

Some things to keep in mind when treating a four bicuspid extraction case

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This is in no sense a scientific paper. In fact, it is not a report on a research project, but just a summarization of some of the beliefs developed from clinical practice and from observation and study of the results of such practice. A similar study of your results can be a source of enlightenment toward better diagnosis and treatment of your current cases.

In a short time it becomes obvious that the better results of four bicuspid extraction are those cases that showed the greatest collapse before treatment. The border line case, which was such a headache to diagnose, is still not everything you would like for it to be. Since it is those cases of marked lack of adequate growth and development, that treat so unsatisfactorily and maintain themselves so poorly when treated with a full complement of teeth, four bicuspid extraction, as a method of treatment is justifiable.

In the past it has generally been argued, extraction vs. no extraction. Either side of said argument is like a rule that is supposedly all inclusive, without exceptions. When dealing with human tissue a more flexible approach seems in order. Let me suggest a minimum percentage rule, as we seem to need some sort of a standard. I have heard mention of such percentages as sixty or seventy. Such high numbers make me shudder. Conceding that there will be a marked variation in different practices, because of location, quality of the operative care the patients have received, number of mutilated cases, health education of the

laity and technical ability of the operator, still I cannot believe it is possible for an orthodontist to conscientiously study the results of his treatment and continue to advocate as high a percentage of extraction in any practice. I feel it is the duty of each of us to be quick to challenge the assumption on the part of many in the professions, as well as the public, that extraction is an easy way out: a panacea for all of our trouble. If the extra time and the added care for details of treatment of a properly treated four bicuspid extraction case has not convinced an operator that extraction is no easy out, then let him study his results of such treatment five to ten years after retention.

Notwithstanding what has been discussed before, treatment by four bicuspid extraction is here to stay, simply because it makes possible corrections in certain cases that would be better off untreated without it.

If not hurried, treatment by this method can reduce the tissue abuse in many cases. This was one of the first results that encouraged me when treating my early extraction cases. By correcting function within the limits of the balance of the denture, with less tissue abuse, resulted in one of the cardinal principles of orthodontics — *stability of treated case*. To my mind, another cardinal principle of orthodontics is — *improvement of appearance*. Treatment of certain cases by the four bicuspid extraction method makes possible an improvement in appearance which cannot be approached in any other way.

After this general approach to the subject of extraction in orthodontics, the balance of this paper is divided into three parts to make it a little easier to follow. These parts are — first, treatment that has been effective in avoiding four bicuspid extraction; — second, indications and contraindications of each case toward four bicuspid extraction and — last, means to make possible the best correction after extraction.

Since four bicuspid extraction treatment is something less than our ideal, all chances to avoid it should be examined. What we can do to avoid it will depend largely on the developmental age of the patient when we first see him. (Many of the cases cannot be helped by early interference, so bear that in mind. Also remember the disadvantages of prolonged treatment). Generally I do not use a full hook up, with the edgewise arch in the mixed dentition. Naturally, there are some exceptions. The devices I generally use in the mixed dentition are the bite plane, head cap, space maintainer, and judicious extraction or grinding of the deciduous teeth. As a whole I have accomplished more with the bite plane. Its beneficial results are not limited to any particular class of malocclusion. The design may vary as a part of a palate or an active Hawley type retainer. This plane has a slight labial incline and is high enough to keep the buccal teeth out of occlusion by three to five millimeters. This will depress the lower anterior teeth and unlock them from occlusal interference.

There is a probability that the buccal teeth may elongate some in reestablishing occlusion with their antagonists. With the lower incisors freed from the lingual of the upper incisors and the palate, the activity of the tongue, the forces of eruption, and the full potential of growth and development

will do wonders to provide adequate space for alignment of the teeth in the lower arch. Since it is the adequacy of the lower denture that determines whether four bicuspid extractions will be necessary, the bite plane will do much, with a minimum of the operator's time.

