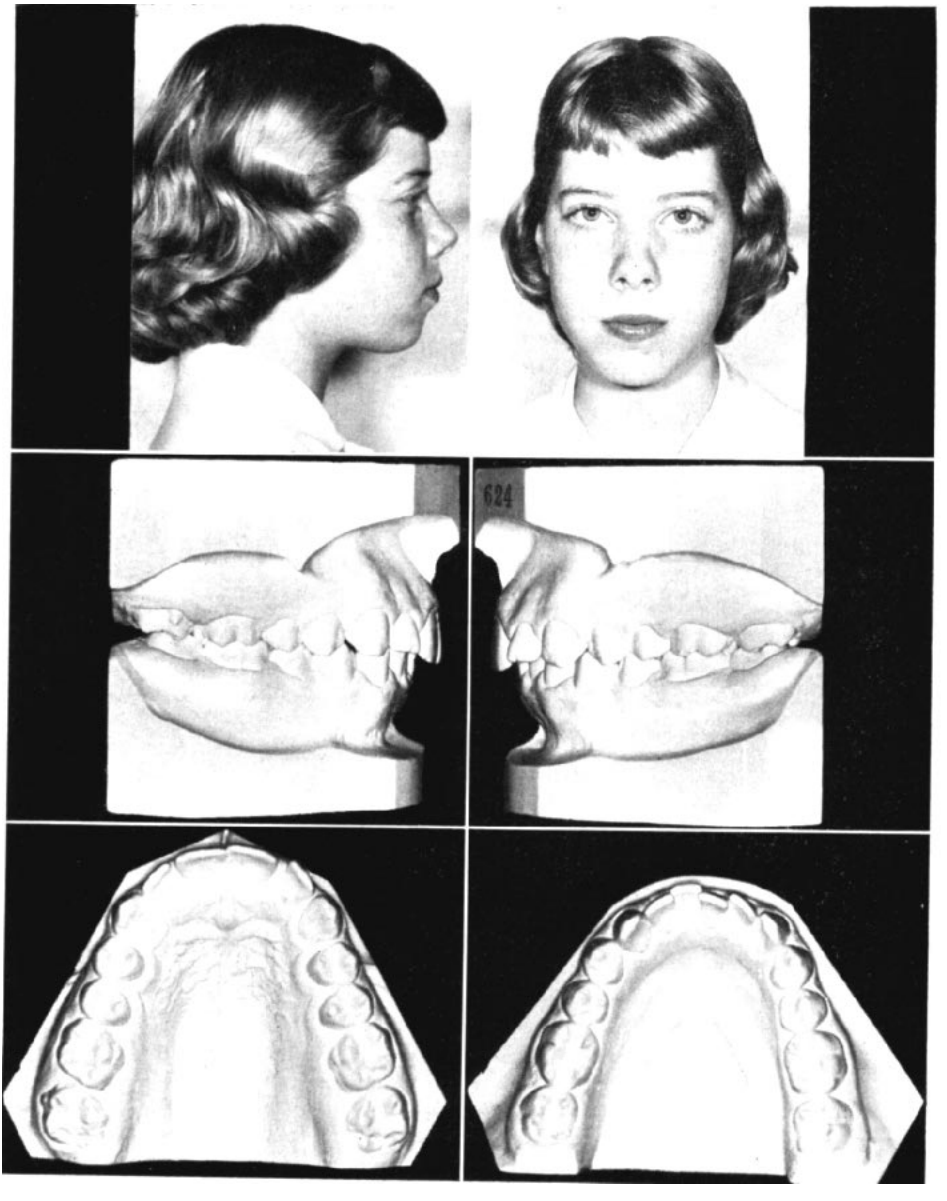

Fig. 13

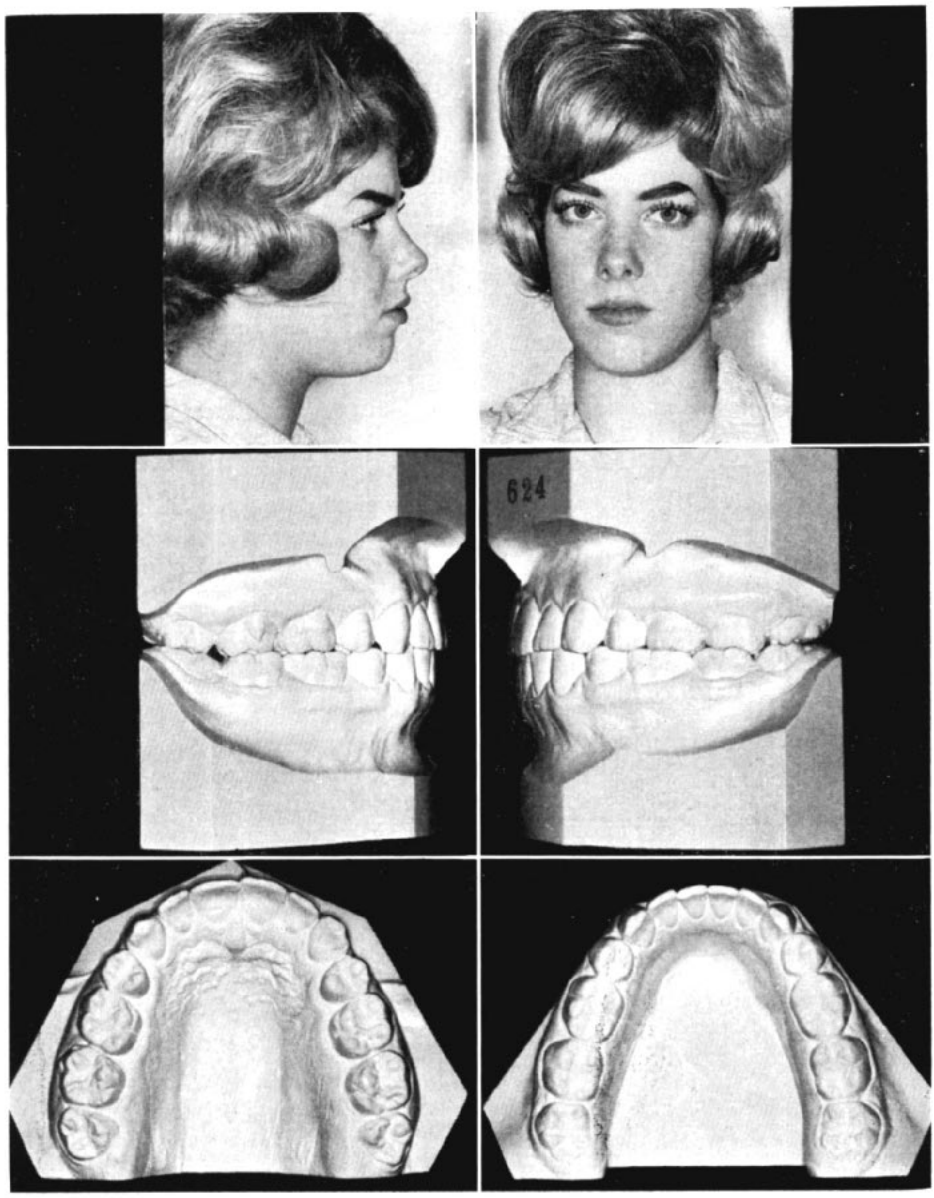

Fig. 14

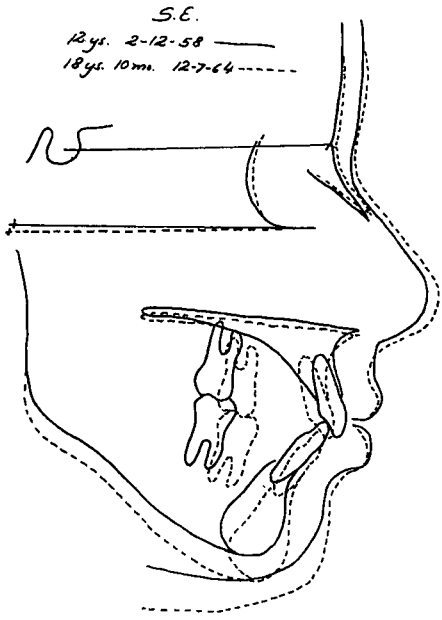

Fig. 15

At age fifteen the lower right third molar appeared to be trapped under the distal of the second molar; application of a separating spring freed this tooth for eruption. At this time the lower fixed retainer was removed. The patient has been seen periodically since and the most recent records shown here were taken three and one-half years after removal of the lower retainer (Figures 14 and 15). There are some who question the validity of effecting facial changes through orthodontic treatment. At the time this treatment was instituted this was the only proven method by which one could assure this patient of such a facial change.

