Further Definition And Implementation Of A Clinical Ideology

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When it was suggested that the procedures followed in my office would be of important interest to this group, I accepted the assignment because I have always felt an obligation to further explain my ideologies of treatment of malocclusion and the results obtained. These results have been shown in plaster clinics during the seminars of this Foundation and, from time to time, at other orthodontic meetings. In speaking of these results, there is no claim of individuality except that I am primarily interested in the ultimate stability of the corrected malocclusion after all appliance therapy, including retention, has been discarded. This objective, of course, is the goal of all good orthodontics. Together with the health and welfare of the teeth and supporting tissues, this final stability becomes the greatest responsibility of the orthodontist and the basis for all rational procedures in practice.

A serious doubt that I have always had concerns the advisability of utilizing techniques which set up dangerous reciprocal forces, particularly if patient cooperation is required in order to neutralize the undesirable effects of appliance therapy. As we all know, the reciprocal action of appliance techniques is the biggest bugaboo in orthodontics. It is a well known law in physics that every action has an equal and opposite reaction. When applied to orthodontic therapy, this means that every desirable appliance action has an equal and opposite undesirable reaction. In unskillful management of cases or a lapse in necessary patient cooperation, the undesirable effects will neutralize the desirable effects to the extent that one pattern of malocclusion is exchanged for a new pattern of malocclusion. To a lesser degree in case mismanagement or lack of patient cooperation, what appears to be an acceptable end result will prove unstable because of a degree of displacement permanently of reciprocal units involved for anchorage purposes. In this respect I am thinking particularly of cases where anchorage units have been displaced farther forward than is permissible for the positioning of the entire denture in balance on apical base.

In every case the degree of potential permanent displacement of reciprocal units is related to the degree of the anchorage problem and to the severity of reciprocal appliance action. While anchorage preparation may effectively minimize such effects, I consider it wiser to avoid or, at least, minimize, such dangerous reciprocal action wherever possible.

Any discussion of appliance therapy must begin with band placement and construction. Band placement and construction is the absolute foundation of all appliance therapy. A rational, regular, and exact positioning of all bands is absolutely essential for unobstructed, orderly functioning of the appliances. A smooth working appliance is essential for success in treatment. I, for one, never want to offset an archwire in any degree to compensate for lack of uniformity or an error in band positioning. I will always reposition or even

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remake a band in order to avoid a bend in an archwire.

Any discussion of angulation of brackets or of second order bends or tip backs, as we know them in archwires, is meaningless without consideration of band alignment on individual teeth. I establish a uniform level of all brackets on all teeth by gauging from the occlusal or incisal edge of the bracket to the tip of the highest buccal cusp or incisal edge. For a gauge I use a Number 2 round Black's amalgam plugger. This plugger is employed in a dual capacity — as a pusher or burnisher, and as a gauge in the initial fitting of every band. For all band strips with preassembled brackets, I gauge from the ear of the bracket to the most prominent cusp or the incisal edge of the tooth. For cuspids I use contoured cuspid blanks without brackets and I gauge from the incisal edge of the band to the tip of the cusp and, when the bracket is installed later, it is assembled with the edge of the bracket even with the incisal edge of the band, thus establishing a uniform level of the bracket with the other brackets preassembled on strips.

For molars I use .180 band material or contoured blanks and establish the level of the band on the tooth at the distal marginal ridge of the molar tooth. Molar tubes or brackets are then installed midway between the occlusal and gingival borders of the band. I have found in practice that this method establishes a uniform level of the molar bracket or sheath with the brackets preassembled on the strips as used on bicuspids and anteriors as well as on first molars, and with cuspid brackets installed as previously explained. I should add that the cuspid technique of positioning the bracket at the incisal edge of the band positions the band gingivally to a maximum degree for retention on these conical and tapering teeth and, at the same time, insures the leveling off of the tips of the cuspids with those of the other teeth.

