Orthodontic Treatment of Cases Complicated by Absence of Permanent Teeth

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THE NATURE of orthodontic treatment is such that it is difficult to analyze a single problem without becoming involved with a discussion of growth and anatomical relations. The object of this paper will be, first, to point out a relationship between this problem and certain anatomical landmarks, second, to make a general survey of cases of missing teeth which have been treated by the author, and, third, to present a practical demonstration of the treatment of a few of these cases.

The orthodontist is frequently called upon to treat cases in which teeth are congenitally missing. There are also a number of instances where teeth have been lost either as the result of accident or from extensive caries. When these tooth units are missing, treatment is frequently made more complicated. One is confronted with the problem of attempting to make some kind of compromise. It is no longer possible to establish a denture with its full complement of teeth in perfect harmony and balance with its environmental tissues. This, however, gives no license for lowering of standards. With a clear concept of the ideal in mind, one should approach these cases with a determination to leave the patient with a result that meets all the requirements as closely as possible.

A series of normal skulls of various types of individuals from different age groups will show that the teeth, in general, bear a certain relation to skull anatomy. It has been pointed out by Tweed that the mandibular incisors bear a definite relation to the body of the mandible. He has indicated the desirability of having these teeth in an upright position over the basal bone. There is a normal variation in this upright position as expressed by his plus 5, inclined slightly to the labial, and minus 5, inclined similarly to the lingual. Untreated cases with satisfactory occlusion occur with a greater variation in incisor inclination than Tweed has described. However, it has been the essayist's experience that in the treatment of malocclusions, the farther the mandibular incisors are inclined to the labial, the more tendency there is for collapse in this area following treatment. It will not be satisfactory, if to get the incisors in proper position, the buccal segments of the arch are expanded beyond what might be considered their normal width. At least a percentage of the cases with missing teeth fall into a group in which there is insufficient structure to house a full complement of teeth and still have them occupy an ideal relation to basal bone.

Atkinson has shown that the maxillary teeth which bear the greatest occlusal stress are always found under the key ridge. In the deciduous dentition it is the second deciduous molars that are found under this bony buttress, but as the permanent dentition develops, the force of masticatory

function is transferred to the first permanent molars. They assume their position under the key ridge, which position is maintained throughout the functioning life of the dentition.

Broadbent has demonstrated that the key ridge is not fixed in its position, but changes somewhat with the shifting of teeth. He has shown that when a maxillary six year molar on one side of the arch has moved forward into the second premolar space, the key ridge on that side may, also, shift forward to the same position. When such a change occurs in bone tissue there is much less possibility of the buccal roots of the six year molar becoming denuded.

I have been hesitant regarding the closure of spaces for missing teeth, especially in the maxillary second premolar area, because of the possibility of seriously changing the relation of the six year molar to the key ridge. To my knowledge, in those cases where such a movement has been created, the maxillary six year molar has remained a vital, healthy functioning tooth.

Standard text books list the maxillary lateral incisors most freqently missing, exclusive of the third molars. Next in order are the mandibular second premolars, then the maxillary second premolars, the first premolars, and the mandibular lateral incisors. The central incisors, the canines, and the permanent molars are rarely congenitally missing.

In order to get a more definite picture of the extent and general nature of the problem, a survey was made of all the cases of missing teeth, congenital or otherwise, in a group of five hundred patients, and the results tabulated.

	No. of cases	No. of teeth	Space kept open	Space Closed
Mandibular second premolars	18	28	10	8
Maxillary lateral incisors	6	8	4	2
Mandibular incisors	6	7	1	5
Maxillary second premolars	3	4	1	2
Maxillary first premolars	3	3	3	
Mandibular first premolars	1	1	1	
Mandibular canines	1	2		1
Mandibular six year molars	13	14	5	8
Maxillary six year molars	3	3		3

Fig. 1.—Teeth Missing in Survey of 500 Cases.

