Incidence of Third Molar Development

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Evaluation of the data concerning the initial appearance of the third molar crypt, degree of calcification, congenital absence and eruption has been more or less arbitrary in the past. Hence, the large number of radiodontographic case records available in the orthodontic practice of Drs. Ketcham and Humphrey impelled the writer to compile some of this valuable information for the profession.

A study of these radiodontographic files has also provided much data concerning phenomena in the forming permanent dentition, but this survey is particularly concerned with the third molar and has involved a study tabulation of the findings in the radiodontograms of one thousand patients.

Radiodontographic examinations have been made annually of eighty percent of the patients who constitute the group represented in this survey. Of the remaining twenty percent of this group, some had only the consultation radiodontograms while others had occasional radiodontograms.

Due to the superimposing of the third molar region upon the malar process, in some of the extra-oral radiodontograms of the younger patients, the report in the survey of the maxillary third molar region is not as complete as is that of the mandibular.

The Time Factor in Third Molar Development

A charted table of the degree of calcification of third molars has been formulated for convenience of estimating the appearance of third molar crypts. The charting of these developing teeth has made it seem wise to divide the tooth into sixths. Data concerning the initial appearance of the third molar crypt, as estimated from the chart, is given as a supplement to that obtained from radiodontographic evidence. Fig. 1.

The cusps of the third molar are completed, approximately, one year after the completion of the development of the crypt. The average time of development from the cusp stage to the first sixth of the tooth is one year. Each succeeding sixth, until the tooth is fully formed, covers about the same period of time. There is a variation in the calcification time. Complete formation of the tooth usually requires from seven to nine years.

As a rule, calcification of the maxillary third molars is from one to two years in advance of those of the mandible. Greater variations in the time of calcification of maxillary and mandibular third molars, may be found in the same mouth. Fig. 2.

The Crypts

Radiodontographic evidence proves that the age at which the third molar crypt may appear can be as early as five years and as late as fourteen,—a spread of nine years. This is proven by deduction because we know, from many cases, that calcification of the cusps is in evidence approximately

FIGURE 1

INCIDENCE OF THIRD MOLAR DEVELOPMENT

SURVEY OF 1000 CASES FROM FILES OF DRS. KETCHAM AND HUMPHREY. BY HARRY V. BANKS A.B. D.D.S.

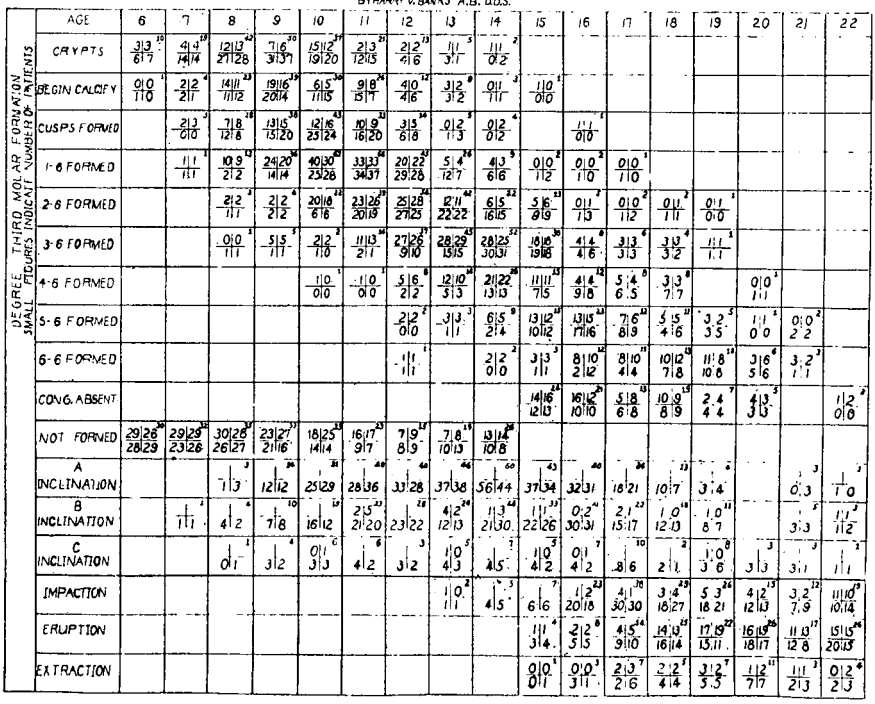


Figure 1

one year after the completion of the devolopment of the crypt and we have one case in which there was the beginning of cusp calcification in one left mandibular, third molar during the sixth year. Fig. 3.