Alignment of the bands upon the teeth at the given level is the next item of discussion. As mentioned, the degree of angulation of brackets, or of second order bends, or tip backs in archwires is meaningless unless based upon standardized alignment of bands upon the teeth with regard to their long axes. It will be noted in studies on tooth anatomy that the vertical dimension or height of the crowns of teeth is greater at the mesial surface than at the distal surface. Thus, a line positioned at right angles to the long axis of the tooth and at a level with the distal marginal ridge of the crown of the tooth will usually pass gingivally to the mesial marginal ridge. This would also be true of a line drawn around the circumference of the tooth at the level of the distal marginal ridge. Because of this and because of the nature of the contours of the crowns of teeth, it has been my clinical observation that, when the ends of a band strip are brought together in perfect alignment with each other, no offset permitted, the mesial side of the band will pass below the mesial marginal ridge when the distal side of the same band is even with the distal marginal ridge.

This alignment of a band on a tooth with a parallel bracket will not only insure maximum uprighting of the tooth on its long axis, but will also provide a degree of distal tipping with a straight archwire dependent upon the individual tooth anatomy or difference in mesial and distal vertical heights of the crown of the tooth. Since, in this respect, there tends to be a natural uniformity of teeth in the same mouth, it follows that a straight archwire will establish a natural degree of uprighting or distal tipping of all teeth in the mouth. Please bear in mind that the degree of this action will vary accord-

ing to the individualities of dental anatomy.

Gauging the level of the bands upon the teeth may vary also in extreme cases. For long teeth and long cusps, I use a Number 3 Black's plugger in place of a Number 2 for my gauge. In the case of the incisor teeth I always align the edge of the bands with the incisal edge. This will require the offsetting of the ends of the bands on the lingual in some cases.

The natural degree of uprighting or distal tipping with a straight archwire upon cuspids and posterior units by band alignment, according to the method described, is usually all that is employed.

For the rotation of all bicuspid teeth and lower anteriors, I center one staple on the lingual surface of the band. This is preferred for the simplicity of rotation in either direction provided by one such staple and because it insures the maximum leverage for rotation stress or tension. Also, this single staple principle makes most effective use of the compression of a coil spring between the bracket and the rotating ligature tie in maintaining tension upon the rotation ligature.

In line with my policy of avoiding unnecessary reflex action in appliance therapy, I favor a method of rotation that requires no flexing or reflex action of the archwire. This is a method learned from our Cuban members who first demonstrated it at a seminar in Tucson. The method not only avoids unnecessary movement in the archwire but also provides most effective and rapid rotations of teeth when used in connection with the lingual staple.

A section of open wound coil spring 010 by .030 and usually three sixteenths of an inch in length is installed on the archwire, round or rectangular, and compressed against the bracket by tying the lingual staple. The length of the spring section should vary, of course, in relation to the size of the teeth. It should exceed the distance between the bracket and the proximal side of the band and should not exceed the distance to the brackets of adjoining teeth when rotations have been completed. If the length of the spring section is precisely determined according to the distance between brackets, the rotating tie may be unnecessary on the tooth to be rotated, but the rotation of the adjoining tooth must be stabilized by a counter rotational tie. While some may not approve, I do not consider the additional interproximal space required for the passage of a rotating ligature between teeth as a serious obstacle. Such a space immediately disappears following discontinuance of the ligature.

From the beginning and throughout treatment, all lower archwires are made flat from anterior to posterior. All upper archwires are provided with compensating curves. Flattening and leveling the lower arch thus from the beginning adds a degree of uprighting to that already provided by the alignment of bands as previously described. This is true, I believe, because the natural state of the lower teeth is in the Curve of Spee and any leveling and uprighting of the posterior teeth in flattening this curve will, in effect, constitute tip back action. Of course, the simultaneous leveling or depression of the lower anteriors will open the bite according to the degree desired.