It was interesting to note that the mandibular second premolar was missing more frequently than any other tooth. Its absence occurred in three times as many cases as did the next in order, the maxillary lateral incisor. It should be pointed out that although a surprisingly large number of mandibular incisors were missing, six in all, three of them were congenitally missing laterals, two were laterals which were lost by accident, and one was a central incisor which was lost because of labial tissue recession. The large number of missing six year molars, due to caries, is sad, but accurate. It indicates there is still need for educating the patient and thoroughness in operative dentistry.

Comment should be made on the two columns at the right of this chart,

which indicate what was done with the space where teeth were missing. The space for the mandibular second premolar was kept open a little more frequently than it was closed. In three of these cases, the mandibular second deciduous molars were left in place, because there were so many other teeth congenitally absent.

The space was closed in two of the cases of missing maxillary lateral incisors and was kept open in four of them. The remark could well be made about a missing incisor, that anything which is done is unsatisfactory. From an esthetic standpoint, the opening of space followed by the placing of an artificial substitute, gives the best result. If the lateral incisor is present on one side, it is best to keep the space open on the other and place an artificial tooth so that better harmony will be established.

In some instances when the lateral incisors are congenitally missing, the maxillary buccal teeth have drifted forward, so that much of the space for the lateral incisors has been lost. With such a condition it is a temptation to leave the space closed, permitting the canines to occupy the space of the lateral incisors. It is possible to do this if the canines have a rather flat labial surface and are not too large in the labio-lingual measurement.

When the lateral incisor on one or both sides has been destroyed in the closure of a cleft palate, it is necessary to keep the space open.

The relationship of teeth is incorrect when less than four mandibular incisors are present. Nature sometimes is so emphatic in indicating she has room for only three incisors, that to insist on making space for four of them would only be inviting failure. In the cases recorded, the space was left closed in five of them and was opened in one.

The space was closed in two of the cases with missing maxillary second premolars. In the third one, the space was kept open as it also was with missing maxillary and mandibular first premolars, because in all of these instances there were so many teeth missing that it would have been unwise to remove any additional ones.

In the thirteen patients in which the mandibular six year molars had been extracted, the space was kept open in eight, and was closed in five of them. When only one tooth has been lost, keeping the space open seems more justifiable.

In all instances where the maxillary six year molar was lost, the space was closed. In each of these the mandibular six year molar had also been lost, and the spaces were closed in both arches.

The first case to be presented is that of a girl, eleven years old, with congenitally missing mandibular lateral incisors. (Fig. 2 A). The mandibular posterior teeth had shifted forward so that the canines were in contact with the central incisors. The maxillary teeth had also moved forward so that correct occlusal relation existed in the six year molars, and only part of the space remained for the maxillary canines.

The face was somewhat deficient in the denture area. (Fig. 2 B). Had it seemed possible, it would have been desirable to obtain some development of the dental arches. However, with the mandibular teeth in satisfactory relation to supporting tissue, even though the arch was small, as the result of the missing incisors, it was considered unwise to attempt opening any

space for the missing teeth. The problem existed of trying to form a maxillary arch which would best fit a mandibular arch deficient in tooth material. The maxillary first premolars were removed and the remaining teeth arranged as satisfactorily as possible. The teeth are not in ideal occlusion, however, it is difficult to see how any other form of treatment could have resulted in as satisfactory a relation and still have the denture adequately supported by healthy tissue.