Ten patients showed, during the sixth year of age, three maxillary right and left and seven right mandibular crypts. Thus, nineteen crypts out of a possible forty were in evidence in the radiodontograms of this group of patients. Fig. 4.

Seventeen third molars in various stages of calcification were found in the radiodontograms of eight patients, seven years of age. Referring to the charted calcification, we can estimate that these teeth made their initial appearance during the fifth and sixth years of age. In a group of seventeen patients, the eighth year presented twenty-three third molars, one-sixth calcified, six, two-sixths and four, three-sixths formed. The same

Figure 2

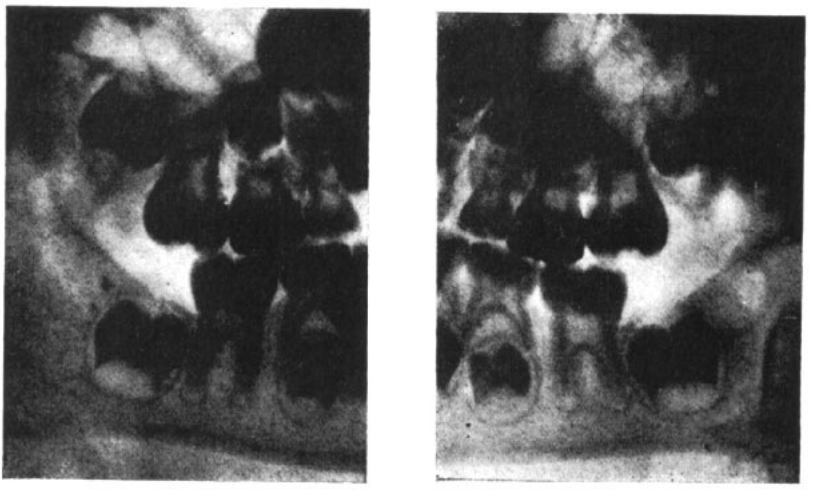
growth period being considered, we again have thirty-three third molars which, in all probability, had their crypts formed during the fifth and sixth years of age.

The eighth is apparently the peak year for the formation of third molar crypts. There were seventy-eight crypts recorded in forty-two children. The estimated number compiled from the table of calcification is six hundred and twelve of a possible one thousand, two hundred and four. The total is six hundred and ninety crypts formed in three hundred and forty-three patients.

Nineteen patients had thirty-six crypts formed at seven years of age. The estimated number of this age-group were four hundred and forty-nine crypts in two hundred and twenty-four children.

The next proportionate number compiled from the radiodontographic evidence and the charted calcification table appeared during the ninth year, at which age there were five hundred and eighty crypts, eighty-one of which were present in radiodontograms of fifty children and four hundred and ninety-nine determined from those teeth calcified in the average number of years in two hundred and fifty patients.

We have, in the radiodontograms of two patients, fourteen years of age, one maxillary left and right, and one right mandibular crypt. Fig. 2.



A B

Figure 3

The evidence of the great latitude in the time element for the first appearance of the third molar indicates that we have, many times, erroneously deducted the tooth under consideration to be congenitally absent. Therefore, although missing teeth charted up to and including the fourteenth year have, in this survey been termed as "not formed," the reader may draw his own conclusions. Personally we believe many of these missing crypts may appear at a later year.

There were, in the consultation radiodontograms of thirty patients, during the fifth and sixth years, an absence of one hundred and twelve third molar crypts. However, owing to the fact that the year of maximum formation is the eighth, these figures are of little consequence. At seven years of

age, thirty-two children had an absence of one hundred and six molar crypts. One hundred and eleven crypts had not formed during the eighth year in thirty-five children, and during the ninth year, of a possible one hundred and thirty-two third molar crypts, there was an absence of eighty-seven. One hundred and seventeen patients, between ten and fourteen years of age inclusive, failed to have two hundred and thirty-six third molar crypts.