Certainly one new case does not represent proficiency but it can demonstrate the possibilities in a different treatment concept. As mentioned earlier, Begg of Australia has brought forth a new concept. The patient whose records are shown in Figure 16 was treated following the Begg concept faithfully. Although the molar relationship is obviously Class I (Angle), the headfilm reveals an ANB difference of five degrees indicating a Class II type of bony base relationship. The four first bicuspids were removed and the classic Begg appliance was placed in June 1963 with bands on all teeth excepting the second molars and the upper right cuspid. Black copper cement was used to place a ring on this cuspid and elastic ligatures used to bring the tooth into alignment. It was banded sixty days later. Stage I therapy was completed in October (three and one-half months) and Stage II begun. Stage II was instituted in January, 1964 three months later. All appliances were removed in July, 1964 and a positioner used for four weeks to effect final detailing. At that time typical retainers were placed. Obviously this particular case has not been subjected to the test of time but the records made in August 1964 show the conditions at the time the retainers were placed (Figures 17 and 18). The reader, of course, must evaluate the process from the clinical records. This particular Begg treatment required six separate archwires and thirteen months of treatment.

Frankly, this is a "brag case"! Everything went in "cook-book" fashion and no problems were encountered. But just as one swallow does not mean Spring—one good result doesn't prove an appliance or a philosophy. The writer could easily show other Begg cases with as yet unsolved treatment problems. In all good faith I must say that for clinical evidence to be truly significant, there should be room in the literature, in meetings and in lectures for the illustration of our problems with the various techniques. Too often the new practitioner is easily discouraged or disillusioned when all of his treatments don't turn out like the beautiful results held up for his examination and guid-

