Correction of Impacted Mandibular Second Molars

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The impaction of mandibular second molars occurs with sufficient frequency that it presents a very definite treatment problem. The location and size of these molars are factors which are of importance in treatment planning. Located as they are at the distal end of the dental arch, special mechanics are required to move them with any degree of efficiency.

Teeth are extracted because a denture is protrusive to the structures of the face or because of crowding. In either condition the teeth are eliminated at points in the dental arches that will best serve treatment objectives. Essentially, the extraction of mandibular permanent second molars will not facilitate treatment problems of denture crowding or protrusiveness.

Frequently lack of space in the dental arch is associated with crowding in the molar area as well as in the anterior portion of the arch. The extraction of a bicuspid in each buccal segment and the closure of the space may permit the eruption of impacted second molars; however, if these teeth have a strong mesial inclination, in all probability they will not erupt correctly even though space is provided. In such cases, moving them into position becomes increasingly important.

Orthodontists have given convincing evidence of the value which they attach to correctly occluded second molars by the effort they have put into making corrections in this area. I expect most clinicians have tried several methods, their choice being dependent in part upon the nature of the impaction.

A very simple method, familiar to everyone in the specialty, is the use of a separating wire tightened and replaced repeatedly until the contact between the first and second molars is opened. If the degree of impaction is very mild, this method may work in some cases. The response is likely to be very slow. While the method is not complicated, the time required to obtain movement can be disappointing.

In the more severe impactions, if an attempt is made to apply a force at the contact area between the first and second molars, it may be necessary to have some bone surgically removed to permit the insertion of a wire.

Since the force from a separating wire is ineffective, one can form the end of the archwire into a partial loop and insert it under the convexity of the second molar crown. A vertical and distal force is applied to the tooth when the archwire is raised and inserted into a bracket on the buccal of the first molar. A soldered stop on the archwire, distal to the bracket, can be effective in creating a distal force. This is a method which I have used on several cases in past years. While it is reasonably effective, it is a difficult procedure. The surgical involvement, the accuracy demanded in appliance manipulation, the patient discomfort, the irritation to soft tissue, and the tendency for destruction of the alveolar crest are all legitimate reasons for not being enthusiastic about this procedure.

In 1969 at our Midwest Component meeting, Dr. Arthur Block presented a paper in which he showed the x-rays of several cases of second molar im-

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pactions which had been surgically repositioned. His paper was well prepared, and the cases were all extreme situations which would seem to justify the surgical approach. This method, as far as the orthodontist is concerned, is not demanding on his time or ability. I do believe that, if the apex of the tooth is moved any great distance, there is a strong possibility that loss of vitality will be frequent.

It occurred to me some time ago that mandibular permanent second molar impactions should not present a problem so much more complicated than any other tooth movements. If one could devise a method of attaching to these teeth and applying adequate force, the problem of moving them could be quite routine.

When screw pins were made available they provided a simple means through which a force could be applied to these teeth. In the extreme situations the distal portion of the occlusal surface is the only area available into which a pin can be inserted. It may even be necessary to have some soft tissue surgically removed to make the surface accessible. As movement progresses it will be necessary to place a second pin in the mesiobuccal cusp of the second molar to complete the movement. With the pin in this position the direction of force is more favorable for uprighting the tooth, and it is also possible to avoid irritation of the buccal tissues distal to the second molar.

A hole is cut into the buccal cusp a short distance into the dentin with the smallest round bur available. A pin is screwed into the opening until it is completely seated and tight in position. It is then bent mesially to form a hook. Ideally, a full edgewise appliance is used to provide anchorage. A bracket is placed on the buccal of the first molar. The archwire is left as long as possible, and an open coil spring is

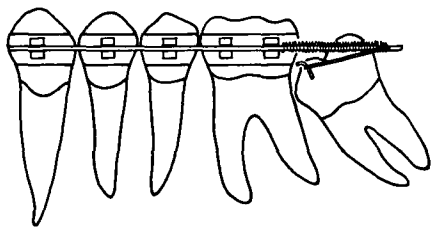

Fig. 1

placed on its distal end (Fig. 1). The archwire from the second bicuspid forward is tied into position. A ligature is tied around the archwire at the distal end of the coil spring, pulled forward, and tied to the second molar pin. The coil spring is then compressed distally to the distal surface of the first molar bracket, and the archwire is ligated into the bracket. If the procedure is carried out in this sequence, it is quite simple. As the movement progresses it will be necessary to use a longer coil.

Sometimes a case is on retention before it is evident that a second molar will require some movement. If the retainer is in the form of a fixed lingual retainer from second bicuspid to second bicuspid, the arch should provide sufficient anchorage to move the second molar. A band is placed on the first molar with a twin buccal bracket .018 x .025. An .018 x .022 wire is fitted, incorporating a double helix in its distal end. The end of the helix is bent to engage a pin on the second molar. The mesial end of the helix rests against the buccal bracket to provide the force, and the wire is tied into position. The mesial end of the wire is left long enough to rest on the buccal surface of the second bicuspid to prevent rotation of the first molar. The force can be increased as necessary by slipping a rectangular tube over the mesial end of the wire to occupy space between the helix and the first molar bracket.