Figure 4

Congenital Absence

Ninety-one patients out of four hundred and sixty-one, fifteen years of age or over, had congenital absence of one hundred and ninety-seven third molars. Of these patients, twenty-nine had an absence of one third molar, twelve of which were mandibular teeth and seventeen, maxillary. Thirty-three of these children each had two third molars that were not formed; forty were maxillary and twenty-six, mandibular. Three third molar teeth in each of fourteen patients had failed to have crypt formation, twenty absences being in the maxilla and twenty-two in the mandible. The remaining fifteen patients had a congenital absence of all four of the third molars.

Potential Impactions and Actual Impactions

The mandibular third molar crypts make their initial appearance high in the angle that is formed by the ramus and body of the mandible. During

the growth period, many of these forming teeth do not change the original angle at which they begin their formation, therefore they cannot assume a position favorable to eruption.

Potential impactions and actual impactions are classified with difficulty. Many third molars apparently having positions favorable to eruption become

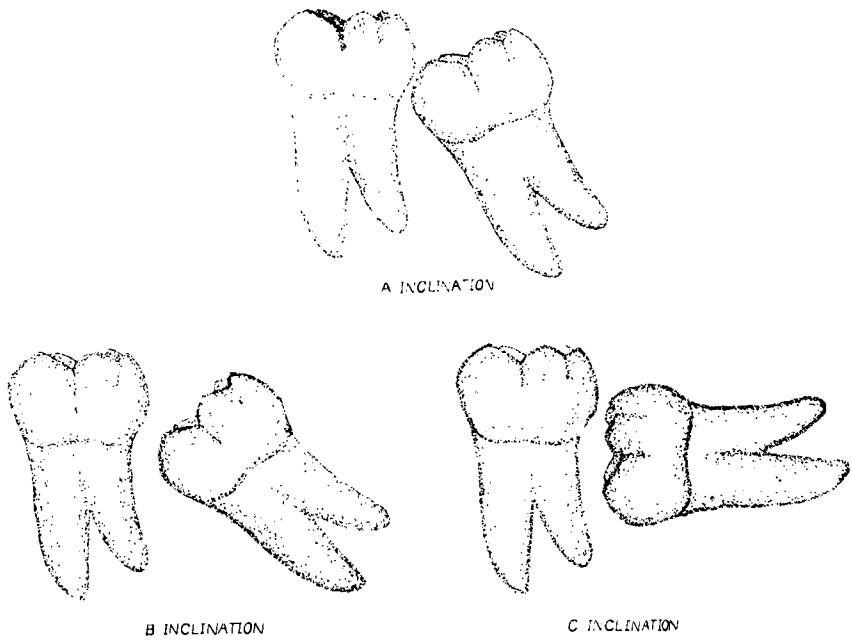
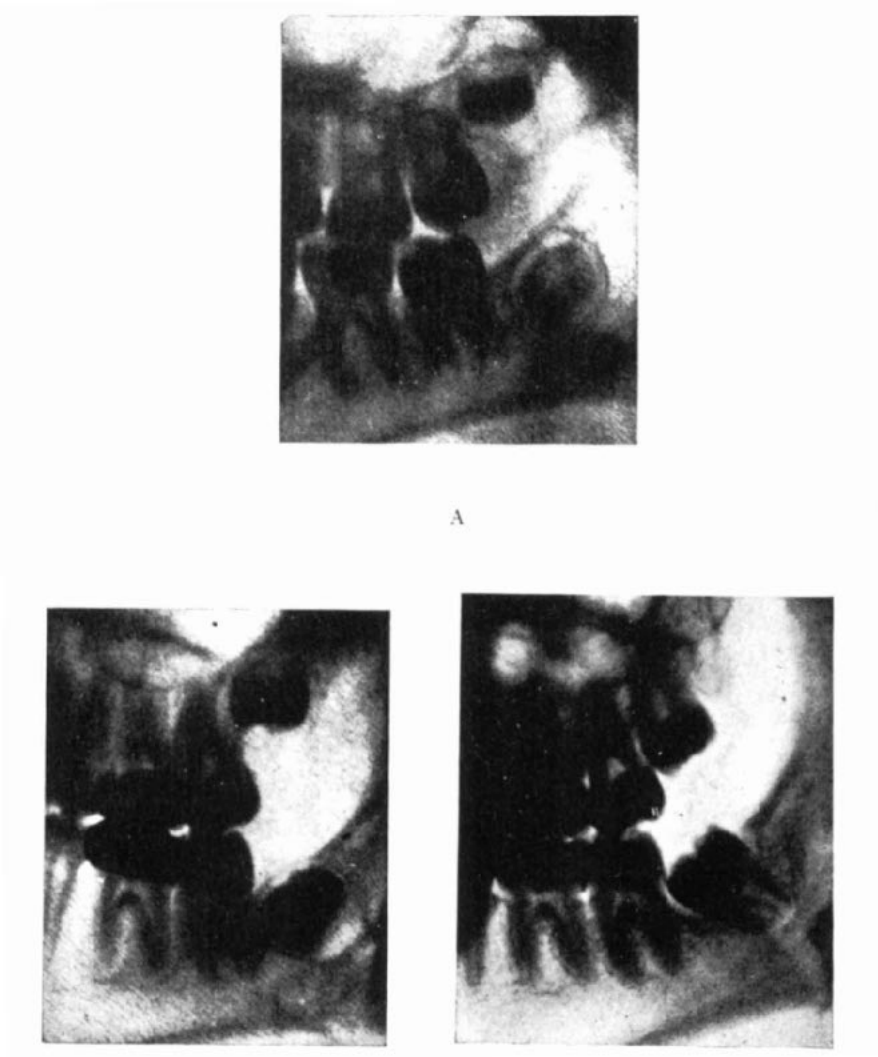


