Case Report

Treatment of Impacted Maxillary Cuspids

C. W. Carey, D.D.S.
Palo Alto, California

Impacted maxillary cuspids and the malocclusions associated with them form an important group for our consideration. They are not infrequent and occur quite often in connection with anomolies of tooth form, missing teeth and malposed lateral incisors and other variations which make the problem of treatment more difficult. The impacted crown may be to the labial as far as the central incisor, it may be to the buccal and distal to the first bicuspid, or more frequently it may be to the palate with the tip of the crown between the lateral and central roots. The apex of the root of the cuspid is nearly always in normal mesio-distal and labio-lingual position. The crown in its descent has missed its guiding landmark, the distal surface of the root of the lateral, and has continued to move mesially and downward either lingually or labially of this member. When the root of this tooth has completed its development, the eruptive movement stops and the tooth becomes lodged in its malposition.

The position of its impaction may be determined by the abnormal bulge of tissue in the region of the crown if it is a shallow impaction, by the rotation or tipping of the lateral incisors, and by X-rays, preferably at least three taken from different angles, and stereoscopic X-rays if available. The most reliable guide to its location is, I believe, the rotation and tipping of the lateral incisor. If the impaction is deep and on the lingual side of the lateral incisor root, the crown of this tooth will be rotated, the labial surface turning distally. If the impaction is labial to the root of the lateral incisor this tooth will be rotated so that the labial surface is turned toward the mesial and the crown tipped labially.

I cite one instance where a patient reported to surgery for exposure of the cuspid crown. Three dentists and two oral surgeons with five X-rays, the patient and the casts to examine, insisted that the location was deep on the palatal side. The orthodontist's opinion, based largely on the position of the lateral crown which was tipped labially and rotated so that the labial surface faced mesially, was outvoted. The operation proceeded, but after much mutilation the crown was not found until the labial incision was made at the point indicated by this evidence.

I prefer to be present at the operation, give instructions as to the location, the amount of tissue to remove, and to dry the crown thoroughly and cement the hook to place on the surface of the crown with black copper cement while the anesthetic is still effective. I do not drill a hole in the crown for reception of the hook because it is not necessary and I may wish to change the location of the hook as the tooth erupts to correct rotation or prevent bite

interference. The hook is then vaselined and the exposure covered with a packing and left for two weeks.

These teeth will often erupt by themselves after they are exposed but in most cases it is preferable to have the appliance in place before the operation and start mechanical assistance to the correction of the impaction several weeks later. Space has to be made for the cuspid and usually distal movement of the maxillary molar and bicuspids and all other irregularities corrected. During this movement the impacted cuspid can be brought to position without delay or prolonged treatment. To accomplish the movement of the cuspid, a piece of .014 chromium wire is soldered to the arch wire mesial to the bicuspid bracket. It is then coiled three times around the arch wire and adjusted in such a manner that when passive it lies at the level of the occlusal plane from which it may be sprung palatally when a shallow U bend at its extremity permits engagement with the hook cemented to the cuspid. The finger spring is not touched again until it is time to band the cuspid or to change the direction of force.

From fifty of these cases treated in my office in the past ten years, I have selected two for this report.