In the upper arch the compensating curve of the archwire incorporates a similar effect upon the upper denture. Since the normal axial inclinations of upper molars in the compensating curve are toward the distal, the curvature of the upper arch in compensating curve formation automatically provides a degree of tip back upon these teeth. At the same time this curvature will tend to elongate second bicuspid and first bicuspid units and depress up-

per anteriors with a resulting open bite effect. Furthermore, the effect of the compensating curve on the anterior section of a rectangular archwire automatically provides a degree of lingual root torque or labial crown torque according to the degree of the curvature. This is all the torquing action that I usually employ on these teeth. The torquing effect in the anterior section of a lower flat rectangular arch likewise establishes a degree of labial crown torque and lingual root torque on the incisors. This torquing action tends to resist excessive lingual inclination of the teeth.

In selection of the types of brackets used, the system of rotation is an important factor. The use of coil spring sections compressed between the bracket and a rotation tie, as mentioned previously, works best with a single solid type of bracket because of the space required for the coil spring section on the archwire. For this reason, I use the single, regular type brackets on all lower incisors, on upper lateral incisors and on all bicuspids. The large single posterior type bracket is used on upper central incisors, upper and lower cuspids, and on upper and lower first molars when second molars are to be banded and engaged. Rotation staples are provided on the labial surfaces or, on buccal surfaces in the case of molars, for these units, except the lower cuspids which carry a single rotational staple on the lingual.

Furthermore, I do not approve of unnecessary flexing of archwires in order to accomplish rotations. The reciprocal wave-like actions set up in the archwire therefrom are very disturbing to the adjacent teeth and will even produce expansion effects in an archwire intended to be passive in this respect. Physiological disorganization in the bone around the roots of teeth so affected, I am sure, reduces the effectiveness of these units for anchorage purposes. The movement of teeth in undesired directions in order to accomplish a given type of movement in other teeth is always to be avoided, if possible.

Another consideration that applies in the management of all types of cases is the number of teeth to be banded and engaged. In the management of all types of extraction cases, I have found it imperative to band and engage the second molars. This is necessary in order to obtain the proper leverage of the archwires in leveling the lower arch and producing the necessary compensating curve in the upper arch. If second molars are not banded and engaged in extraction cases, the posterior segments of the archwires are so foreshortened that they provide little leverage action for vertical height adjustment in either arch. Unless a minimum of three units distal to the cuspids is engaged on each side, there will be little depressing action on the anteriors above or below, and second molars are likely to extrude occlusally above and beyond the banded teeth.

When second molars are not erupted and available for banding at beginning of treatment and it is planned to engage them in the course of the treatment plan, I use the wide posterior brackets on the first molars with a mesial staple to be used as a counter rotation tie when any mesial traction is to be applied to these teeth before the second molars have been engaged.

There are exceptions in banding second molars, of course, in cases where little or no leveling or bite opening is required on the anterior units of extraction cases and when the anchorage situation permits. In non-extraction cases, banding of second molars may not be necessary except in critical anchorage situations and in severe closed bites.

With regard to central and lateral

incisors, these teeth are usually not banded at the beginning of treatment where any crowding exists. Exceptions to this are in extreme closed bite situations such as Class II, Division 2 cases when the resistance of incisor teeth is utilized to assist in the uprighting or leveling action of archwires in the beginning phases of treatment, and to retract the upper incisors to the maximum practical extent in order to get them out of danger and to facilitate normal tongue and lip action.

As a cardinal principle in my management of cases, all rotations are taken out coincident with leveling treatment. This is considered essential for free and smooth working of appliances, the elimination of occlusal interferences, and for minimizing retention after treatment.

The time for extraction of teeth is something that I vary according to the circumstances of the case. In order to prevent avoidable mesial migration of anchorage units during the initial leveling and uprighting stages for these teeth, I very often postpone extraction of the selected units until this phase of treatment is over. This is done so that pressure on the contacts between the teeth will be maintained as a block to the undesirable forward movement of posterior units. Teeth to be extracted may or may not be banded during the period depending upon whether I wish to use them in any way to assist in appliance action.