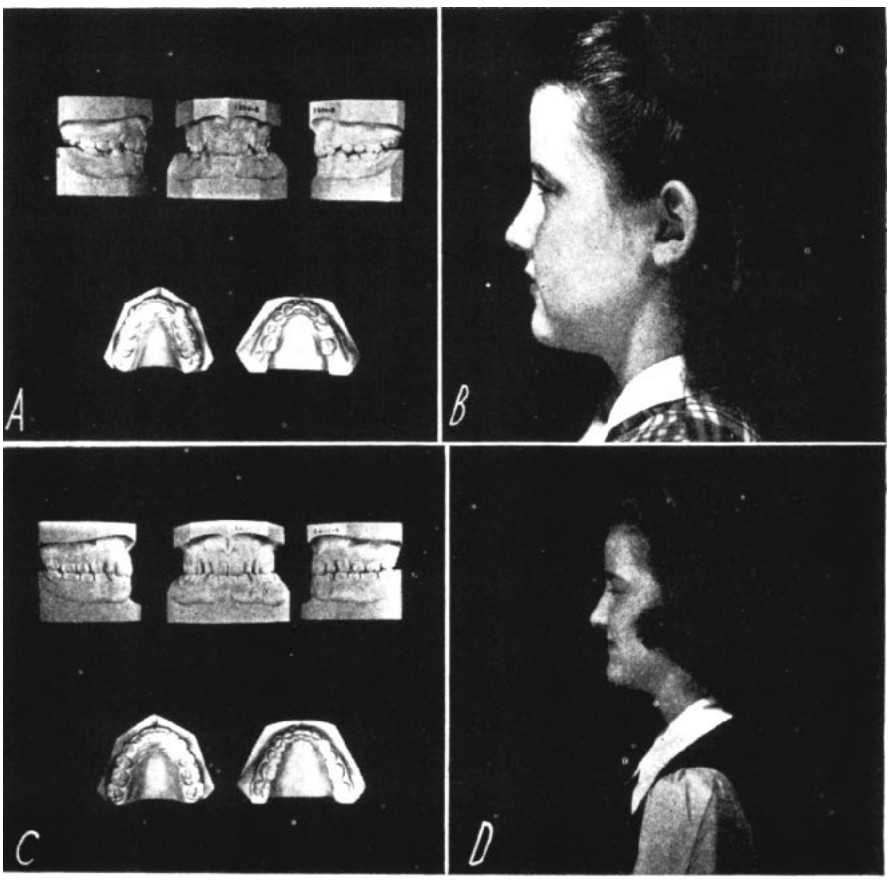

Fig. 2 A.—Models of Case I before treatment. B. Photograph of Case I before treatment. C. Models of Case I after treatment. D. Photograph of Case I after treatment.

Sometimes the orthodontist is called upon to treat a patient whose general health and nervous condition is so unfavorable that he is justified in postponing treatment until a more satisfactory period. It is highly probable that this period may not be easy to discern. However, the length of time required for treatment may be reduced and additional information regarding the growth tendencies and health of oral tissues may be obtained.

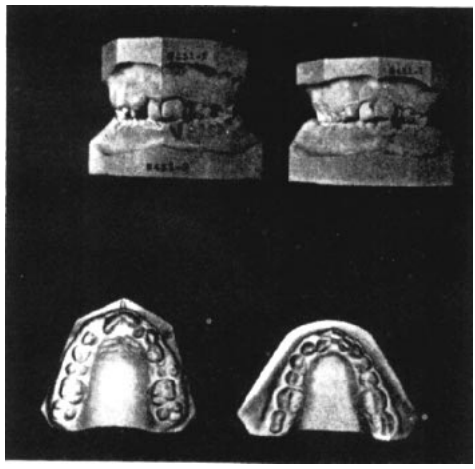

Fig. 3.—Models of Case II at 10½ years of age on the right, and 21½ years later on the left.

The case shown in figure 3 is one in which treatment was delayed. The maxillary right lateral incisor was congenitally absent. The left lateral incisor was a peg-shaped tooth with a very short, inadequately formed root, so that its extraction was indicated. The left maxillary canine was impacted to the lingual of the left lateral incisor. The mandibular arch was contracted to a marked degree with the left central incisor crowded labially to the rest of the incisor teeth. The patient had unsatisfactory health, and was highly nervous. The combination of factors made treatment contraindicated when the first records were made. When the second set of models was made, the extensive tissue recession had occurred on the labial surface of the left mandibular central incisor.

It is not easy to determine the etiology of such a tissue condition. It may have been caused by the position of the tooth. However, I have observed other teeth in similar positions which have not reacted in this way. The combination of tooth position and health of the patient would, no doubt, be conducive to the tissue change. It is obvious that the extraction of the tooth was indicated before starting treatment. If the tissue recession is an indication of nature's ability to accommodate all of the mandibular teeth, opening the space for such a tooth would be contraindicated. Leaving the mandibular arch with only three incisors, is not ideal, nevertheless, unsatisfactory as it may be, it seems to be the best that can be done for this patient.

