Case analysis and treatment planning in class II division 1 cases

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The analysis and treatment planning for Class II, Div. 1 to be described are from the teachings of Dr. Harry Bull. They are my understanding of his diagnostic and treatment methods gleaned during the past five years of association with him in the Bull Study Group. Clinical experience of the essayist following upon close adherence to these principles since 1947 instills conviction of their worth.

As I see it our analysis and treatment problem is concerned with a malocclusion exhibiting two characteristics —

1. Upper anteriors in labial axial inclination, and

2. Occlusion of some or all of the teeth of the buccal segments in Class II relation.

This may be an oversimplification in the midst of the current ramifications in classifications of this syndrome. However, it has the practical advantage of focusing attention on two common characteristics of Class II, Div. 1 malocclusions and treatment planning on the bony areas most responsive to desired tooth movement.

Our treatment objectives here are the same as for treatment of all malocclusions. They are the four enumerated by Tweed — improved facial esthetics, good occlusion, health of teeth and investing tissue, and stability of the end result. We add one corollary pertaining to good occlusion which, stated briefly, requires that after treatment the patient shall be unable to bite distally to Class I.

To do this we need a working hypothesis which should be simple yet comprehensive enough for general application, in keeping with clinical experience and research, and affirmative, objective and specific in its concepts.

Simplicity and comprehensiveness are antagonistic. One invites the dogmatic reasoning exemplified by the phrase "This is it". The other invites qualifications and exceptions *ad infinitum*. It would be nice to draw a line somewhere in between and say "These are they".

Clinical experience states that malocclusions show discrepancies which impose limitations on treatment. These are usually phrased negatively, for example, "Denture expansion as a treatment procedure in the correction of malocclusion should be discarded". (Strang[1]). Carey,[2] Howes[3] and Nance[4] have written similarly and also have advised against increasing arch length. Tweed[5] warned against moving teeth off basal bone. Thompson[6] and a host of workers in orthodontics and other fields of dentistry counsel against increasing the vertical dimension. Recently Bull[7] has argued against changing jaw relationship. Noting the dual bites and relapse following treatment which attempts to reposition the mandible or hopes for favorable condylar growth, he advocates correction by tooth movement and maintaining the arch relationship.

We can reason that if we must not expand then, per contra, we must maintain. This puts us on an affirmative footing. Next a rhetorical question, "Maintain what?" which is answered by, "Arch width or arch form". This

shifts emphasis from the act to the object acted upon; it is a move away from the subjective toward the objective. Finally we ask, "Maintain which arch form?" and reply, "The arch form of the malocclusion". This reduces to unity, leaving us affirmative, objective and specific.

We can convert similar conclusions about not increasing arch length, not moving teeth off basal bone, not opening the bite and not altering arch relationships. Put it together and it sounds like this. "We must maintain the arch form, length and thickness, and the vertical and horizontal relationship of the arches."

As a working hypothesis this has a very confining aspect like the feeling the claustrophobe gets in an elevator. Is it right to define limits on tooth movement in such a cold mathematical way?

We think it not only right but realistic. Teeth, alveolar bone and their vertical and horizontal relation with other teeth and alveolar bone, are relationships of matter in the three planes of space. They are subject to such physical laws as "No two things can occupy the same place at the same time," which is that of static orientation, and "For every action there is an equal and opposite reaction", which is one of force and motion.

It should be remembered that the clinical experience from which this hypothesis was derived is both the reflection of failure and the rationalization accompanying changed treatment methods which were successful. For example, Tweed[8] advised not moving teeth off basal bone after comparing successfully retreated cases with previous treatment failures.

Our purpose in attempting to restate these clinical conclusions in an affirmative, objective and specific way is to make them indicate more positive action when analysing cases and planning treatment. If it can be said that something like a mathematical concept emerges then perhaps we should regard it thus and accept these attributes as stable characteristics inherent in each malocclusion. Eventually we may find that stability of treatment will follow in direct proportion as they are not encroached upon in treatment.

Wylie[9] states similarly, "The hypothesis is that nature has combined the parts of the face in random fashion, with little regard for how well they go together, and that the efforts of orthodontists will be better rewarded if they are directed towards working out the best clinical procedures for dealing with accepted disproportions."

Case Analysis and Treatment Planning

In analyzing orthodontic cases and planning treatment we consider four factors -- the patient, models, x-rays and photographs.

When examining the malocclusion we note more factors, we note the arch length, arch form, arch thickness, vertical height, and the horizontal relationship of the arches, which includes anteroposterior and mediolateral relationships. We call these stable characteristics. When planning treatment we try to maintain these characteristics. We know that, if increased, they may tend to revert.

Arch length is the distance measured around the arch from the last molar on one side to the last molar on the other side. It doesn't matter whether this is measured along the buccal surfaces or on the tips of the cusps. It does matter however that at the end of treatment the same type of measurement will show the same length, or if any change occurs, that it will be less than the original dimension.

Arch form is the characteristic curve seen in the occlusal view. In treatment we try to retain this as it is also a stable characteristic and will tend to revert if widened.

Arch thickness is the thickness of the alveolar ridges. This thickness varies considerably throughout the mouth and between jaws. The lower anteriors are located in the thinnest portion of the alveolar bone; the upper anteriors are located in the thickest portion. There is practically no latitude for bodily movement of the lower anteriors labially or lingually, without moving them right out of the bone although clinical experience indicates some space available for tipping or uprighting. However, there is considerable latitude for lingual movement of the upper anteriors, also considerable latitude for crown tipping or root torqueing movements.