In Class I cases I do not extract lower units until the upper cuspids are occluded well distal to the lower cuspids. This is done to avoid functional occlusal interferences to the upper cuspids in their distal movement and to assist them in every way possible. Extraction of the selected lower units follows as soon as practicable in this respect.

In Class II, Division 1 cases all extractions are performed simultaneously except when an attempt is made to reduce the Class II relation first. When this has been accomplished, the procedures as in Class I cases apply.

In Class III cases and anterior cross bites the extraction of the lower units is performed first. The extraction of upper units is usually not performed until the lower anteriors are functioning in their normal incisor relationship to the uppers; however, this procedure is varied in cases where one or more upper central or lateral incisors are lingual to adjoining teeth to the extent that they would interfere with this normal incisor relationship with the lowers. Then all selected units would be extracted simultaneously so that upper cuspids may be moved sufficiently to permit normal alignment of the upper centrals and laterals.

In Class II, Division 2 malocclusions I prefer not to extract at all. I have found in these cases that the apical base is usually adequate for the complete dentition and the skeletal pattern is regular. I think the etiology of this type of malocclusion is musculature with mandibular displacement distally. I believe that extraction in these cases tends to precipitate relapse. I have treated cases in this class successfully after mutilation by the loss of first molars and, in one case of full complement of teeth, I have extracted second bicuspids. So there are exceptions. I did, however, reduce the Class II relation before I extracted in the one case. In any case of this type I prefer to do that before extraction is considered.

The next factors to be discussed in the management of all types of cases are the techniques used in the retractions of cuspids and other anterior teeth. The methods used follow the aforementioned principles of facilitating, stimulating and guiding growth. Also involved are the principles of avoiding unnecessary reciprocal actions,

particularly extreme degrees of such action and the avoidance of a requirement for patient cooperation whereever possible. The technique begins with removal of the obstacles or impediments to balanced and harmonious growth and development in the form of the units to be extracted. Those of us who have had the patience and have not been too hasty in our actions have learned that cuspids upright themselves under the influence of the labial musculature of the mouth when such movement is unobstructed by other teeth, occlusal interference, or appliances. This is nature following her own instincts and helping herself when given the opportunity. There are exceptions of extremely malposed teeth where this phenomenon may be too slow and require assistance.

After these cuspids have attained a vertical position or a relatively normal axial alignment, further distal movement, bodily in scope, will require stimulation and guidance. For this further stimulation and guidance, I endeavor to continue to employ the influences of the labial musculature plus an appliance action which has its primary reciprocal forces dissipated in a lateral direction rather than anteriorly against posterior anchorage units.

The method is applied to both upper and lower dentures and is as follows: When the leveling and rotation phases have been completed to the extent that bracket engagement for all teeth concerned is free and easy on an .020 round arch, the distal movement of cuspids is begun. A round .020 wire is fashioned into the form desired, without tiebacks or stops of any kind, but long enough to extend three sixteenths of an inch beyond the distal margin of the molar sheaths, level in the case of the lower arch and with compensating curve in the case of an upper arch. Several inches of open wound coil spring .010 by .030 are slipped over a corresponding length of .030 round wire. The entire length of spring is then compressed to the maximum extent and released. This will tend to shorten the length of spring as a whole and will stabilize the length of this coil. If this is not done, improper handling or tinkering by the patient may alter the length of the coil spring after its installation and shorten it in such a way that it becomes inactive.

After this conditioning, a length of the spring one quarter inch longer than the distance around the arch from cuspid bracket to cuspid bracket is installed on the archwire and the wire tied in. All bracket ties are made easy enough to permit free movement of the archwire anteriorly and posteriorly in the channels. On the cuspid brackets, the tied ends of the ligature bracket tie are placed at the distal of the brackets. A counter rotational tie is usually made at the distal on the cuspids and a mesial counter rotation ligature is attached to all second bicuspids. This stabilization of rotation is necessary. Otherwise, the cuspids to be moved distally may rotate distally and second bicuspids, though straight, may tend to rotate mesially. If this rotation were permitted on the second bicuspids, any possible anchorage value of these teeth would be reduced. After passing through the last molar sheaths, the distal ends of the archwire for one sixteenth of an inch are turned lingually or palatally forty-five degrees or more. Since the wire has been allowed to extend three sixteenths of an inch beyond the distal end of the molar sheaths, this provides one eighth of an inch of free travel forward of the entire archwire.