The third case is that of a girl aged eleven years (Fig. 4). The teeth were in a Class II division 1 relation, and complicated by congenitally missing maxillary lateral incisors. The size and shape of the maxillary canines were such that placing them in the position of the lateral incisors seemed possible. The mandibular incisors were inclined quite noticeably to the labial. Leaving the mandibular arch in distocclusion would make it easier to place the incisors in a better position, and not disturb them with Class II elastics. Consequently, the distocclusion was not changed in treatment. The spaces

were closed in both arches and the maxillary canines were placed in the lateral incisor position. The patient was seen recently, six months after treatment was completed, and the relation of the teeth has remained unchanged.

It is not ideal to conclude an orthodontic case by having the space for a six year molar supplied by an artificial substitute. One gets the impression

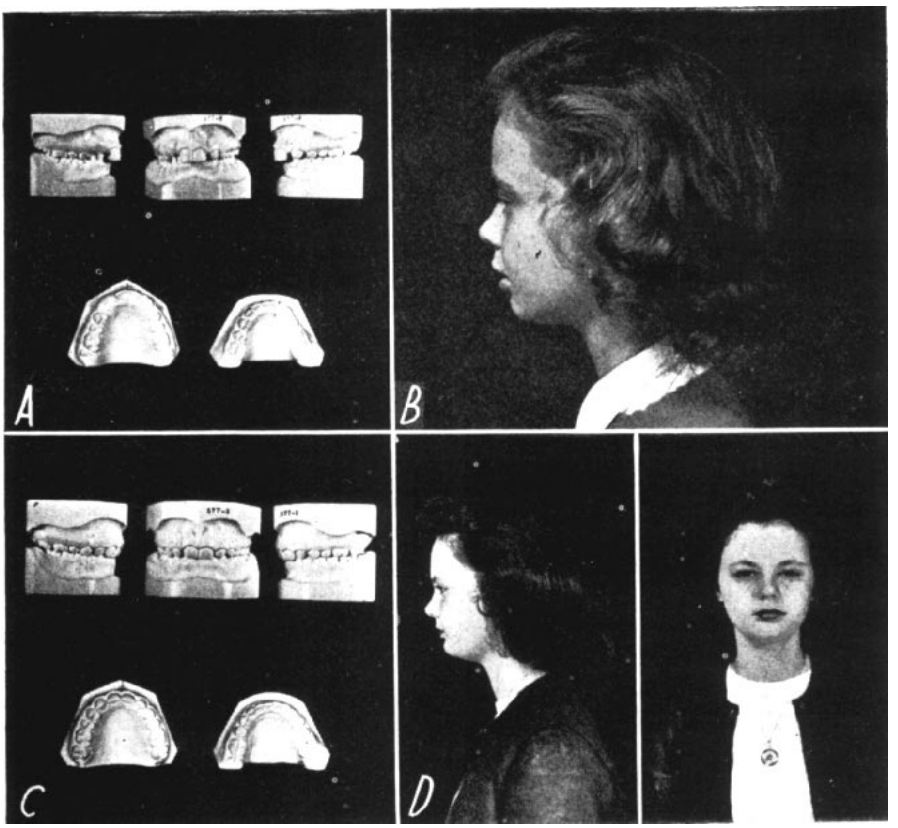

Fig. 4 A.—Models of Case III before treatment. **B.** Photograph of Case III before treatment. **C.** Models of Case III after treatment. **D.** Photograph of Case III after treatment.

that if susceptibility to caries and the dentist's inability to cope with the situation has resulted in the loss of a six year molar while the patient is still in orthodontic age, a bridge replacing such a tooth also has the possibility of early failure. As difficult as it is, especially in the mandibular arch, to move the twelve year molar into the six year molar position, it should still be possible with careful appliance manipulation to do so. In certain cases, at least, the orthodontist does the maximum service by creating such movements.