This contrast in ridge thickness can be visualized if we consider the relative axial inclinations of the upper central and lateral teeth in Class II, Div. 2. Imagine transposing these teeth to the lower incisal ridge. The lateral incisor root would stick through the lingual plate and the central root would protrude from the labial plate. The fact that in the upper jaw these roots are well covered by bone emphasizes the greater thickness and greater latitude for lingual repositioning of teeth in this area during correction of our cases. Our treatment plan for Class II, Div. 1 acknowledges the limitation implied by this variation in ridge thickness.

Vertical height is a stable characteristic. It is reflected in the malocclusion by the degree of overbite. Through functional necessity this also influences the amount of overjet if the incisors and canines are in contact. Clinical experience has indicated the difficulty of increasing vertical height and then maintaining it after treatment is complete. In arbitrarily increasing this dimension we are encroaching upon a stable characteristic and risking reversion to its former size.

The horizontal relation of the arches includes the medio-lateral and anteroposterior relation of the bony ridges. The medio-lateral relation is a matter of treatment concern primarily in the correction of posterior crossbites. Frequent reversion tendencies even though good interdigitation is established illustrate the stability of this characteristic. The anteroposterior relation includes Class II and Class III. Frequent relapse where their relation is altered during treatment indicates that this orientation is also a stable characteristic. Muscular function and condylar relationships also exert a stabilizing influence. This may be visualized by a brief consideration of both contrasts and similarities which exist between Class II, Div. 1 and Class III malocclusions.

Several years ago Dingman[10] introduced a new surgical treatment for Class III malocclusions. One of the advantages claimed for this operation was that it does not alter the relation and action of the muscles of mastication. Previous operations did change the action or relation of these muscular forces and relapse often followed as the cases tended to revert to their former state in response to functional disharmony created and the dominant muscular pressure exerted.

Several years ago, Bull[7] advocated a new treatment for Class II, Div. 1 malocclusions. One of the advantages claimed for it is that there is no change in the relation and action of the muscles of mastication and no repositioning of the condyle.

Many previous treatment procedures did change the relation and action of the muscular forces and were frequently followed by failure as the cases tend-

ed to revert in response to the pressures exerted. Dingman obtains his results by surgical movement of a segment of the mandible and attached teeth to a point where desired occlusion is established. Bull obtains his results by bodily movement of the teeth through the bone to a point where desirable occlusion is also established. Neither attempts to reposition the condyle. Theoretically, each could obtain his results with partial ankylosis of the condyles. Each accepts these muscular forces and condylar relations as stable characteristics of the malocclusion. Each has found that maintaining them in *status quo* enhances success and stability in the end result.

If the truth of this concept regarding stable characteristics is to be tested in its practical application then:

1. We do not increase arch length. This means extraction in most cases.

2. We do not increase arch width or arch form. This is also a factor influencing extraction.

3. We try not to increase arch height. This is not amenable to extraction for elimination of the discrepancy. It does mean that we should try to depress anteriors in their alveoli without increasing the vertical distance between arches. It may also mean that judicious grinding or reshaping in some cases will offer hope of reducing the overbite.

4. We try not to alter arch relationship or the stabilizing muscular and condylar relationships associated with it. To us this means extraction in Class II, Div. 1 and correction by movement of teeth through bone. We correct the procumbent upper anteriors by retracting them. We correct the buccal occlusion by moving the lower cheek segments forward. Such reciprocal tooth movements do not alter stable characteristics of the malocclusion and do promote greater stability of the end result.

Extraction in treatment of Class II, Div. 1 is not an original concept, but Bull was the first to offer it as a rational plan, which emphasizes correction by differential tooth movement. Pressure of an orthodontic appliance might reposition the mandible and might coincide with favorable growth changes but we can rely on the fact that it does move teeth. This reliance on a consistent treatment response enhances the prognosis accordingly.

While the thesis for correction of Class II, Div. 1 by forward movement of the lower buccal segments presupposes a stable arch relationship, there is evidence which indicates that all Class II arch relationships are not stable. Some may be induced by cuspal guidance. This might seem to invalidate correction of these cases by tooth movement and would do so if removal of cuspal interference were followed by immediate and complete return to Class I.

Since there is little evidence that this happens we still have to treat these cases with Class II mechanics and correction by tooth movement is still in the picture.

Discrepancies

From the standpoint of our hypothesis concerning stable characteristics we can see that both normal and malocclusion possess these basic attributes. The difference is simply that in good occlusion they exhibit a normal or harmonious relationship while in malocclusion they show a discrepant relationship.

The references already cited appear to show that there is a growing conviction among orthodontists that discrepancies are numerous in type and variable in degree.

Eventually we may come to regard all malocclusions except those induced

by habit as exhibiting some type or degree of discrepancy among these stable characteristics.

From the standpoint of the historical perspective it is well to remember that there were no discrepancies until a few years ago. Hunter's[11] work on the constancy of mandibular arch length in 1771 and the clinical experience cited by Case[12] and Grieves[13] had no pertinent bearing as long as orthodontists regarded the malocclusion as simply a potential normal occlusion requiring only the stimulation of an ideal arch wire to set necessary growth and developmental processes flourishing.

Tweed[5] initiated the concept of discrepancies when he first extracted teeth and when his methods gained acceptance. Here for the first time was a malocclusion whose potential normality was so glaringly impotent that his treatment plan had to acknowledge it. His reference to, "teeth too far forward in relation to their bony bases," as requiring extraction of four bicuspids may be considered as referring to a discrepancy between teeth and bone.