Case I

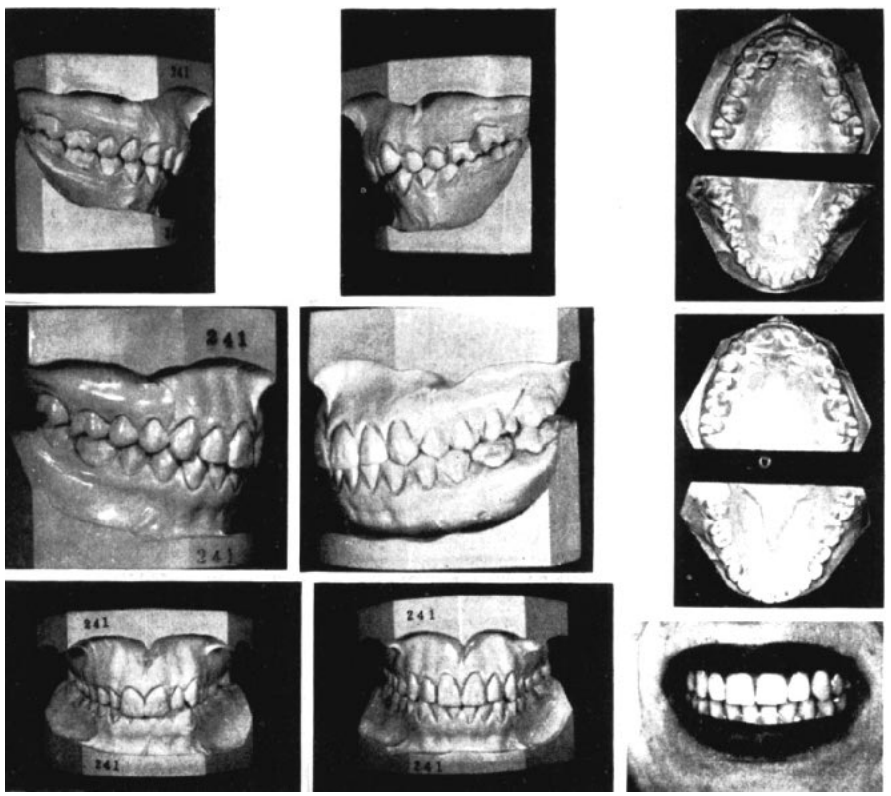
History: This patient, age 14, of Italian descent, is a thin, phlegmatic, but healthy girl. The father and mother have quite normal jaws and dental arches and strong healthy teeth. There are four other children, none of whom needed orthodontic attention. The birth was normal and the weight 7 pounds. Breast feeding was supplemented by the bottle and she enjoyed good health during infancy. Because of recurrent colds, the tonsils were removed at age 4. At 7 the ears were lanced to drain abscesses. The child has had a well balanced diet but not a good appetite. There was no record of high temperature illness during the coronal development of the anterior teeth. There was no habit history of consequence. The time of development of both deciduous and permanent teeth was normal. At age 8 the lower left second deciduous tooth was removed because of an abscess. All of the first permanent molars have occlusal restorations.

Case Analysis: The jaws are in normal relation to the skull. Both maxillary and mandibular arches are contracted. The lower left first molar has drifted forward because of the early loss of the second deciduous molar and has forced the biscuspids and cuspid crowns mesially. The anterior teeth are crowded and inclined labially. The upper left and right lateral incisors are hypoplastic and the right is smaller than the left. The deciduous cuspid is still in place and the permanent cuspid is impacted palatally. The upper posteriors on the right side have drifted forward one full cusp plus the forward drift of the lower posteriors. The mid line of the lower anteriors is to the left of center and the midline of the uppers is to the right of center. The bite is closed in the anterior region. Both upper and lower anteriors are elongated and the occlusal curve of Spee is reversed in the maxillary arch and excessive in the mandibular arch. The case is a Class I malocclusion, complicated by hypoplastic lateral incisors, an impacted cuspid and unilateral bimaxillary protrusion.

Treatment Objectives: We desired (a) to move the lower left posterior segment distally and establish correct mandibular arch form and stationary

anchorage as soon as possible, (b) to move the upper left posterior segment distally a full cusp, (c) to move the upper right posterior segment distally, (d) to bring the impacted cuspid into position, (e) to open up spaces for normal sized porcelain capped lateral incisors, and (f) to open the bite in the anterior region.

Mechanics of Treatment: Edgewise bracket bands were placed on all of the teeth except the second bicuspids on the left side and the first molars. Bands bearing .022 square tubes were placed on the molars. After applying



Case I.—Casts and photographs before and after treatment.

.018 round stainless steel arch wire for several weeks, arches of .022 square stainless steel distorted to conform to the existing arch form were placed with threaded end section and nut with lock springs on the left side. The occlusal surfaces of the lower posteriors were built up with black copper cement. The deciduous cuspid was extracted and the cuspid exposed and hook cemented to place. A tip back bend was placed anterior to the lower left molar and the arch seated in the brackets. The nut was tightened periodically.