Fig. 5 A.—Models of Case IV before treatment.
B. Models of Case IV after treatment.
C. Photograph of Case IV after treatment.

The models in figure 5 A are those of a girl aged fourteen years and eight months. Unfortunately the original photographs are missing. She had a rather severe Class II division 1 malocclusion. The mandibular incisors were inclined labially. The maxillary right six year molar had been extracted, and the mandibular left six year molar was abscessed, so that extraction was necessary. All four third molars were present.

In treatment, the remaining three six year molars were extracted and the spaces closed, along with other changes in arch form and relation. Due in no small measure to the splendid cooperation by the patient, treatment was completed in fourteen months.

The face is deficient in the lower part, however, the teeth appear to be in satisfactory relation to bone structure (Fig. 5 C). The mandibular arch has had no retention. The maxillary arch has been retained by a Hawley retainer worn at night. The case has been seen recently, six months after completion, and there has been no visible change in tooth relation. Radiographs show the third molars developing in favorable relation to the twelve year molars.

The fifth case is that of a girl, eight and a half years of age with a severe Class II division 1 malocclusion (Fig. 6). The mesial angle of each maxillary central incisor had been broken. The mandibular incisors were inclined strongly to the labial with insufficient space for them in the arch. The mandibular left second premolar was congenitally missing.

This case was treated by removing the mandibular left second deciduous molar and moving the mandibular left six year molar to contact the first premolar. The twelve year molar followed the movement of the six year molar without attachment to it. When the maxillary premolars erupted into position, the maxillary left first premolar was removed so that in closing the space created by its removal it was possible to get more satisfactory cuspal relation on the left side of the arch.

Fig. 6 A.—Models of Case V before treatment. **B.** Photograph of Case V before treatment. **C.** Models of Case V after treatment. **D.** Photographs of Case V after treatment.