Figure 5

impacted due to lack of mandibular development. Others have formed in such positions that the long axes have an angulation of forty-five degrees, mesially or distally, or greater, some being even horizontal or parallel to the body of the mandible. Even these seemingly hopeless impactions may improve in position and erupt.

To facilitate the charting of these teeth we have formed an arbitrary classification of A, B, and C inclination. Fig. 5.

The teeth in the A group lie in the bone, the long axis being at an angle between vertical and forty-five degrees, mesially or distally. These teeth are in a favorable position for erupting, providing they are not in



A

B

C

Figure 6

contact with the second molar near the cemento-enamel junction or caught in the ramus. They may also change their position and enter the B or C classification. Fig. 6. Three hundred and sixty-two patients presented five hundred and eighty-three third molars in this group.

B angulation is an angle that the tooth occupies which is between forty-five degrees and the horizontal, the mandibular teeth usually being mesially and maxillary teeth distally inclined. Most teeth in this position may be considered as potential impactions, although there are many that change for the better and assume a position favorable to eruption. Two hundred and ninety-seven patients in the B group had four hundred and four mandibular third molars and twenty-five maxillary third molars lying at an angle forty-five degrees or more from the vertical.

C classified teeth are lying horizontally in the bone or parallel to the body of the mandible. We have recorded a few teeth in such position as having improved and erupted. Fig. 7. These teeth may, as a rule, be classified as hopeless impactions. We have seventy-one patients presenting eighty-nine mandibular and four maxillary third molars in this position.

Had it been possible to have the patients in the latter two groups return for further radiodontographic examinations, the final status of these teeth could have been determined and this would have been very interesting. Forty-four patients in the B and C groups showed definite improvement of these teeth, some having erupted, although the lack of subsequent radiodontograms makes the report incomplete.