However, Tweed[14] later reported removal of eight bicuspids and while this may still be regarded as a discrepancy between teeth and bone, it introduces the factor of magnitude or degree.

Case No. 346 (Fig. 1) is a discrepancy between teeth and bone but it also is severe in degree. Attainment of the treatment objectives for this patient necessitated the extraction of four first bicuspids and four first molars. Examination of the photographs will show that the desired objective of improvement in facial esthetics has been accomplished. Inspection of the treated models will show that satisfactory occlusion has been established. It will also be noted that the lower third molars have erupted with a marked mesial axial inclination. In this case despite the extraction of eight teeth there is still no room on the alveolar ridge for the third molars. The roots of these lower third molars are in the ascending ramus.

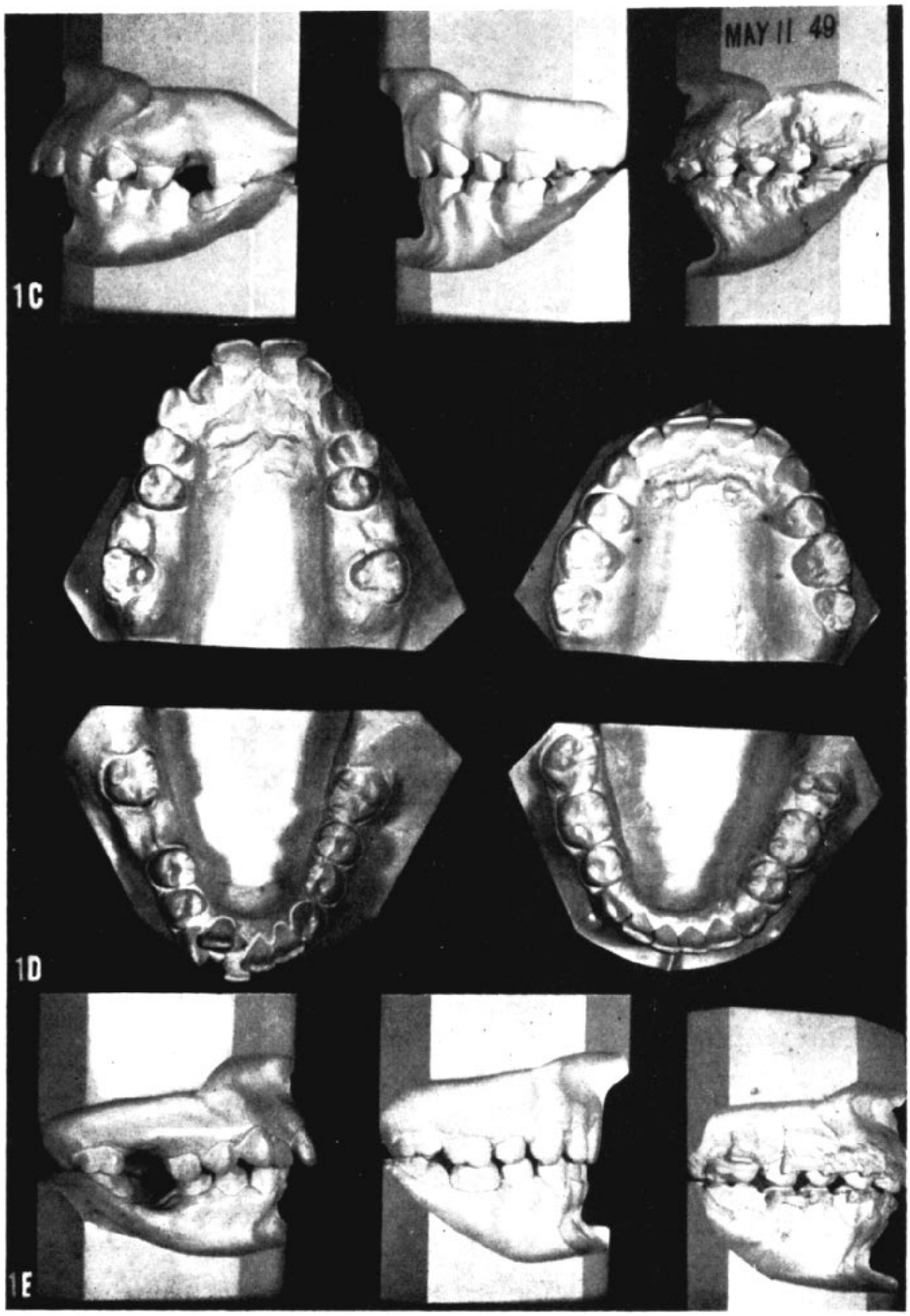
Case No. 303 (Fig. 2) is a Class II, Div. 1 malocclusion with an overjet which measures just under ¾ of an inch. This is both a discrepancy of teeth to bone and a discrepancy between the bone of one jaw compared with the other.

Treatment of this case necessitated the extraction of all four first molars and the upper first bicuspids as well. Some of these teeth were actually lost prior to orthodontic treatment but their space was needed for reduction of the discrepancy and it is immaterial whether the recommendation for extraction came from the general practitioner or the orthodontist.

An unusual discrepancy between teeth and bone is illustrated by Case No. 453. (Fig. 3.) There are three models of this case. The first illustrates the original malocclusion, the second illustrates the stage of treatment when the patient was transferred to my practice. The final models illustrate the treatment result. While we treat the unusual in an unusual way, every effort was made to do so in a manner consistent with the usual methods of case analysis and treatment planning.