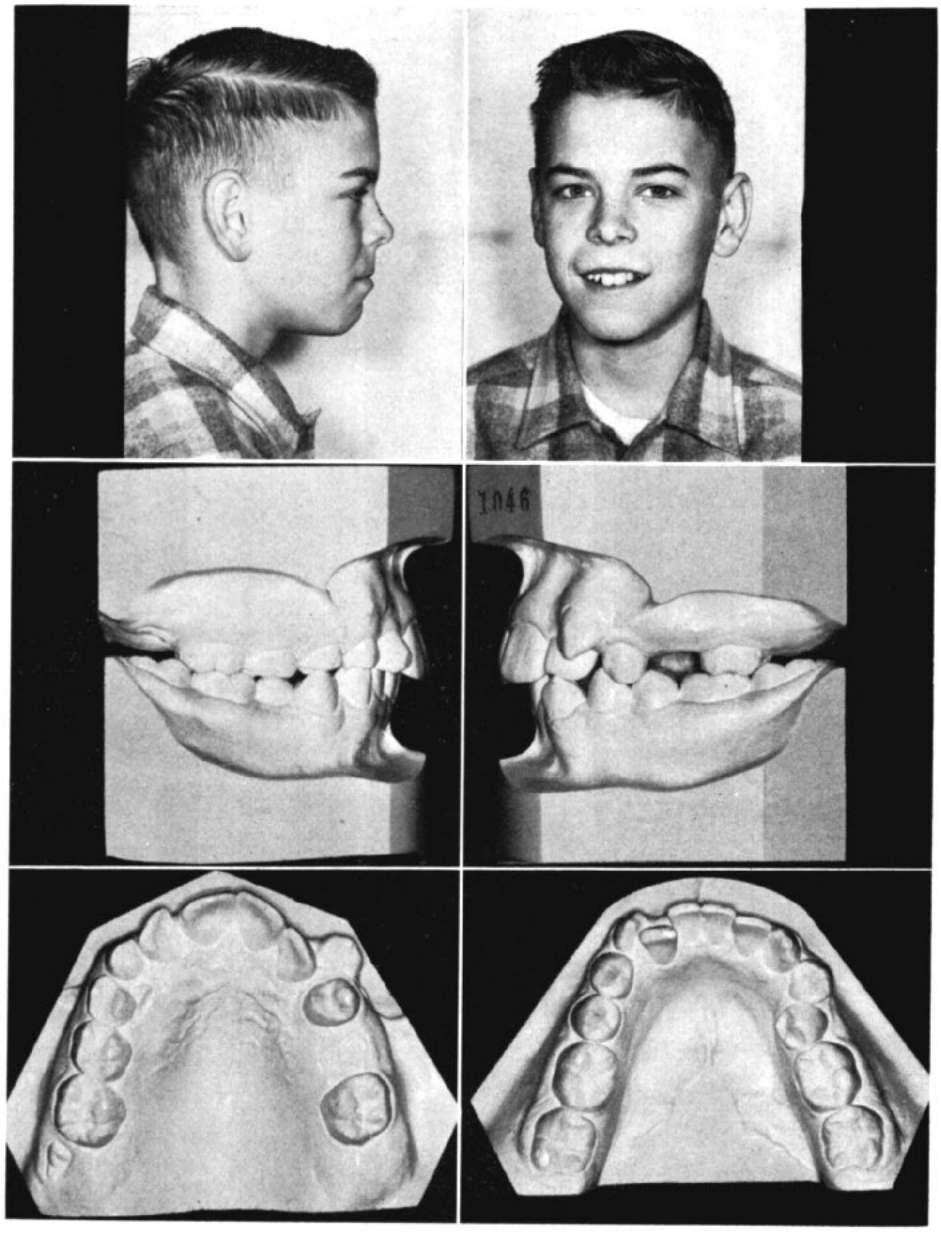

Fig. 16

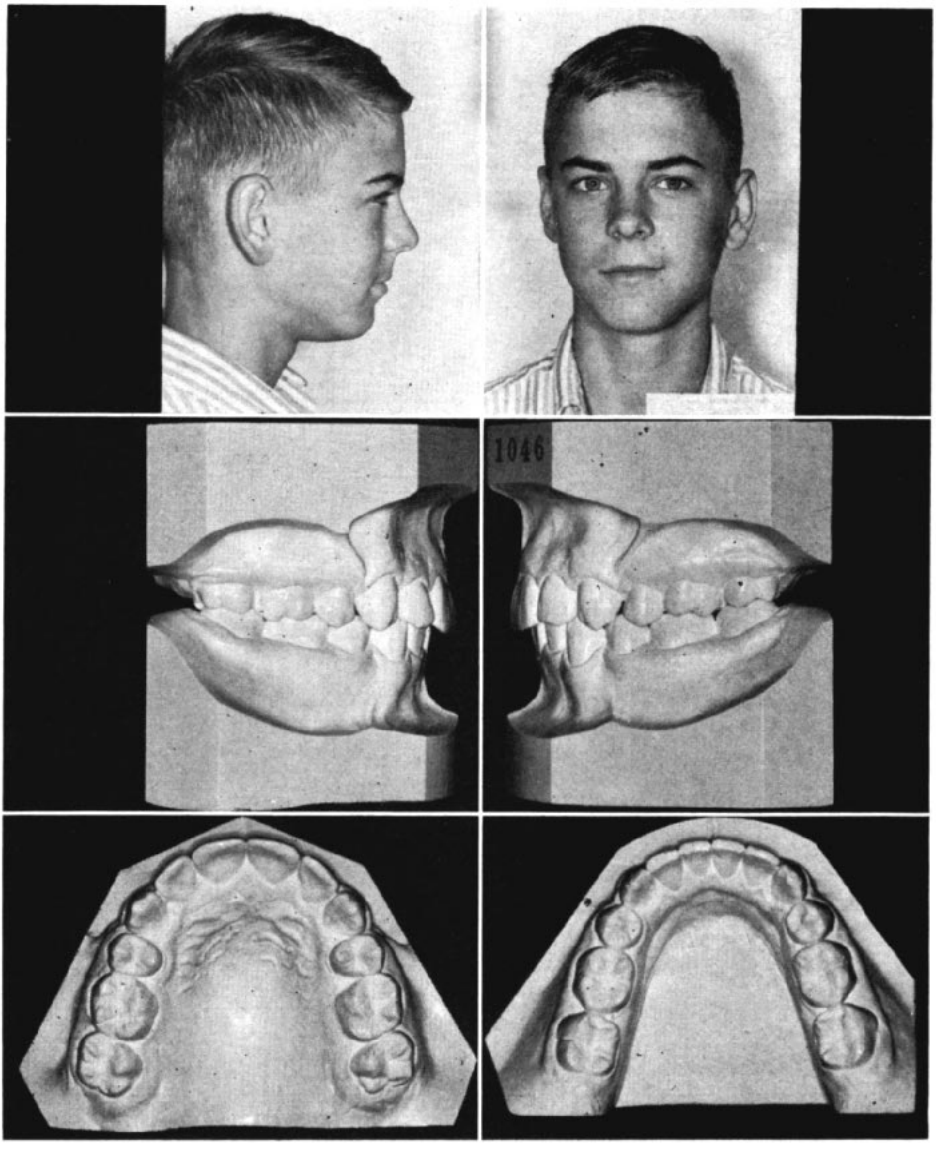

Fig. 17

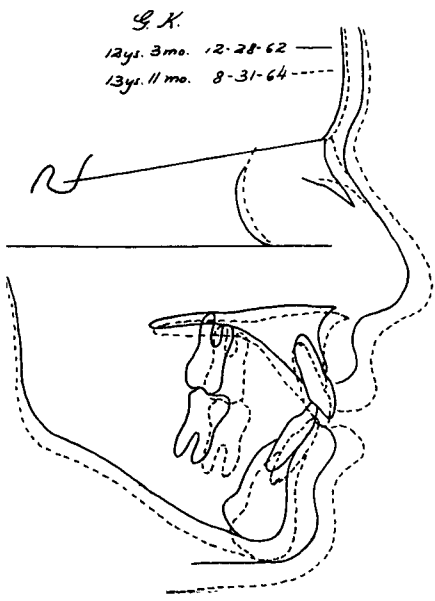

Fig. 18

ance. Too seldom does anyone tell him that "brag cases" are highly significant and also the "cream of the crop." Back home are the mill-run results with all of the unsolved problems which we all have.

As the writer was deep in his graduate studies, the work of Nance[4] appeared in the literature and was thoughtfully reviewed. About the same time Carey[5] made his observations on arch length and expansion. Even so, I went ahead with the lingual arch and the Johnson twin arch for several years. It is extremely interesting to review these cases after this much time. One of this type is shown here to provide a little food for thought for those who have no trust at all in growth and development.

The patient shown in Figure 19 was first examined at 12 years of age when these records were taken and treatment instituted. Gold bands were fabricated for the permanent first molars and W-shaped .038 gold lingual arches were constructed and placed as well as .036 tubes placed on the buccal.

Both arches were then methodically expanded until sufficient room was developed to accommodate the teeth. This required four months. The upper and lower anterior teeth were banded with the original Johnson twin arch bands and twin arches were used to align these teeth. At this time all four first molar bands were removed and the .036 buccal tubes realigned to intrude the anterior teeth. A new solid lower lingual arch was constructed which was closely adapted to the necks of the teeth. Very light Class II elastics were applied and changed once each day until the bite opened and good interdigitation was established.

The appliances were removed after twenty-three months of active treatment and retainers placed. The upper retainer was the typical removable Hawley type bite plate, but the lower consisted of gold bands cemented on the cuspids with an .038 gold bar running from cuspid to cuspid and on distally to include the second molars. This was removed after one year and a removable lower retainer placed. The patient was dismissed and advised to wear the retainers as needed.

To my great pleasure, he returned from college to practice law in Sacramento and came to the office recently to inquire about the health of his mouth. The records shown in Figure 20 are fourteen years after conclusion of treatment. No retention of any kind has been employed for ten years. Since the writer did not have access to a cephalometer in 1949 the absence of tracings is excusable. Study of the models and the face shows that total expansion of the order of six mm has held successfully, but equally interesting is the change in facial profile. This case and others like it which drift in from time to time have a very sobering effect upon my occa-