Thus, this archwire may be described as a floating arch, because it may float anteriorly a distance of one eighth of an inch from contact with central incisors without creating any drag on the anchorage units other than that

inherent in the friction within the channels of the brackets.

This archwire and anterior coil section exert a distal stimulation against the cuspids in the following manner. The action is provided primarily through one quarter inch over-extension of the anterior section of coil spring when compared with the circumference of the arch between the cuspid brackets. Whether the archwire is positioned distally to the maximum extent, that is, with the anterior section up against the central incisors or whether it has floated anteriorly to a comparative degree, there is always the influence of the labial musculature bearing posteriorly across the entire anterior segment of the arch and spring. This influence is particularly active when the wire has floated forward to the maximum extent or degree extending the appliance against the labial musculature. This restraint, in itself, is sufficient to move cuspids distally when unopposed or unobstructed by other teeth or appliances.

In addition to this posterior pressure from the lip, there is additional pressure stimulation from the compressed anterior section of coil spring when the archwire is positioned distally within one eighth inch of the central incisors. The direction of force is directed distally from the ends of the coil spring section against either cuspid bracket while reciprocal forces in the opposite direction are dissipated around the archwire in a direction laterally against the wire until completely dissipated in a lateral direction right and left at the mid-line. This exemplifies a principle of physics as follows: when two equal forces, originating at different points, meet at an angle, their combined reciprocal action or direction of force will be along a line or axis bisecting the angle at which they meet.

Thus, assuming that the curvature of the anterior segment of the archwire is symmetrical, the reciprocal action of a cuspid to cuspid coil would be along two lines or axis on either side, through points midway between the median line and the ends of the coil section on the archwire, and a point at the median line of the arch or palate directly in line with both ends of the coil section. In our appliance action, therefore, the reciprocal action of the distal force against the cuspid brackets at the ends of the coil section, which tends to float the entire arch anteriorly, is much less than the effective action against the cuspids in a distal direction.

In addition to this reduction of reciprocal forces, the freedom of the arch to float through the channels of the brackets minimizes any drag on the anchorage units until this effect is nil.

The activation of this appliance is checked at regular intervals throughout this step in treatment. Whenever the circumference around the arch from cuspid to cuspid bracket is within one eighth of an inch or less than the length of the coil in action, a new archwire and a longer coil section are installed as in the beginning, or a new longer section of anterior coil may be slipped over the end of the old wire by freeing only one side of it in the mouth.

It will be noted that space closure or complete distal movement of cuspids will take longer in many cases when compared with apparent results of other methods or techniques. This will be true, of course, whenever the entire distance of movement or space closure is accomplished by distal movement of the cuspid, for any forward or mesial migration by teeth posterior to the space, simultaneous with cuspid movement, will reduce the time required for space closure correspondingly. I do not believe that the speed of

unobstructed physiologic tooth movement is proportional to the pressures applied.

It will be noted, also, as the distal movement of cuspids progresses and the appliance action continues, that, in many cases, the length of the original archwire becomes too great. This will be observed as an increase in the length of the ends of the arch as they extend distally through the last molar sheaths. When this occurs, the excessive length of the ends should be clipped off and replacement archwires should be made correspondingly shorter.

Whenever this phenomenon develops, it is explainable in two ways. Either the entire anterior section, including the central and lateral incisor teeth, is moving back with the cuspids as they go distally or the posterior units behind the extraction sites are moving mesially. From clinical observation, I believe that it is for the first reason that this occurs.