Diagnosis of a discrepancy between teeth and bone was indicated on the second model which represents the patient when she transferred to my office. It shows in the lack of space for the lower left lateral incisor and by the fact that all other spaces were almost entirely closed in this arch. Expansion would have permitted room for this tooth to be placed in alignment but expansion is not permitted in keeping with our policy of maintaining stable characteristics as they are found. The prognosis for tissue regeneration on the lower left central was considered

Fig. 1A. Photographs before treatment.
Fig. 1B. Photographs after treatment showing improvement in facial balance.



Figs. 1C & 1E. Models on right show change after closure of first molar spaces and before extraction of first bicuspids. Models in middle — note mesial axial inclination of lower third molar. Despite extraction of eight teeth, its root is in the ramus.
Fig. 1D. Left model — before treatment but following extraction of lower right and both upper first molars. Right model — treated case.

Fig. 2A. Photographs before treatment.
Fig. 2B. Photographs following treatment showing improvement in facial balance.

poor especially in view of the increased strain which would be placed on this tooth if an attempt was made to wedge the lower left lateral in alongside of it. The Bull Study Group recommended that a wax set-up be done with the lower left central removed in order to determine the type of occlusal relation which could then be established. The set-up showed that this occlusion would be satisfactory and such treatment a definite improvement over the poor prognosis for retention of the central. It also seemed more consistent with our treatment objective which states that health of investing tissues is desired. However, removal of the lower left central then created a discrepancy between the upper and lower anteriors. This was countered by disking of the interproximal surfaces of all upper six anteriors, starting at the distal of one canine and working around to and including the distal of the other canine. The incisal edges both upper and lower were straightened and shortened. I don't believe casual inspection of these upper anteriors would show any grinding or reshaping and I emphasize this to illustrate the very mild amount which should be done.

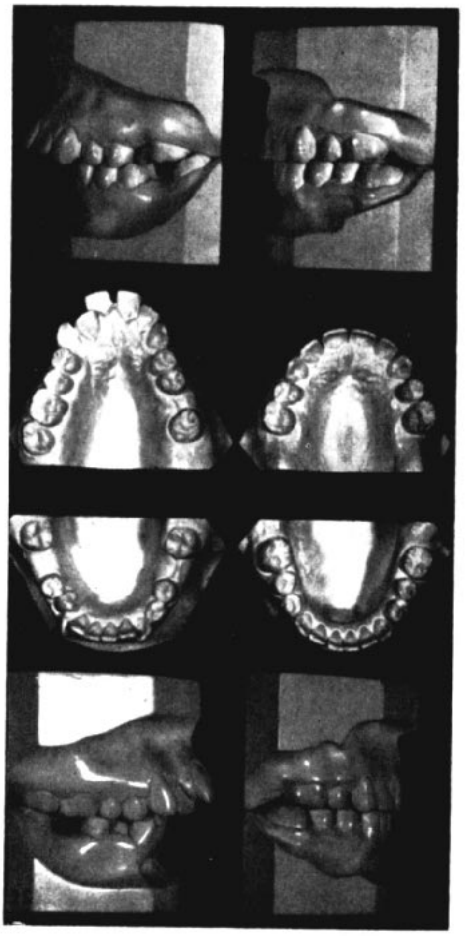


Fig. 2C. Left models show marked discrepancy between bone & bone. Overjet measures almost ¾ of an inch. Upper left & both lower first molars lost prior to treatment. Right models show treated case following removal of upper right first molar and both upper first bicuspids and closure of spaces.