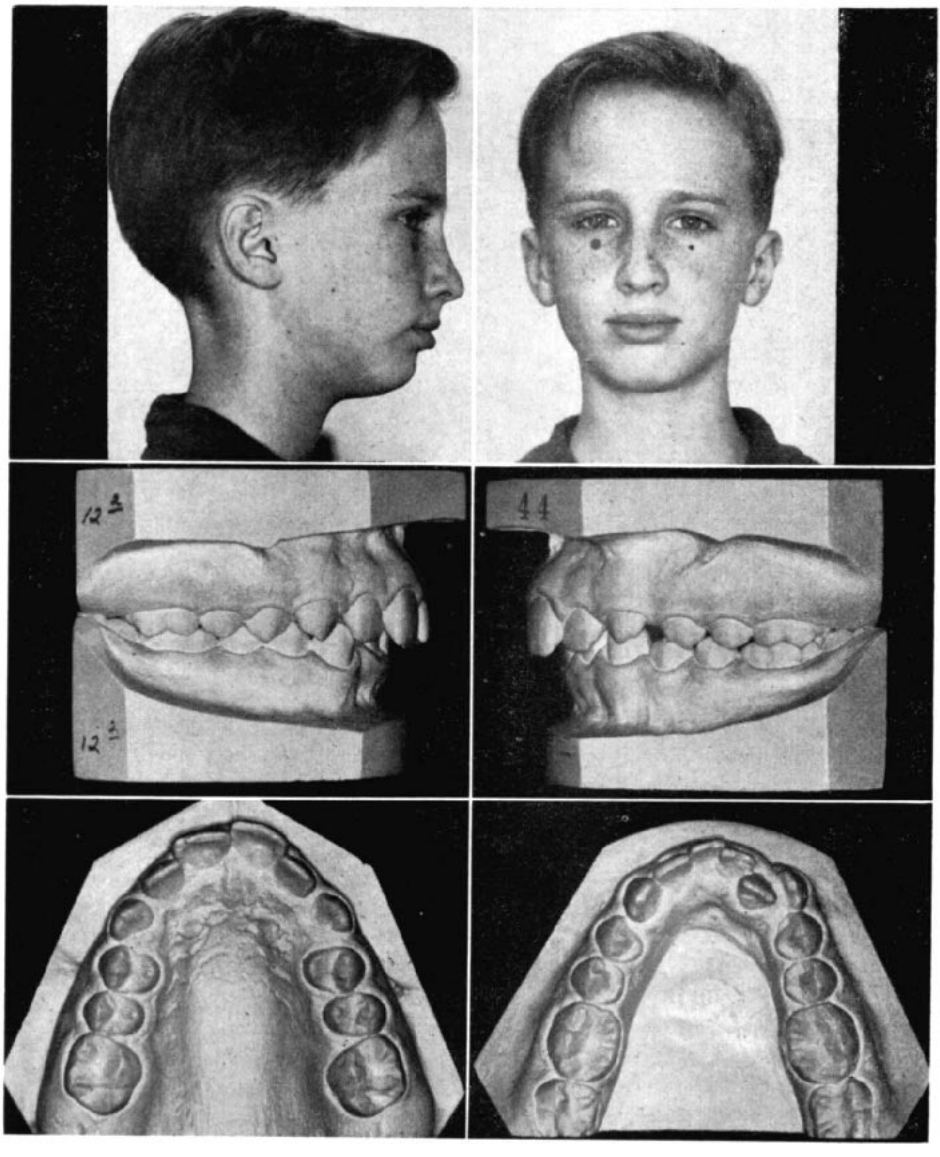

Fig. 19

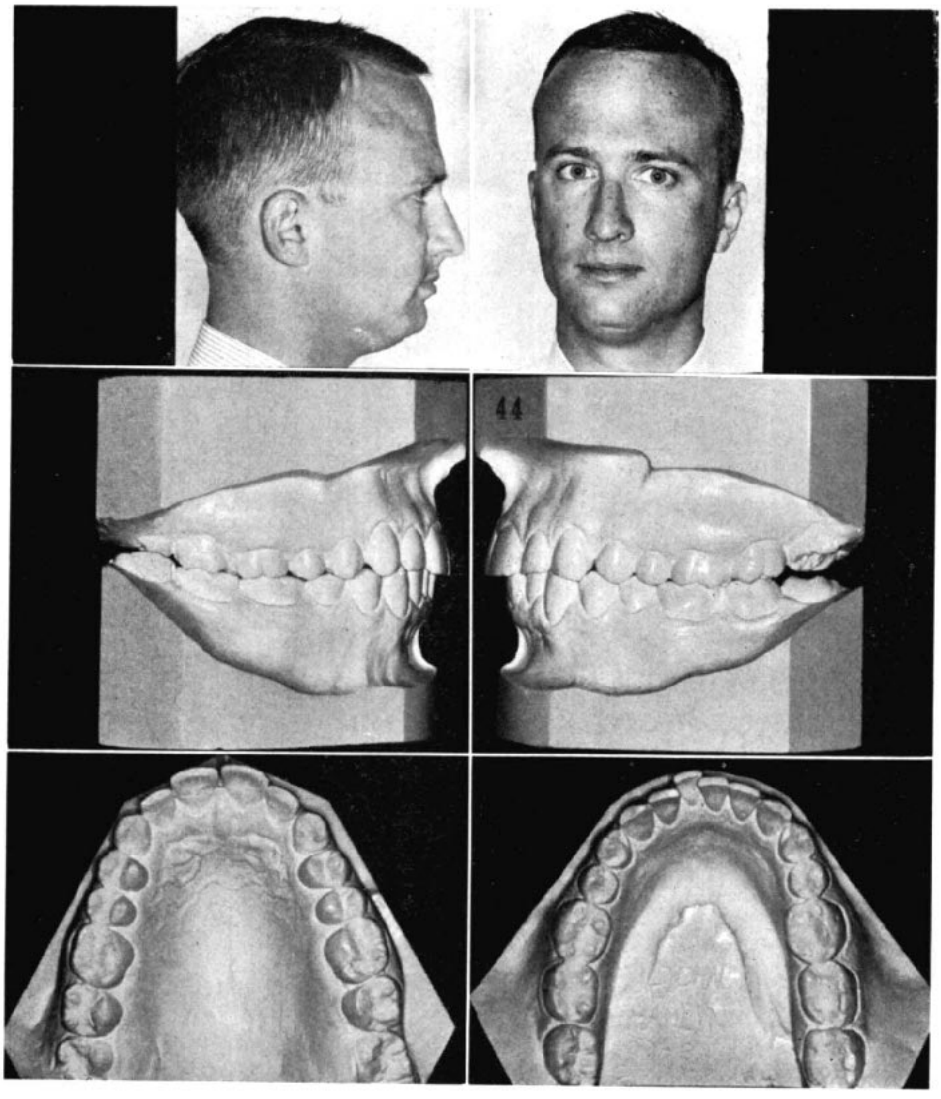

Fig. 20

sional enthusiasm for extraction of teeth with no effort for expansion.

Although our aim is to produce results of great stability, clinical experience teaches us all that factors beyond our control often act to alter the perfection of our handiwork. I believe it is high time that we teach the student about the vagaries of retention. I have found it beneficial to observe my cases closely each month for a minimum of one year in retention. During this time one can usually detect the tendencies for future difficulties.

I believe that we should then "level" with the patient. To preserve the ideal result, some cases will simply have to be retained on an occasional basis indefinitely. Just as people wear eye glasses to see better, and prosthetic devices to chew, some must support their teeth with a retainer to maintain perfection of dental alignment. The choice is with the patient and, frankly, when they have gone through extensive treatment, I think they are entitled to decide for themselves just how far they wish to go to protect the result.

As the father of teenage daughters I have witnessed the hours spent on cosmetic effort; compare this to the use of a retainer one or two nights a week. What a small price to have dental perfection! And you know, I think the old timers could have been right, long term retention seems to give more stable results.

As we go into this new era of complete university control of all orthodontic teaching, it will become increasingly important that we remain alert to the evidence produced by the clinical orthodontist in his office. The role of the individual is being gradually but certainly replaced in all phases of American life by the committee or staff of experts. Perhaps this will be better for all, but group conclusions are only valid when the proper material is offered for appraisal. The computer works perfectly, but only on the data which is programmed for its use. The proper study of man is man himself, the proper evaluation of orthodontic theory and technique can only be made on treatment results, the clinical evidence.

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BIBLIOGRAPHY

1. Graber, T. M., Extra Oral Force — Facts and Fallacies. *Am. J. Ortho.*, 41: 490-505, July, 1955.
2. Parker, W. S., Mechanical Principles and Orthodontic Appliances. *Angle Ortho.*, 30: 241-247, October, 1960.
3. Parker, W. S., A Technique for Treatment with Cervical Gear. *Angle Ortho.*, 28: 198-209, October, 1958.
4. Nance, Hays N., The Limitations of Orthodontic Treatment. *Am. J. Ortho.*, 33: 177-223, April, 1947. 243-301, May, 1947.
5. Carey, C. W., Linear Arch Dimension and Tooth Size. *Am. J. Ortho.*, 35: 762-775, October, 1949.