My reasoning is as follows: First, unless some of the ligature ties have been made too tight or some other error made in appliance construction or installation, there is no appreciable drag or mesial force exerted against the posterior units. Secondly, and most important, I have repeatedly observed this action or phenomena in cases where no coil section has been installed. With only a plain leveling arch in position, without incisor bands and without tie backs of any type, I see extraction spaces shrink until they are less than half their original dimension.

Under the circumstances, this could be due only to a natural mesial or forward migration of posterior units or a distal or posterior movement of the cuspids together with the incisor teeth.

If it is the posterior units coming forward, then I would consider that action unavoidable and unpreventable regardless of what methods and techniques were used. However, a natural improvement in the axial inclinations and the relations of anterior teeth together with a corresponding degree of facial improvement convinces me that this is where the improvement is taking place.

This is a profound illustration of the potential for improvement in the growth and developmental pattern of the structures that we are concerned with when the natural forces are unimpeded. This is also in harmony with the concept of correction by facilitation of normal growth and development.

For the retraction of central and lateral incisors, after the distal movement of cuspids has been completed, I use the conventional .020 wire with round closing loops distal to the lateral incisor brackets and cinched back to the molar units. The ends of this wire are tipped distally and lingually. I have not found that the resistance of the four anterior incisor teeth in the lower will displace anchorage units during this step in treatment; however, cervical anchorage may be used in order to reinforce posterior units if desired.

With respect to this use of cervical traction, I employ it to assist in the distal movement of cuspids in stubborn cases, particularly in the maxillary arch. This is done in conjunction with the use of the anterior coil section by engaging the hooks from the gear over the archwire in a manner which permits them to slide back against the cuspid brackets.

In a similar manner, it is employed directly against the cuspids, and through tooth contacts to the last molar teeth, as anchorage reinforcement for retraction of incisors. I also employ cervical traction in the retraction of upper central and lateral incisors by applying it to hooks or spurs on the archwire in the anterior region.

This method is safer, I believe, particularly if there is any great distance to move these teeth since there are no tie backs or reciprocal force against posterior units. If the patient doesn't wear the gear, there is no progress, but if these teeth are cinched back against the posterior units, they will come forward, especially in the upper arch, unless cervical reinforcement is faithfully applied against these teeth.

In the employment of the described technique, I believe that the natural forces are being followed to the maximum extent and that the end result will constitute the most natural harmony and balance for the individual case, and that stability after treatment with or without retention will be the ultimate attainable for the patient. I believe that the individual responses of the teeth and progress of the case in general will indicate the nature and the extent of the correction indicated for the individual case. It has been my experience that teeth move readily into their normal positions and relationships when unopposed and unobstructed. Hence, when the methods are correct, the progress is good.

When tooth movement is slow or stubborn and progress is frustrated, there are obstructions that must be overcome or the methods and objectives are wrong and are being opposed by the natural forces of occlusion. Thus, when the distal movement of cuspids slows down and becomes stubborn, there is either some functional interference or they have probably progressed as far distally as they should go. Whenever cuspids take on an excessive distal inclination, and this happens under the influences of the technique described, I am inclined to believe that they should not go any farther, and that the teeth should be uprighted with their crowns remaining in their attained relative positions.

Furthermore, when properly retracted and uprighted, I do not believe it should be necessary to tie back the cuspids during retraction of the central and lateral incisor teeth. If this is necessary, I believe it indicates an instability which will cause trouble later on in the case. I have never produced a dished-in face by these methods and my retention problems have been minimum. This convinces me of the clinical soundness of these methods.

With the complete retraction of the incisor teeth, the patient is ready for a rectangular ideal arch. The lower arch naturally precedes the upper in this respect because of the nature of incisor relations. In Class I cases, of course, this will be the finishing stage of treatment and requires no explanation on my part.

In cases where the complete space of the extractions is not needed for the positioning of the anterior teeth on apical base, there will be some space, of course, distal to the cuspids at this stage of treatment. If this space is considerable, and I am not concerned about getting my anterior teeth positioned too far lingually, I use a rectangular wire with vertical closing loops incorporated in the space to be closed and cinch the anterior section back against the posterior segments. If the space is small, or I am concerned about positioning my anterior teeth too far lingually, I will use a rectangular arch with tie back stops distal to the second bicuspid brackets or first molar brackets if second molars are engaged. I then use a series of tie backs at regular intervals, cinching the archwire back against the last molar teeth in order to close the space. This slower type of movement, I believe, is more considerate of the anterior segment.