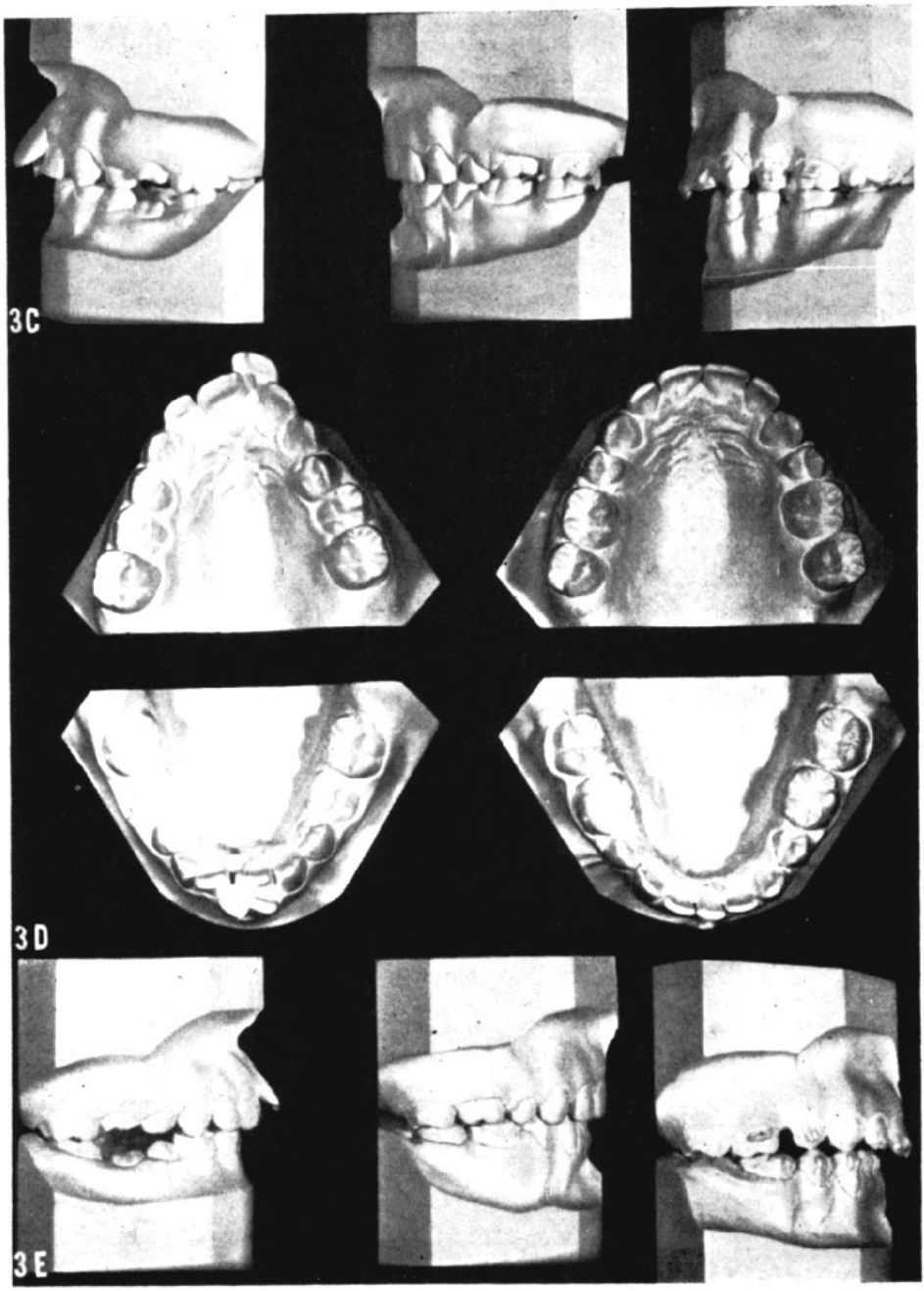
Since Tweed reintroduced extraction treatment well over a decade ago a great deal has been said about extraction pro and con. Considerable attention has been given to extraction treatment, how to close spaces and align the teeth. Very little attention has been given to a consideration of which teeth to extract when planning treatment.

The orthodontist who is starting an extraction case is in a similar position to the crew coach picking his varsity eight. Each must make a decision based upon a process of elimination. Each know that once his choice is made there can be no substitution. Each realizes that those he eliminates are no longer important and it is only those who remain which are. Finally, each realizes that while the race is still to be run a poor choice now will jeopardize the outcome.

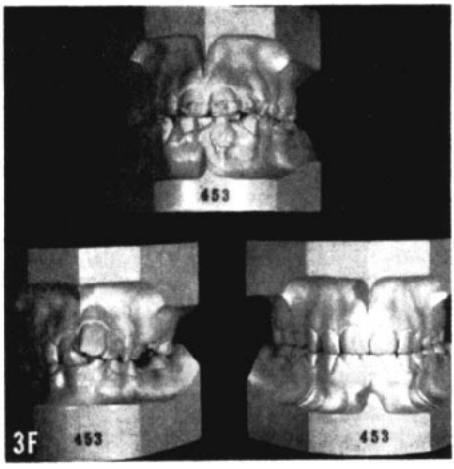
Both coach and orthodontist have similar factors in their problem. One of these is aggregate size. The coach wants a proper size crew to fit the supporting boat, not overburden it. The orthodontist also considers aggregate

Fig. 3A. Photographs before treatment.
Fig. 3B. Photographs following treatment showing improvement in facial balance.

size. He wants a proper-sized tooth crew to fit the supporting alveolar boat and not overburden it. The coach seeks crewmen who are similar in size and shape. He wants to pair-off equals for coordination of effort and function. The orthodontist also wants similarity in size and shape. He pairs-off equals for coordination of force and interdigitation. Balance between port and starboard is essential. Lack of such balance will cause the racing shell to veer off to one side. Lack of such bilateral symmetry in the mouth may cause the



Figs. 3C & 3E. Models on right show denuded crown & root of lower left central, insufficient space for lower left lateral. Models in middle show treated case. Lower left central was removed and upper anteriors disked. See Frontals in Fig. 3F.
Fig. 3D. Left model shows crowding of lower incisors. Right model shows treated case with lower left central removed. Note retention of arch form.



teeth to veer off to one side. Health and conditioning are very important to the coach. Frequently he picks an oarsman who is in good physical condition over one who has good bladework but who might collapse half way over the course. Each of his crew must "pull his weight in the boat" to the end of the race. Health and condition are essential to the orthodontist too. He cannot afford a collapse half way over the course either. Each of his crew must still pull its weight to the end of the race also.

We know that extraction treatment can maintain good facial esthetics and improve poor ones. We know that good functional occlusion can be attained and also health of investing tissues. But the objective of health of teeth in the final result is often dependent on choosing the proper extraction. This is the opportunity to remove the unhealthy ones and wherever possible to see to it that only the healthy ones remain when analyzing the case and planning treatment.