The radiographs of case L.O. show the successive steps in the movement of

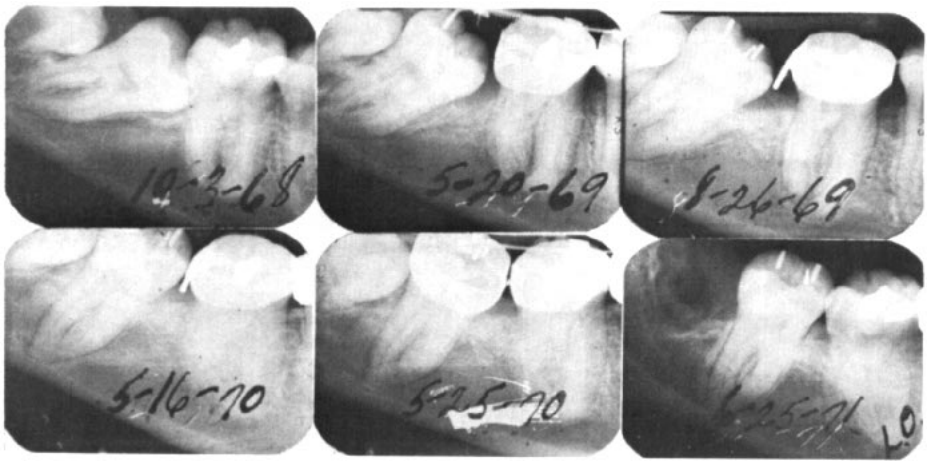

Fig. 2

a severely impacted second molar (Fig. 2). The original film was dated 1/3/68. The second one, dated 5/20/69, shows a partial correction. It is possible to see the spur in the occlusal surface of the second molar, the bracket on the first molar, the archwire, and the coil spring. The third film, dated 8/26/69, shows pins in the mesial area which were used to continue the movement. At this time the patient left for college, and a spur was soldered to the first molar band to guide the second molar in its eruption. When the patient returned on 5/16/70 the change in molar position was evident, even though it was still necessary to correct the axial position of the second molar. Bands were placed on the involved buccal segment on 5/25/70 and left in position during most of the next school year. The final radiograph, dated 6/25/71, shows the final tooth position. The impacted third molar has been extracted.

Case J. H. had an unerupted and impacted second molar (Fig. 3). It was necessary to expose the crown in order to attach to it. From 10/69 to 3/70 space was made available, and a spur was soldered to the first molar band to guide the eruption of the second molar. The third film, dated 5/19/70, indicates no change. It was apparent that the third molar was preventing the eruption of the second molar. Following extraction of the third molar, the second molar was banded and elevated into occlusion. The final picture was taken on 3/21/71.

The first radiograph of case W. G., dated 6/1/68, shows the impacted second molar (Fig. 4). A change in its position is apparent in the second film taken on 1/31/70. The third film, dated 6/29/70, reveals the correction in axial alignment. The final film was taken on 9/28/70. The third molar was extracted later.

In case S. C. the second molar did not arrive at its impacted position until

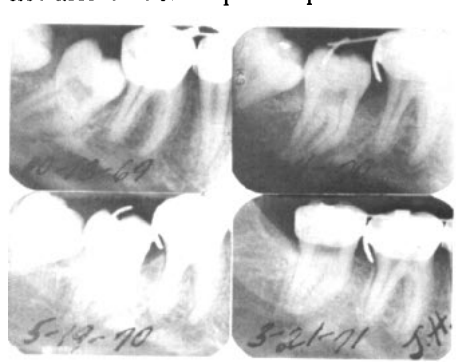

Fig. 3

Fig. 4

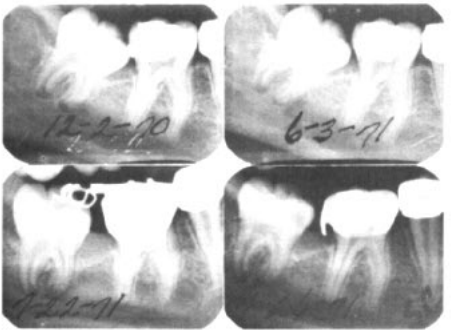

Fig. 5

some time after the case was completed (Fig. 5). A fixed lingual arch retainer was in position on the second bicuspids. Since the case was on retention and the impaction was not too severe, an attempt was made from 12/2/70 to 6/3/71 to move the second molar with a separating wire. The amount of change was very little. A band was placed on the first molar with a twin bracket on the buccal surface. An .018 x .022 archwire was formed with a helix in the distal portion. The end of the wire was curved to contact a spur on the second molar. Small rectangular tubes were subsequently inserted on the wire between the mesial of the helix and the distal of the first molar bracket to reactivate the helix. The rectangular wire was extended to the buccal of the second bicuspid to prevent rotation of the first molar. The space was opened from 6/3/71 to 7/22/71. The spur soldered to the first molar band will guide the tooth into position.

There has been considerable variation in the length of time required to move these teeth. One naturally is inclined to evaluate the merits of each method of applying force. From a consideration of anchorage, I believe it is definitely superior to have a full appliance with all teeth banded, as was done in the first four cases. Whether one uses a helix or a coil spring to supply the force is not important. They are both quite efficient. These records would seem to indicate that the helix created more rapid movement. However, it was used on a less severe case with less anchorage resistance in the rest of the arch. The choice of the nature of force application was purely incidental and was not made with any intention of making a comparison.

The location of the teeth and the nature of the attachment of buccal musculature could be an influencing factor in one's choice of force application. The coil spring requires space distal to the second molar. The helix does not require space in this area, but it could be irritating to buccal tissues that are attached too closely to permit its proper function.

When treatment is completed, the pins can be cut off at the tooth surface and polished. If the pins have been screwed into place with cement, they should provide reasonably satisfactory restorations. If the patient is not highly susceptible to caries, such a pin in the cuspal area should be safe. If the patient is not too consistent in regard to oral hygiene, or if good supervision is not provided by the dentist, the pins should be removed and a good restoration placed.

It is hoped that the presentation of these case records will be of help in correcting the position of impacted mandibular permanent second molars.

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