Even in Class I cases, I find that many times some adjustment in occlusal relationships is necessary at the end of treatment. This is accomplished with Class II and vertical elastics, as in-

dicated, or triangular elastics may be employed.

In the preceding discussions, the basic principles of technique are those applied to individual tooth movement and arch formation in all classifications of malocclusion. In the treatment of Class II and Class III malocclusions, we have the additional factor of correcting the anteroposterior relation between the arches or apical bases when they are involved.

In the management of all Class II, Division 1 cases, I apply cervical traction to the maxillary arch. I will begin this in the mixed dentition stage or in the permanent dentition, depending upon the time at which the case presents. When the anterior teeth are crowded or overlapping, the cervical traction is applied directly to the first molars in the maxillary arch. If the upper incisors are protruding and spaced, I will apply the cervical traction directly to them at the beginning through Class II spurs on an archwire and continue until all spaces are closed in the anterior segment. From this point, the cervical traction will be applied to the molar teeth as well as the anterior by installation of molar stops. If possible, the cervical traction is continued until the Class II relationship has been reduced to Class I, after which the case is treated as a Class I malocclusion.

In Class II extraction cases with crowded anteriors cervical traction may be used directly against the upper cuspids in the retraction of these teeth after extraction of bicuspids. This traction may be continued against the cuspids and through them and through the contacts of all the posterior teeth until Class I molar relations are established, and continued during the retraction of central and lateral incisors. Or, after all space closure has been accomplished in the maxillary arch, the cervical traction is then applied to the archwire in the anterior region, with stops against the molars, continuing the distal traction upon the entire maxillary arch.

In a manner similar to the uppers, cervical traction may be applied to the lower cuspids in their retraction and continued during retraction of the central lateral incisors when this reinforcement is deemed necessary for the conservation of the anchorage units in their original positions.

When it appears that the cervical traction against the maxillary arch alone is not accomplishing the necessary adjustment between the arches in their anteroposterior relations, I will supplement the cervical force against the maxillary arch with Class II elastics. As a rule I do not utilize anchorage preparation in the mandibular arch excepting that provided to a degree by band placement and the leveling action of the appliances upon the posterior units as previously mentioned. Of course, I always have the second molars engaged in these situations and a rectangular stabilizing arch installed on the lower. It is my belief that, if the Class II relation stubbornly resists the combination of cervical traction to the maxillary arch and the Class II elastics, there is little use to attempt further distal positioning of the lower teeth or even to prevent them from coming forward. This is in line with my concept of following the natural forces and allowing them to indicate what the final adjustments must be. Again, I will say that, when the response to therapy is not ready and willing, either the plan of treatment and technique are wrong, some obstacle has been overlooked, or the patient is not cooperating.

In the management of Class II, Division 2 cases, cervical traction is applied directly against the cuspid brackets and through the contacts of the teeth to all the posterior units.

When sufficient posterior movement of these teeth has been accomplished to free the lateral incisors and the centrals, these teeth are engaged and brought into alignment. From this point leveling actions are continued in both arches accompanied by the necessary rotations. I always band second molars in these cases to facilitate the leveling action of the archwires in the lower and the compensating curve action of the archwires in the upper. Many of these bites are closed in the original malocclusion and all the length and leverage possible is needed in the archwires to overcome this.

When the bite has been opened and there is no occlusal or arch interference with the positioning of the teeth in Class I relation, I will institute Class I mechanics in conjunction with normal bite exercises to facilitate and stimulate the mesial correction of the lower in its anteroposterior relationship with the upper. These procedures first facilitate, then stimulate and guide the needed adjustment or correction. Since I consider the etiology of these cases muscular and likely to continue after treatment, I retain them by means of an upper Hawley with a flat anterior shelf lingual to the upper anteriors to maintain the bite opening or level and perhaps a cuspid to cuspid soldered lower lingual arch to insure the alignment of the lower incisor teeth. I have reason to believe that this is not always necessary.