Often an activated Hawley, acting along with the bite plane, will move the upper incisors lingually, where they are less likely to be broken. Needless to say, if used this way, it must be worn until full treatment is undertaken.

The head cap is another auxiliary means by which a four bicuspid extraction can be avoided. As commonly used, its usefulness is limited primarily to Class II cases. We have all seen plenty of extraction cases where such fate could have been avoided if the molar relation had been corrected by means of the head cap in the latter part of the mixed dentition. (That last phrase is added because of my difficulty in maintaining this type of correction through the change from mixed to permanent dentition). From recent researches in growth and development, and studies made of treated cases, I am led to understand that fullness of profile will tend to improve as the face develops to maturity. This should encourage us in our efforts to avoid extraction.

The value of the space maintainer has long been realized by the profession. It is needless to say that this knowledge has not always been utilized to the fullest. Adequate arch length before orthodontic interference, especially in the lower arch, should mean much toward stability of the treated case, because that lower arch was in balance with the surrounding soft tissues.

There is a tendency to think of a space maintainer only in connection with the early loss of a deciduous or a permanent tooth. Actually the best

space maintainer I know is a good filling, restoring the tooth's mesial distal diameter, as well as its form. There are twelve surface contacts of the buccal teeth in each arch and the loss of one-half of a millimeter at each contact is equal to the width of the average upper lateral incisor. While we are waiting to treat, a reminder to the patient to visit his general dentist will pay large dividends.

It is my belief that the removal of deciduous teeth, when it can be established by means of X-rays that they are beginning to deflect the erupting permanent teeth, is a wise procedure. If the deflection has progressed far, it is sometimes necessary to maintain the space of the extracted deciduous tooth until the permanent tooth erupts into position or can be moved into place. Sometimes this is a "Robbing Peter to pay Paul" type of tactic; but it will usually delay treatment until later when more can be accomplished, and the growth pattern has had time to assert itself.

In some cases it seems best to grind certain deciduous teeth to relieve occlusal interference. This is true of long pointed deciduous cuspids, especially of the cuspids of the lower arch, tending to lock the cuspid to cuspid expansion of that arch. A reduction in the crown length of the lower cuspids will free the lower and a reduction in length of the upper cuspids will make possible a lateral masticating stroke.

After you have tried everything mentioned above to avoid four bicuspid extraction, and still are not willing to risk treatment with a full complement of teeth, then and then only, should you begin to consider whether the case is one that can be better treated by extraction of the first bicuspids. Several prime considerations are: molar relationship or class, axial inclination of the teeth, soft tissues surrounding the denture, amount of space needed to

align the teeth, and the developmental age of the patient.

As a whole Class I cases are more amenable to treatment by four bicuspid extraction. Of the many types of Class I cases, the high cuspid and the case with what is commonly called "Teeth too large for the jaws" are the cases that will treat most easily, with the greatest stability of treated case. Double or bimaxillary protrusions with irregular teeth will treat fairly well if handled carefully. True prognathous cases, with little or no irregularity, should be avoided like poison. As much as some of these cases may need cosmetic improvement, this is a *type*, and not conducive to orthodontic interference.

Class II cases are not very suitable for treatment by extraction of all first bicuspids. Correction of the molar relation presents quite a problem of no certainty. There is a decided difference between a true Class II case and a case with Class II molar relationship. Most cases with Class II molar relationship present quite a good lower arch with little irregularity of the teeth. With care this arc of teeth can be aligned, and if given occipital support will serve as a base for elastics to correct the molar relationship. Many Class II relationships have mandibular displacement and improve markedly with opening of the bite and rubber band traction. In those cases where the lower should not be subjected to elastic traction, but has a reasonable chance of maintaining itself in fair alignment, I often extract two upper first bicuspids, leaving the molars in Class II relation. Unsatisfactory as this type of treatment is, I often prefer it to four bicuspid extraction in Class II cases.

The extraction of four bicuspids in a Class III case is contra-indicated. There are usually exceptions to all rules, but I don't know what they are in this instance. The marked difference in

growth potential in the two arches, plus the influence and position of the tongue, seem to favor some other therapy.