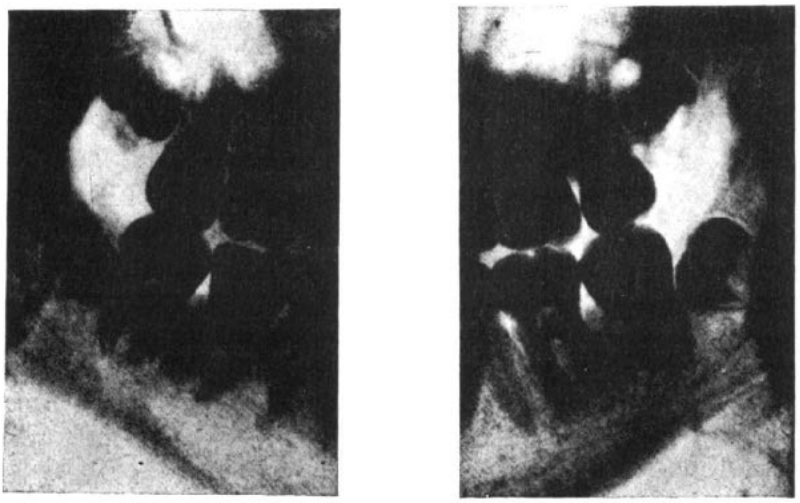
In the growth period many favorable changes evolve in the positions of calcifying third molars. No doubt a large number of teeth which have been given the benefit of the doubt should have been termed impacted. Those teeth considered in this group were, to the best of the writer's judgment, hopelessly impacted. We have one hundred and fifty-five children having fifty-six maxillary and two hundred and seventy mandibular third molars impacted.

Extractions

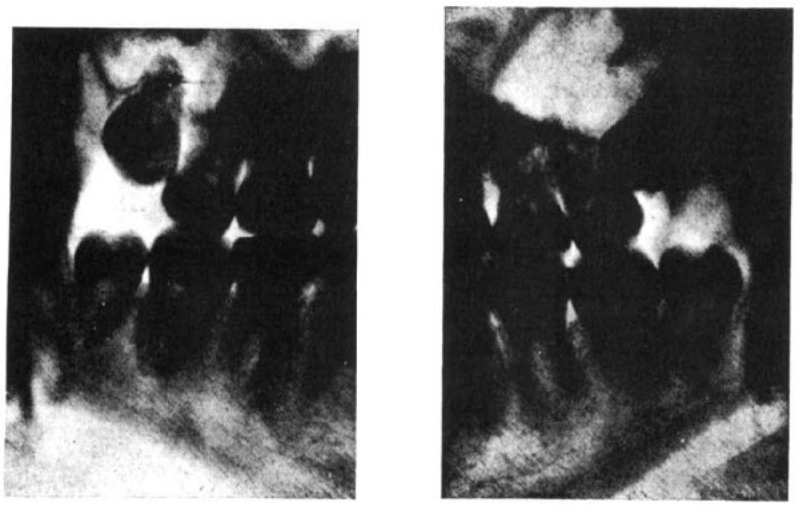
Forty-one patients have had seventy-six offending teeth surgically removed.

Unerupted Teeth

Those patients eighteen years of age or over who had teeth in positions favorable to eruption have been placed in the group of unerupted third molars. We have no assurance that all of these teeth will erupt. Eighty-seven patients have one hundred and thirty-one maxillary and forty-three mandibular third molars unerupted, but not considered as impacted.