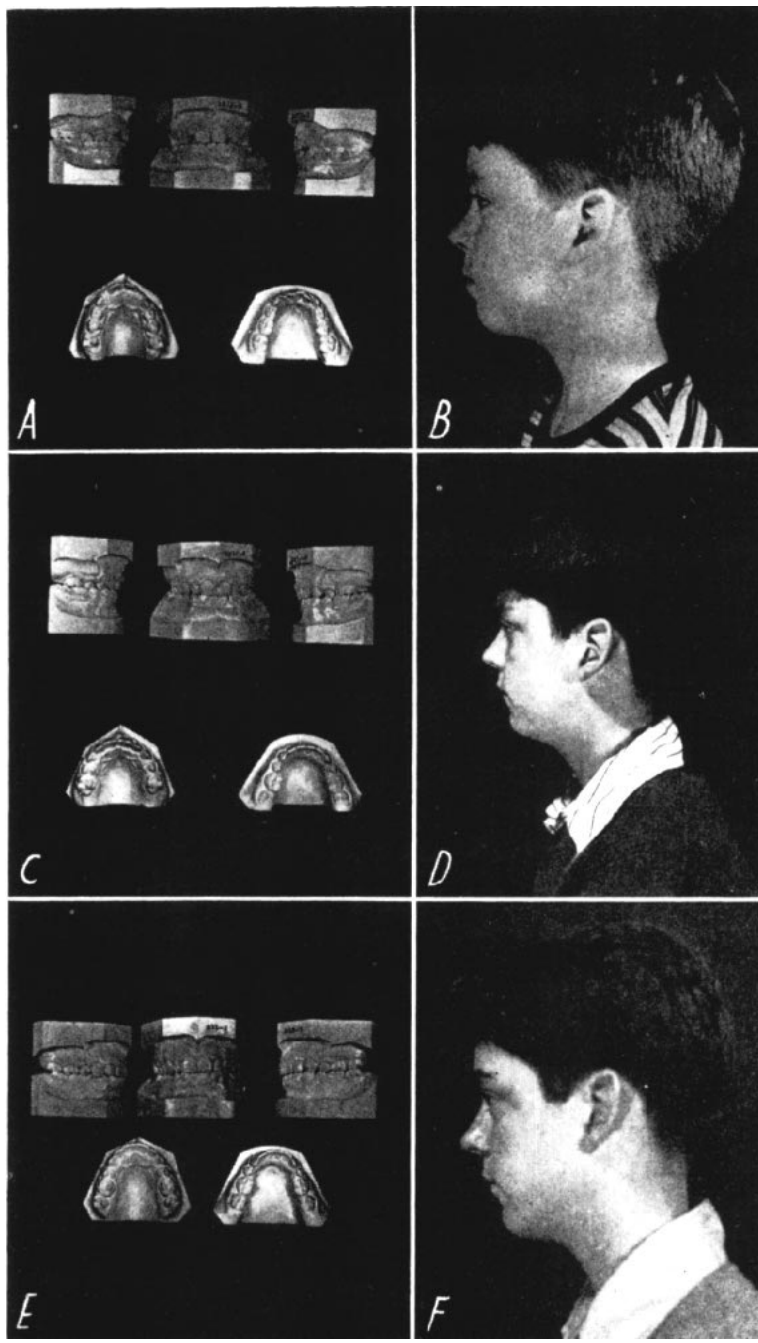

Fig. 7 A.—Models of Case VI before treatment. **B.** Photograph of Case VI before treatment. **C.** Models of Case VI after treatment. **D.** Photograph of Case VI after treatment. **E.** Models of Case VI twenty-one months after completion of treatment. **F.** Photograph of Case VI six months after completion of treatment.

The sixth case is that of a boy nine years of age with a Class I malocclusion (Fig. 7). The mandibular arch was crowded in the incisor area. The maxillary arch was narrow, with the buccal teeth of the left side biting lingually to the mandibular teeth. There was insufficient space for the maxillary lateral incisors. The mandibular second premolars were congenitally missing. All four third molars were present.

The profile photograph showed a tendency for a fullness in the denture area.

This case was treated intermittently over a period of four years. The mandibular second deciduous molars were removed and the spaces for the missing mandibular second premolars were closed. When the maxillary second premolars erupted they were extracted and the spaces were closed.

The face was a little flat at the conclusion of treatment, however the photographs taken six months later shows the face in more pleasing balance. The radiographs at the conclusion of treatment reveal healthy structures throughout. In spite of the elimination of tooth material there is not any too much space available for the developing third molars.

This case was dismissed with no mechanical retention. A study of the record models in figure 7 E will show a change in arch form, probably according to type. The arches are narrower in the cuspid area. The mandibular incisors are inclined more to the labial. The fact that there has been no collapse in the arches would indicate that the denture is in satisfactory balance with supporting tissues.

The duration of treatment can be shortened considerably if cases of this nature are not started until the premolars and canines have erupted.

Many times in orthodontic endeavor one senses a feeling of disappointment. We should all desire very much to see a well-balanced face with a full complement of teeth. No compromise quite measures up to nature's ideal. For the most part, the cases herein presented are not beautiful results. They do represent an effort to treat malocclusions with deficiency of tooth material and aberrations of growth in such a way that they will be as satisfactory as possible in years to come. With further investigations in the field of growth, a better understanding of the problems involved, and with refinements of technique, it should be possible in the future to improve the treatment of these dentures.

Conclusions

1. Malocclusions with missing permanent teeth may present difficult treatment problems which are intimately associated with growth and development.

2. Not infrequently, lack of growth creates a condition which makes it possible, and sometimes even preferable, to eliminate the space for missing permanent teeth.

3. In making a diagnosis, it is important to observe the relation of the teeth to their bony foundation.

4. The amount of growth present at the beginning of treatment should be an indication of the availability of tissue to accommodate tooth movements.

5. When posterior teeth are missing, if at all possible, the same teeth should be eliminated in the opposite arch, so that better occlusal relationships will be produced.

6. If other factors will permit, it is preferable to delay the treatment of cases with missing teeth until the canines and premolars have erupted.

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