Tweed extracted the four first bicuspids. Time and clinical experience have proven him correct. Occasionally however, we see malocclusions in which extraction of four first bicuspids would be unwise or clearly contra-indicated. Two cases to be shown exhibited first

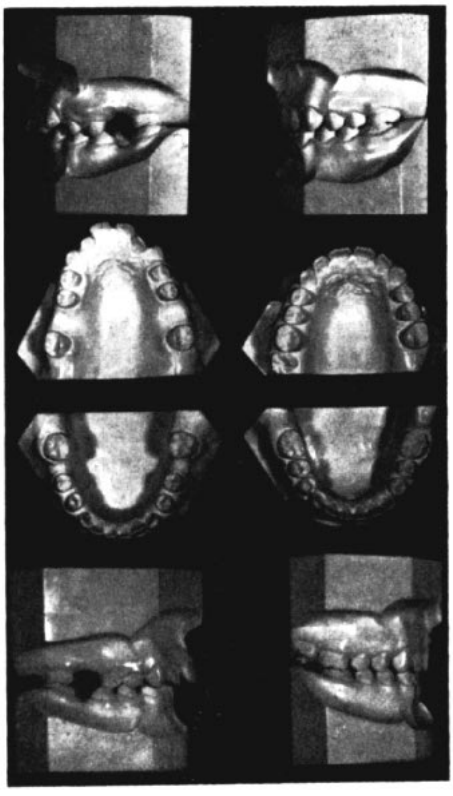


Fig. 4. Left models — upper first molars lost just prior to treatment, lower first molars lost several years previously. Right models — treated case with first molar spaces closed.

molar health problems as indicated by deep caries or large restorations threatening pulp involvement or else actual prior loss before presentation for treatment. In each case bicuspids were in healthy condition and to comply with our objective concerning health of teeth all first molars were extracted.

No. 382 (Fig. 4) shows routine treatment of a Class II, Div. 1 molar extraction case. Prior loss of the lower first molars several years before treatment and subsequent forward drift of the lower second molars established a pseudo-Class I relation with the upper second molars. All other teeth were in Class II relation.

Extraction of unhealthy first molars

assumes that treatment techniques are available which will enable the operator to work with the healthy teeth which remain but not sacrifice other treatment objectives. Clinical experience indicates that our objectives can be attained with these cases.

No. 357 (Fig. 5) illustrates crowding and rotation of upper incisors, a blocked out upper left canine and mesial drift of the bicuspids. Ideally, treatment should hold the second molar in place while filling the entire first molar space by distal movement of the bicuspids and even the blocked out canine in order to allow for alignment of the incisors.

Measurement from the crest of the interdental papilla at its contact with the upper centrals to the middle of the mesial marginal ridge of the upper left second molar is the same before and after treatment.. While it is recognized that this could occur through labial movement of the centrals during treatment together with a corresponding mesial drift of the second molar, there is little or no indication of this in lateral views of the models.

Some of these patients have only one or two unhealthy first molars, yet in each instance all are extracted. This brings up the factor of extraction of like teeth.

We feel that analysis of cases treated by the extraction of unlike teeth indicates that this does not afford as good results as the extraction of like teeth. Removal of teeth which are not alike in size and shape results in the occlusion of teeth which are not alike in size and shape. A moment's reflection will indicate that the removal of any four like teeth causes the least disturbance of the normal relations of the occlusal inclined planes. The only inclined plane relations which are disturbed are those on the mesial half of the teeth posterior to the space and the distal half of teeth anterior to the space. All other inclined plane relations throughout the occlusion can be retained.

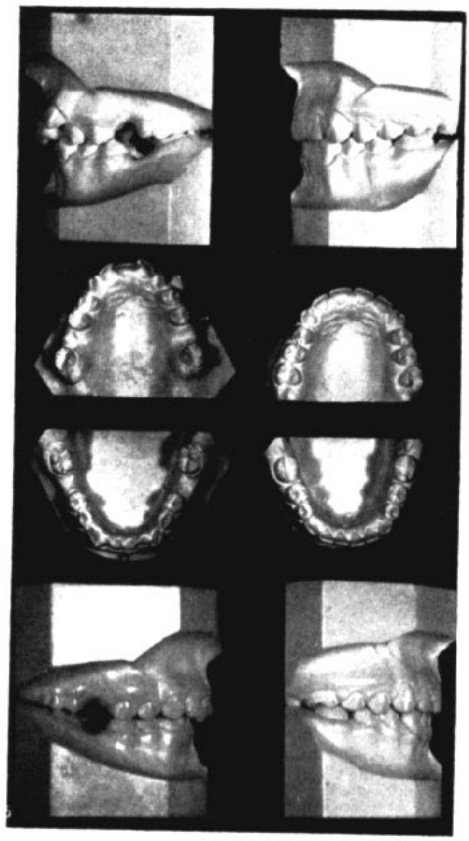


Fig. 5. Left models — note rotation & crowding of upper incisors and blocked out upper left canine. Right models — Result following distal movement of upper left bicuspids & canine. Distance from interdental papilla at its contact with mesial of upper centrals to mesial marginal ridge of upper left second molar is the same before and after treatment.

We believe that this treatment renders a better service to the patient. It will avoid potential embarrassment and complication entailed by loss of unhealthy molars following removal of four healthy bicuspids. It avoids the necessity for prosthetic replacement in an age group where such early molar tooth loss will be followed by many years of bone and tisue resorption plus the attendant strain of prosthesis on abutting teeth.