A



B

Figure 7

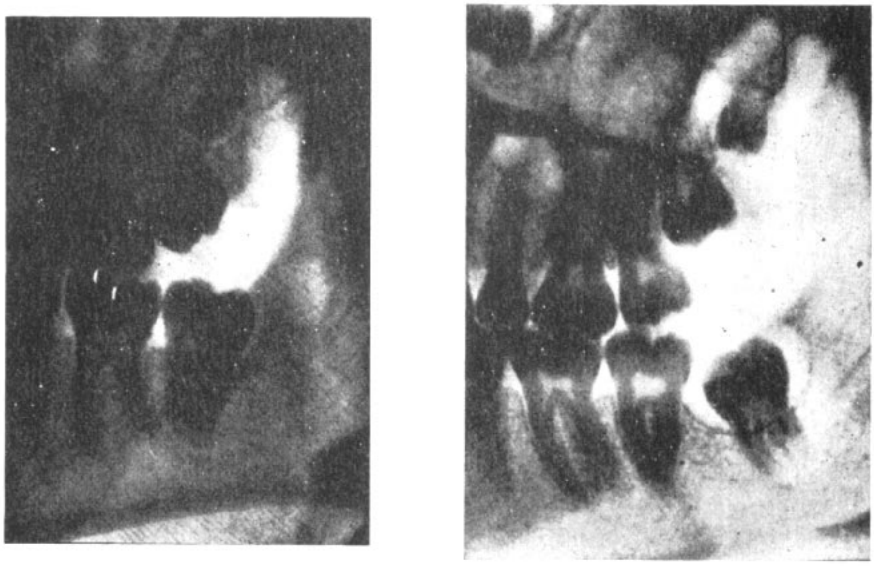


Figure 8

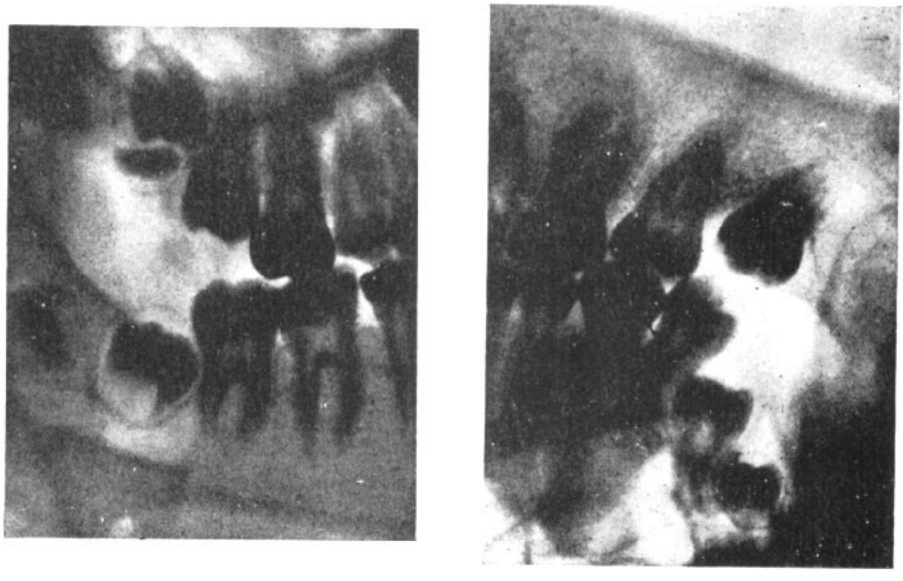


Figure 9

Erupted Teeth

One hundred and forty-two patients had one hundred and sixty-seven maxillary and one hundred and eighty-two mandibular teeth erupt.

The prognosis of third molar behavior is uncertain in regards to ultimate position.

Additional interesting phenomena consists of supernumerary fourth molars which were present in eight of the four hundred and sixty-one patients, fifteen years of age or older. Two of these eight patients had bimaxillary fourth molars, the remainder had unimaxillary, supernumerary molars. Fig. 8 We have also the record of one boy, who, during his thirteenth year, had bimaxillary supernumerary molars developing occlusally to the third molars and one right mandibular fourth molar crypt in which calcification started during the fourteenth year. Fig. 9.

It is evident that complete intra-oral and extra-oral radiodontograms are necessary for diagnosis. Radiodontographic examinations should be made at stated and definite periods of time during treatment and also during the observation period.

Conclusions

1. Third molar crypts may appear as early as the fifth year and as late as the fourteenth year.
2. The year in which the greatest number of crypts are formed is apparently the eighth year.
3. There may be variations in the degree of calcification of third molars in the same mouth.
4. Positive evidence of congenital absence may be lacking until the fourteenth year.
5. The mandibular third molar crypt lies in the angle formed by the ramus and body of the mandible and frequently is at an acute angle to the body of the mandible.
6. The calcifying tooth often remains in the position, normal or abnormal, in which calcification is first in evidence.
7. Teeth apparently in such a position as to be considered impacted, sometimes improve and erupt.
8. The necessity of complete radiodontographic examinations at stated and definite periods of time is obvious.

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