When distal movement had been accomplished, tip back bends were placed in the lower left cuspid and first bicuspid. The nut was released and

the arch bent to ideal form and seated. When the entire left posterior segment had been moved distally and arch form attained, the second bicuspid band was placed and stationary anchorage established. With inter-maxillary force and screw force, the upper left molar was moved distally followed by distal movement of the cuspid and bicuspid with tip back bends. The second bicuspid band was placed at this time. During this operation the cuspid was being brought to place as previously described and spaces made for the lateral incisors. After the distal movement was accomplished the arch was ideally conformed to tooth measurements. The cuspid bracket band was placed when the crown was accessible and the bite opened in conformity with the arch curvature. The active treatment consumed 15 months time.

Retention: The bands were removed and an upper retainer of vulcanite was constructed and worn for several weeks until the porcelain crowns were placed. Upper retention was then discontinued. The lower retention consisted of a lingual wire of .036 stainless steel soldered to the lingual surfaces of the molar bands. This was worn for one year. On its removal a vulcanite plate without labial wire was placed to be worn at night only.

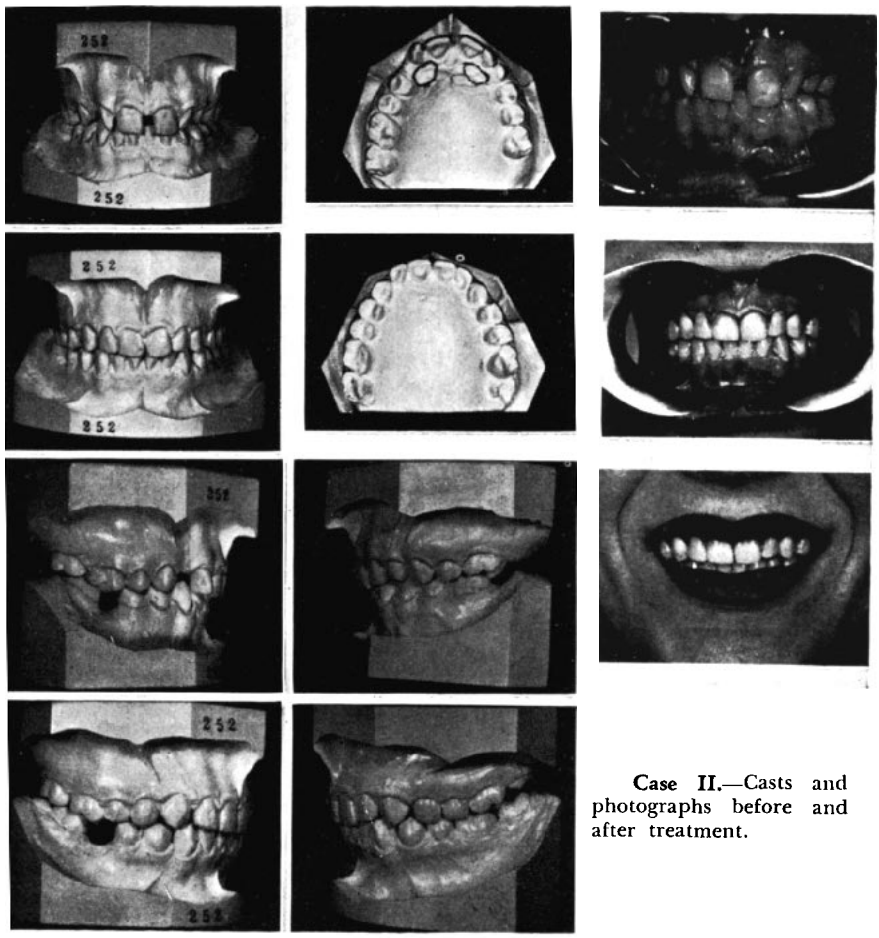
Case II

History: This patient, age 18 and married, is a strong robust girl of Scotch-Irish descent. There is no hereditary history of anomolies. Early infancy was marked by serious illness. At 18 months she had an appendectomy followed by gangrene of the bowel. At age two the tonsils and adenoids were removed. At two and one half years she had pneumonia with high fever. The remainder of her childhood and the years of development she enjoyed good health. Her appetite is good and the diet well balanced excepting for her dislike of meat and eggs. The permanent teeth are abnormally susceptible to decay and occlusal restorations have been placed in most of the posteriors. This case is interesting in that I later learned the patient was two months pregnant at the time treatment was started. At the time of consultation I specifically mentioned that such a condition during treatment would contraindicate correction of the case. After six months this was brought to my attention and the decision was made to continue with the treatment. Four months rest period was allowed for the birth of the baby and considerable attention was given to the diet and vitamin fortification.

Case Analysis: The jaws are well developed and in normal relation to the skull. The lower right second molar has drifted forward because of the early extraction of the lower right first molar. The teeth anterior to this space have drifted distally. The arch form is close to normal. There is a large space between the upper central incisors, and the lateral crowns are rotated so that their labial surfaces face distally. The upper left deciduous cuspid is still in place and the upper right has been lost recently. There is insufficient space for the permanent cuspids and no raised eminence of tissue on the palate to indicate position of the cuspid impactions. The median line of the upper anteriors is normal, and lower median line has shifted to the right side because of the molar space. There has been very little mesial drift of the upper posteriors. The X-rays and position of the lateral incisors indicate a deep impaction of the cuspid crown between the lateral and central roots on each side. The case is a Class I malocclusion, complicated by the