Before I make up my mind to extract four bicuspid in any case, the axial inclinations of the cuspids and incisors, especially in the lower arch, get due consideration. Cuspids which are upright, or where the crowns tip distally before extraction, will require a lot of bodily movement to place them in the same upright position in the first bicuspid space. This is equally true of the incisors. When studying my treated cases it seemed that failure to keep these teeth at their original degree of uprightness or procumbrance, which ever it may have been, was followed by rapid collapse to some degree. The collapse was noticed first in a break of the alignment of the lower incisors, followed by an increase in the overbite and finally a slippage of the molar relationship on one side, or both. This subject of axial inclination has been a touchy point for some time. I am not recommending any particular degree of uprightness, but feel that the axial inclination of the lower incisor least disturbed by the malocclusion will serve as a guiding light. Taken this way, axial inclination is the resultant of heredity, growth and development, type, and the play of the surrounding soft tissues.

As we consider the obstacles of treatment by four bicuspid extraction, we must not overlook the soft tissues surrounding the denture. Foremost among these is the tongue. It will not tolerate impingement. If it lies in the floor of the mouth, and its mere size has prevented any shortening of the arch, or has opened up spacing from its size or activity, that should act as a red flag against extraction. It is always best to differentiate between size and activity of the tongue. Sometimes

activity can be limited or corrected.

Habits involving the soft tissues should have an influence upon our planning. Some may be broken before or during treatment and with corrective exercises become an ally in our treatment.

The developmental age of the patient is an important consideration when planning four bicuspid extraction. An unpleasant fullness around the mouth at twelve years of age is less objectionable than the same fullness would be at sixteen or eighteen years of age. This is true cosmetically as well as from the stability of treated case.

After you have studied the indications and contraindications and have decided to treat by four bicuspid extraction, it is not always possible or wise to start treatment then. Developmental age is again the key to when treatment should be started. Generally, the twelve year molars should be erupted and up where they can be banded. It is almost impossible to treat a four bicuspid extraction case properly without being attached to the second molars. With the second molars banded it is possible to maintain the proper curve of spee. They furnish additional anchorage where needed, to be used in closing the spaces from the front as well as to help give better control of the arch that is needed to open the bite sufficiently. This additional anchorage makes possible the correction of the axial inclinations of all of the teeth.

Prior to the eruption of the second molars, several corrective measures may be considered. Enucleation is one of them. Personally, I cannot see anything to be gained by enucleation of the first bicuspid. The cuspid lies so much deeper in the bone than the first bicuspid at this early age, I do not believe the cuspid is deflected, nor will tend to erupt in the first bicuspid space

any more so than it will after extraction of the first bicuspid when it erupts.

Removal of the first bicuspid shortly after eruption may be justified in a few cases. This is fraught with danger and should only be considered on patients who will cooperate implicitly. Do not allow the arches to shorten materially, and insist on complete treatment later. Be sure there will be marked deflection of the erupting cuspids and second bicuspid if some space is not provided. This early extraction of the first bicuspid will often shorten the period of active treatment materially, because there will be less space to close, the axial inclinations of the teeth will require less correction and the case will have established a balance that tends to shorten the period of retention.

At last we come to the mechanical treatment of the four bicuspid extraction case. The technical details must be given our utmost care, if we are to accomplish what has been planned and justify our choice of treatment. Therefore, anchorage must be a primary consideration. Factors determining the proportionate anchorage available are, number of teeth distal to the extractions, means employed to move cuspids and incisors distally, occlusal interference to teeth being moved, as well as the stationary anchorage as such developed by occlusion of teeth distal to the extractions. I fail to see any justification for the tip back bends (prepared anchorage) of such extent that they disturb the occlusion, move the roots forward, without giving additional anchorage. Tip back bends that take up the slack of the appliance, and will keep the teeth of the buccal segments upright as they move forward are useful. More worthwhile auxiliaries to anchorage are the head cap and the use of the incisor teeth.