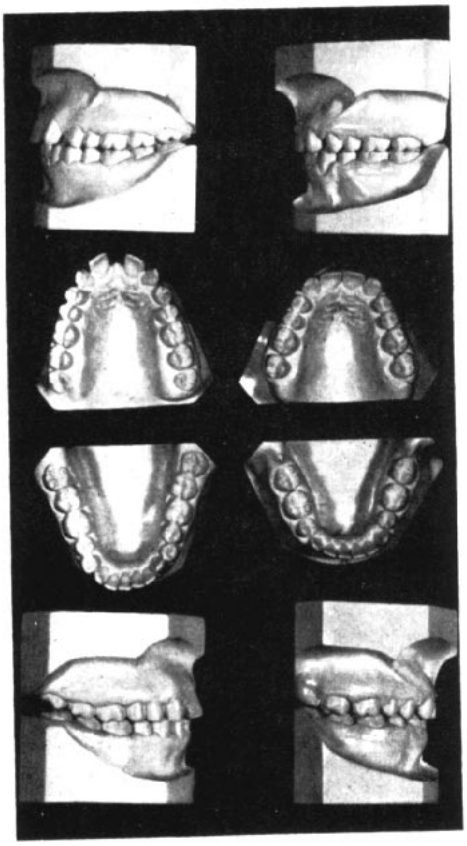


Fig. 6. Left models — upper laterals congenitally absent. Right models — upper canines moved into lateral spaces. Lower first bicuspids removed.

However, in some patients the extraction of four like teeth is contraindicated on other grounds. These usually involve tooth anomalies or discrepancies in the normal relation between teeth and other teeth.

These are characterized by abnormal size or shape of individual teeth, congenital absence or prior loss of teeth. Wylie[15] also includes, "Dental restorations which fail grossly to imitate satisfactory anatomical form".

No. 311 (Fig. 6) is a Class II, Div. 1 malocclusion with congenitally missing upper laterals. As such it is both a discrepancy in arch relationship and in the number of teeth in the upper jaw compared with those of the lower. Extraction of the lower first bicuspids counteracted both since it permitted correction of the Class II relation by tooth movement in the usual manner and established a practical quantitative balance between the teeth of each jaw. The upper canines were moved in to the lateral spaces and the first bicuspids were positioned as canines.

No. 337 (Fig. 7) presented with all upper bicuspids and both lower second bicuspids congenitally absent. While the Class II occlusion indicated a discrepancy in arch relationship there was little evidence of any discrepancy between teeth and bone as indicated by the relative size of the teeth and that of the well-developed alveolar ridges. As a consequence treatment was limited to alignment of teeth and closure of spaces. No extractions were done and the molar relationship was left in Class II.

Treatment of such discrepancies of teeth to teeth often necessitates a compromise in the selection of teeth to be removed and the finished case is usually a compromise result. The best compromise is that which varies the least from standard practices. We try to remove teeth which will establish quantitative balance with basal bone and which are as nearly alike as possible for the sake of the occlusion and as nearly individually healthy as possible for the sake of health.

In these cases diagnostic wax set-ups were made and various combinations of teeth arranged on the ridges in order to determine the best arrangement possible. This form of analysis has several advantages. It is a three dimensional solution to a three dimensional problem. Human anatomy is not taught by the two dimensions of the textbook or blackboard alone. For a better understanding of the complexity of its various parts a study in the third dimension is required. This is secured

through dissection of the cadaver. The teeth and jaws are an integral part of this anatomical complex and an analysis of the problems and the available solutions are secured when done in a similar manner. The set-up should be started with the lower anteriors. They should be placed upright and on the ridge. As much of the ridge should be conserved as is possible and the teeth should be cut off just below the depth of the clinical crown. This will necessitate arrangement of the anteriors in keeping with the actual limitations imposed by this narrow bony ridge.

All of this may be summed up in the following guide for selecting the proper extractions, "After extraction, the teeth which remain must be in quantitative balance with basal bone, collectively alike in size and shape, individually healthy and invested by healthy tissue."

Such factors as congenital absence, malformation and tooth loss prior to treatment are frequently encountered. These graphic situations are easy to recognize. They are the textbook type of discrepancies between teeth and teeth. What is not so apparent are discrepancies among the anteriors. We think this problem is encountered very frequently and jeopardizes stability of the end results. It may explain a great deal of the spacing between uppers and crumpling and rotation of the lower anteriors following treatment.

Unless the anteriors of these cases are treated edge-to-edge, we often see spaces between the upper anteriors or else the buccal segments do not show good Class I interdigitation. Where one exists the other does not. This indicates that the upper six anteriors in these patients are not sufficiently wide to maintain proximal contact and also permit good interdigitation in the buccal segments.

The upper lateral is often to blame. It is frequently congenitally missing, variable in size and shape, and apt to

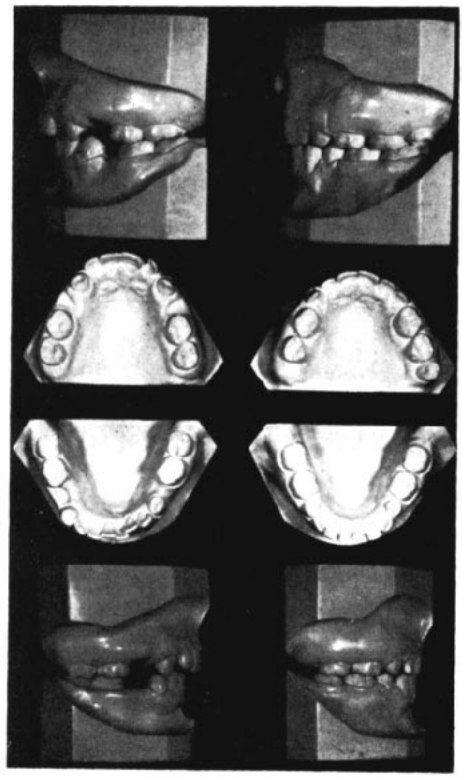


Fig. 7. Left models — all upper bicuspids & lower second bicuspids congenitally absent. Right models — treated case. Note that upper first & second molars have been rotated to increase arch length in order to counterbalance two additional teeth in lower jaw and to keep mesio-buccal roots of upper first molars from protruding into canine fossa.

show symmetry of size and shape between the right and left sides. In these cases the upper and lower laterals are often approximately the same width. There are other cases where upper centrals or cuspids may be unusually narrow but these are relatively less common.