In obtaining the needed anteroposterior correction in Class III malocclusion, my initial phase of treatment is directed toward establishing and maintaining a normal Class I incisal relationship of the anterior teeth. Cervical traction may be employed directly against the lower cuspids or the six lower anterior teeth as a unit in accomplishing this. Simultaneous forward expansion may be used in the upper. When normal anterior functional relations have been established in these cases, the remaining discrepancies in occlusal relations are treated symptomatically. Class III elastics without benefit of anchorage preparation are used at any stage of treatment. I consider that, in this type of case, the establishment and maintenance of normal functional relations of the upper and lower anterior segments are the guides for the positioning of the posterior units. Depending upon the degree of the Class III discrepancy, cervical traction, supplemented by Class III elastics, may be applied entirely against the anterior segment of the mandibular arch until all space closure has been accomplished or it may be stopped at any intermediate point, and the remaining space closed by rectangular arches with vertical closing loops cinched back against the last molar unit.

My first principle in treating this type of malocclusion is in following natural forces by establishing, first, the normal functional relations of upper and lower anterior segments and integrating the posterior units accordingly. Retention is of little importance in these cases except in maintaining expansion of the maxillary arch after correction of posterior crossbites.

In the preparation of this paper much has necessarily been left unsaid. I have endeavored to bring out the major principles of my ideology and clinical orthodontic practice and to outline the basic techniques employed to implement this ideology in practice. Detailed techniques are material for demonstration courses.

I reaffirm this ideology as follows: 1. No permanent improvements may be brought about in the management of malocclusion that exceed the limitations of the hereditary pattern for growth and development in the structures concerned as influenced by congenital factors, if any. 2. Our efforts

in the correction of malocclusions must be directed along the lines of adjusting environmental circumstances in all factors of occlusion with the objectives of facilitating, stimulating and guiding the growth and development of the structures concerned toward a maximum attainment of the individual hereditary limits. 3. For assurance in the attainment of these objectives, I believe it is best to plan techniques which avoid or minimize undesirable displacement of units permanently by reciprocal action inherent in appliance techniques. 4. Furthermore, it is my belief that the objectives and outlines of treatment are most faithfully pursued to the extent that dependence is not placed upon patient cooperation for the neutralization of dangerous reciprocal force. 5. For the most stable and natural harmony and balance attainable in the correction of a malocclusion it is best to follow the natural forces of occlusion as they affect the progress of the correction.

This is accomplished by the early removal of all impediments and interferences for normal positioning and functioning of the structures concerned. From this point the individual or mass movement of teeth in all their relations will proceed readily and with considerable ease when the objectives and techniques are correct and the patient is doing his part. I might say, in connection with this principle, that the teeth in all their relations tend to go where they should when permitted to do so. When treatment is directed toward first freeing and then stimulating and guiding these natural tendencies, the end results will be the best natural harmony and balance and the most stable correction.

In pursuing these principles, I strive for results at the end of treatment which anticipate a natural pattern of correction which would be that inevitable after the discontinuance of all retention. Confident of this, it has become standard procedure in my office, at the end of treatment, to remove all bands and archwires simultaneously and to continue observance of most cases without retention for a period of at least one year. This by no means implies that retention has become passe in my office. I continue to use it rationally when I feel there has been failure to neutralize all etiological factors — old or new — during the progress of the case. I cannot, however, feel that my responsibilities in any case are discharged with the installation of retainers. I merely consider that a new phase of treatment has been entered in such cases.

In closing, I wish to re-emphasize that the clinical achievements of Charles Tweed are my inspiration. It is through him, and with the kind cooperation of the other members of the Foundation, that I first perceived the most practical potentialities for orthodontic practice.

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