While making the appliances, be sure to use all of the mechanical advantage

possible, such as properly placed staples. It is not sufficient to have staples on the mesial or distal of the bands, but they must be placed correctly on the gingival or occlusal. They will be very helpful in closing the spaces, rotating and correcting the axial inclinations of the teeth involved.

An appraisal of the anchorage present or available and the job to be done should resolve in the best means to close the spaces left from the extractions. A reciprocal coil spring across the anterior segment of the arch, acting from cuspid to cuspid is a frequent choice. This is undoubtedly a good choice if the cuspids are upright, with plenty of space to align the cuspids and incisors. The cuspid to cuspid width of the arch must be watched closely. There is also a tendency to use too much force, acting over too long a range with this choice. Others may prefer a pull type coil spring, acting on the individual cuspids, either with or without bracket engagement, depending on the mesial tip of the cuspids. The incisors may be used for additional anchorage while the cuspids are moved distally. This method is very advantageous when the space to align the cuspids and incisors is at a premium, or the cuspids are badly tipped mesially. The best control of the distal movement of the cuspid is secured by moving it along the arch wire by ligature ties. This is not a very popular choice, because of the time consumed. The vertical loops have been and are being used to move the cuspids and incisors distally, either separately, in units, or in mass. They are a questionable choice because of the lack of adaptability and the harshness of the reaction.

I prefer the reciprocal push type coil spring acting from cuspid to cuspid on a .022 round tempered gold arch, provided the cuspids are not too badly tipped mesially and there is ample

space to unravel the incisal irregularity, otherwise my choice is the pull type coil spring with the incisors banded for additional anchorage. With the reciprocal coil spring working along the round arch you get a tip and then upright type of movement, which can be modified by bends in the archwire. The coil spring pressure should be slight, acting over a short range and increased every six weeks. This leaves the incisors free to follow the cuspids and if they begin to impinge on the tongue space, they will stop and space will open between the cuspids and laterals. Too much coil spring pressure will also cause space to open between cuspids and laterals. This is evident after the first adjustment as a rule, so reduce the coil spring pressure and give the tissues a rest.

After the cuspids have been moved distally enough to provide ample space to align the incisors, and space has begun to open between the anteriors, I band the incisor teeth and change to a .022 x .028 formed arch (The lower incisors should not be moved more lingually than upright). After banding the incisors no more effort is made to keep the molars from moving forward, unless there is a full Class II molar relation to be corrected. The balance of the space is closed by a ligature around the end of the arch, keeping in mind that the bicuspid and molar width decreases as those teeth move forward. With the spaces closed, and the arch wire in the lower incisor brackets and the arch tied back, the case is ready for elastics. If prolonged Class II elastics are necessary, a headcap to help support the lower arch should be worn at night. Finish the case with the

utmost care for details, keeping in mind that the study of my treated cases seemed to show greater stability where the molar to molar width was not disturbed. This included maintaining the type of the arch. A narrow, tapering type arch must be left as such, or there will be narrowing and marked rotations and staggering of the lower anteriors. Much of the collapse of the lower incisors following treatment can be avoided if the cuspids are depressed so as not to interfere with the lateral excursion of the mandible. Spot grinding during and after retention will be helpful also.

Following the above considerations and treatment with retention in accordance with the principles of tissue reaction and our four-bicuspid extraction cases should be a source of enjoyment when we see them years later.

SUMMARY

1. Extraction cannot be avoided in the proper treatment of some malocclusions.
2. Advocates of four-bicuspid extraction in a high percentage of their cases, should study a series of their cases treated in that manner after being out of retention for five to ten years.
3. Means that can be employed to avoid extraction; during the watching and waiting period of mixed dentition.
4. If extraction is unavoidable, the most advantageous time for the extractions should be utilized and an orthodontic technique instituted to establish a balance of the forces of occlusion, acting through and on this shortened denture.

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