Discrepancies among the anteriors may exist to a more subtle degree. These are manifested in malocclusions which exhibit deep overbite and overjet. We are accustomed to treat these by flattening the arches to reduce both overbite and overjet. If the models of treated cases which had deep overbite

and overjet are held so that the anteriors are in edge-to-edge bite then the buccal segments should show a relation somewhere between Class I and Class III and closer to Class III. If the buccal segments are nearer Class I then a tooth discrepancy between the upper and lower anteriors probably exists. This is so because an edge-to-edge bite is not a stable one and will likely revert particularly where deep overbite existed in the original malocclusion. If these cases do revert, any increase in the overbite which is in the vertical plane will have repercussions on the overjet which is in a horizontal plane. This recurrence will bring pressure to bear against the lingual of the upper anteriors and against the labial of the lower anteriors. The familiar result is crumpling of the lower anteriors. Less frequently, the lower anteriors maintain alignment and the uppers show spacing.

Overbite is a characteristic of the vertical plane. Teeth are not arranged in individual units in the vertical plane. This would seem to rule out the possibility of reducing tooth structure to eliminate discrepancies in this plane but there is evidence that some possibility exists.

It is common knowledge that function of the teeth during years of use produces considerable wear. Facets appear on occluding and approximating surfaces. Where carried to an extreme the cusps wear down, occlusal surfaces become flat, overbite and overjet disappear as the incisors assume an edge-to-edge relation, and arch length decreases with interproximal wear.

We usually feel that these changes occur slowly over a period of many years. Enamel is a very hard substance and highly resistant to attritional wear. However abnormal function or lack of function in malocclusion can either accelerate or retard the loss of enamel through wear and these influences are already apparent in the age group which we treat. We have all seen cases of Class I malocclusion where lower incisal edges show very asymmetrical or oblique wear. In Class II, Div. 2 the lower centrals and to some extent the lower laterals may show precocious wear due to their premature functional contact with the upper centrals. But the upper and lower incisors of open-bite and Class II, Div. 1 cases frequently do not show wear. The scalloped incisal edges of these teeth may appear just as they did when they erupted at the age of five or six. To see these scalloped edges, which we might call virginal incisals, five or six years later is an anachronism. It would seem that reshaping of these virginal incisals to the extent simulating what would have occurred had the teeth been in normal alignment and function is an opportunity to help reduce the discrepancy in the vertical dimension and stimulate better stability in the end result. Another opportunity may exist on the lingual surfaces of the upper four incisors. Strong prominent ridges exist at the mesial and distal. Where these impinge on lower centrals and laterals there may be cause for rotation and collapse of the lower anteriors following treatment. In good occlusion these ridges are worn down through normal function. Where the question of equilibration following orthodontic treatment exists these discrepancies which have been aggravated through lack of function should be considered also in that category of dental treatment.

Reshaping alone will not overcome the discrepancy which exists in the vertical plane. We cannot remove that much tooth structure. It can be of help however and taken with other phases of treatment such as depression of the anteriors and finishing them in a more upright position or in the case of severe discrepancies in a slightly recumbent position will help provide stability of the result.

SUMMARY

1. The conclusions of research and clinical experience indicate that there are discrepancies which impose limitations on treatment.
2. There is a growing conviction that these discrepancies are numerous in type and variable in degree.
3. Discrepancies refer to discrepant relationships of teeth, bone and dental arches.
4. Analysis and treatment planning will be facilitated if discrepancies are regarded objectively in terms of the teeht, bone and dental arch relationships to which they refer.
5. Arch form, length, thickness and the vertical and horizontal relationship of the arches are significant terms to which the findings concerning discrepancies refer.
6. We may call these "stable characteristics" to denote that they are significant relationships of teeth, bone and arches which exhibit a high degree of stability.
7. Findings concerning discrepancies testify that where these stable characteristics are encroached upon the prognosis for successful and stable results are jeopardized accordingly.
8. These findings also indicate that where stable characteristics are not encroached upon the favorable prognosis is accordingly enhanced.
9. Consideration of all treatment objectives should be included when choosing extractions in planning extraction treatment. These include facial esthetics, occlusion, health of teeth and healthy investing tissues.
10. To comply with this we may use the following as a guide, "After extraction, the teeth which remain should be in quantitative balance with the bony arches, collectively alike in size and shape for the sake of occlusion, individually healthy and invested by healthy tissue for the sake of health."
11. There is evidence that discrepancies among anteriors may exist which is manifested in spacing of uppers or crowding of lowers following treatment.
12. These include slight abnormalties in size and shape of anterior teeth. Deep overbite alone may also induce such changes.
13. Grinding or reshaping of anteriors whether performed as equilibration of occlusion after treatment may be justified if done judiciously.

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