impaction of the maxillary cuspids and the partial closure of the space following extraction of the right mandibular molar.

Treatment Objectives: We desired (a) to move the lower right second molar distally and restore the mandibular arch form, (b) correct the median line, (c) to close the spacing between the upper central incisors, (d) to expose the impacted cuspids and place them in normal position, (e) to rotate the lateral incisors and (f) to correct the occlusal relation on the right side.



Case II.—Casts and photographs before and after treatment.

Mechanics of Treatment: Edgewise bracket bands were placed on all teeth except the molars on which were placed stainless steel bands with .022 square tubes on their buccal surfaces. The cuspids were exposed and hooks cemented. These were covered by a pack for three weeks. Arches were placed of .018 round chromium. After three weeks an .022 round arch was placed on the lower. The sixth week .022 square arch wire was placed on both arches.

In the lower arch stops were soldered mesial to the left molar tube and distal to the right second bicuspid bracket. A coil spring was inserted be-

tween the lower right second molar and the stop. In the upper arch chromium wire .014 was soldered to the arch distal to the laterals, coiled around the arch three times and with tension hooked and inserted into the cuspid hook. The central incisors were ligated together. The lateral incisors could not be rotated until the cuspid crowns had erupted because labial recession would occur. The hook was cemented to the lingual surface of the right cuspid and the position of this hook had to be changed three times to accomplish this rotation as the tooth erupted. When access permitted, the cuspids were banded with bracket bands and a new arch of .022 square chromium was placed on which was allowed to slide on each side a coiled spring between the first bicuspid and lateral incisor. The cuspid bracket was ligated to the arch wire at either extremity of the coiled spring depending upon which rotation was necessary as the cuspid moved into position. After bracket engagement these springs were removed. It was necessary to apply maxillary hooks and intermaxillary anchorage for a short period to effect distal movement of the maxillary teeth. The active treatment consumed twenty months four of which the patient was on leave.

Retention: An upper vulcanite plate was constructed with an .022 round chromium wire passing between the cuspid first bicuspid embrasure around the labial surface of the cuspid incisal to the height of contour and straight around to engage the anterior teeth.*

The lower retention consisted of a vulcanite plate with embrasure rests and a tooth for the missing first molar.

It is interesting to note that in spite of the pregnancy and lengthy period of treatment there was no perceptible tissue destruction and only two occlusal pit cavities needed attention. The diet was built up with vitamin C, D and A and phosphorus added to make up the deficiency diet which lacked meat and eggs.

616 University Avenue

* I have never found it necessary to fix the axial position of these teeth with a rigid attachment such as a lingual bar. This method only increases the hazard of relapse.