SOME DENTAL ANOMALIES AND THEIR TREATMENT.

By Chalmers J. Lyons, D.D.Sc., Ann Arbor, Michigan.

(Read before the Mid-Winter Clinic Atlanta, Ga., March 15, 1918.)

MORE than a quarter of a century ago it was recognized that during the eruption of the teeth, the brain and the nervous system, the stomach and whole intestinal tract, the circulatory and respiratory systems, all show an increased tho varying liability to irritation.

Years ago that great master in Oral Surgery, Dr. James E. Garretson, taught that the process of the eruption of teeth caused many disorders thru reflex disturbances in various directions.

For years unerupted teeth have been recognized as etiological factors in the production of cysts of the jaws. In spite of all this knowledge little attention has been given to the subject of dental anomalies by writers upon surgical topics. The comparative scarcity of literature along this line has perhaps led to misapprehensions regarding diagnosis and treatment and conservative methods which would result in benefit to the patient, have too often given place to uncalled for radical operations, obviously detrimental to his comfort and appearance.

It is to some of these abnormal conditions that the writer purposes to call your attention at this time.

The human family has, thru centuries of use, established what we call a normal condition of the occlusion and arrangements of the dental organs. It has been so established because it is a condition that is most favorable for their function.

Now when a variation from the normal occurs which is a disadvantage or a disturbance of function, we naturally look back to discover if possible the cause of the deviation from normality. It has been contended, altho not clinically proven, that there is a tendency to degeneration of the jaws of the human race and that the continual development of the nervous system is accomplished at the expense of the osseous system. Thus the more intellectual the human race becomes, thru the process of evolution, just in that ratio will the osseous system become depleted.

The disciples of Darwin believe that as we ascend the scale in so-called civilization, we lose some of the factors that were necessary for the maintenance of life in the primitive man. As an illustration,—the animal depends upon its physical strength for its food and its protection. The bony frame work comparatively is very strong. The bones are large, long and the prominences upon their surfaces for the attachment of muscles are very marked, thus indicating that the muscles are large and strong. As we ascend the scale to man, we find that the bones are comparatively small in diameter, and shorter, showing that the muscles are not so large and strong.

Great changes take place in the jaws and teeth. They become smaller in size, the teeth change their shape, because man is now no longer required to procure his food with his teeth or to protect himself with his jaws. The tem-

poral muscle, zygomatic arch and jaws decrease in size and are not so prominent.

¹Talbot has stated that if we compare the jaws of the orang and chimpanzee with those of the esquimaux, we observe a wonderful difference in regard to size, shape and character of the jaws and teeth. If we now compare the jaws of the esquimaux with those of our working classes, and these latter with the jaws of young people of the well to

Figure 1.

do classes who are not required to work physically, we shall observe almost as great a change as between the jaws of the chimpanzee and esquimaux. Figure 1—jaws of chimpanzee, esquimaux and civilized man.

Much of our food today is prepared in such a manner that mastication is almost unnecessary and arrest of development of the jaws must follow as a result. While the etiology of all dental anomalies cannot be accounted for by arrested development of the osseous structure of the jaws, many of them originate in this manner. Others are caused

by some structural changes in the early development of the teeth and jaws.

We will first consider the impacted lower third molar. This condition is in the large percentage of cases caused by either lack of normal development, or by arrested development of the inferior maxillae. The second molar immediately in front and the coronoid process behind bound the space accorded to the third molar. Each tooth which has no deciduous predecessor is developed beneath the base of the coronoid process, that is the first, second and third permanent molars. The only manner in which these teeth are able to take their places in the normal arrangement of the teeth in the jaw is by the physiological absorption of the anterior surface of the coronoid process. While this process of absorption is going on, on the anterior surface, thru the laws of compensation, nature has provided for a deposition of bone on the posterior surface. Thru these two processes, absorption and deposition of bone, respectively, all of the molar teeth are able to erupt into their proper positions. Figure 2 shows developmental stages of first, second and third molars.

However, when either of these physiological processes in the process of development of the mandible is arrested, the interval between the anterior surface of the coronoid process and the last erupted tooth which is usually the second molar, will be insufficient for the normal arrangement of the presenting third molar. Under these conditions, the tooth in pressing forward, takes a direction in which the least resistance is offered to its progress and a condition becomes manifest which we term impaction.

Another condition which must be recognized in accounting for the malposition caused by the impaction, is that the tooth has been directed from its course at a comparatively early period of development, irrespective of resistance offered at the time of eruption. This condition may be accounted for by a

¹Talbot—Degeneracy of the Jaws of the Human Race.

change in the character of the cancellous bone immediately adjacent to the developing tooth. If, thru some inflammatory process peculiar to the individual or by the same process set up thru some pathological disturbance, or trauma, a secondary deposit of dense bone is laid down, around the developing tooth, a change in direction of eruption of the tooth may take place or there may be a prevention of its eruption entirely. This retarded condition is also due to the fact that at the points where all of the other teeth are located, soft spongy bone or alveolar process is found and absorption of tissue takes place more readily at these points than at the point of eruption of the third molars which is made up of dense cortical or true bone. Frequently it will erupt until it comes in contact with the second molar and then stop on account of insufficient space in which case only a small part of the tooth will be presented. The upper third molar presents an entirely different condition on account of the difference in the character of the bones in the upper and lower jaws. When, for any reason there is a retarded development of the upper jaw which makes it shorter in its anterior posterior diameter, so that there is not sufficient room for the normal eruption of the third molar, the crown of that tooth will point toward the cheek, taking the direction of least resistance in its course. It slides out to the side, being guided by the second molar, which is already in place. If there were plenty of room both upper and lower third molars would erupt without pain which is rarely ever the case.

The cuspid teeth are the next in the series most likely to be impacted. The etiology of this condition is the same as that of the impacted molars, viz., insufficient space for the normal presentation of the tooth in the process of eruption. The cuspid teeth make their appearance long after the eruption of the lateral incisor and some time after the eruption of the first bicuspid. In case of retarded de-

velopment of the jaws, there may not be sufficient room between the lateral incisor and first bicuspid tooth for normal eruption of the cuspid tooth and a resultant impaction occurs.

On account of the tendency of an erupting tooth to follow the course of least resistance, the tooth will slide out to the buccal or into the lingual surfaces of the jaws. It is also true that at an early period of development of these

Figure 2.

teeth, that a secondary deposit of bone in the jaws, due to an inflammatory process, may influence a change of direction in the developing tooth so as to change its position entirely when it erupts.

While the third molar and cuspid teeth are predisposed to impaction more frequently than any others, yet any tooth in either jaw may become impacted if the environments are not such that normal eruption can be made possible.

The next anomaly which we will consider is the unerupted or aberrant tooth. This condition may be present in any part of the jaws and any tooth may be the offending member.

There is always a reason for the tooth being unable to erupt normally. The developing tooth meets some obstruction in its normal course such as a supernumerary tooth or a normal tooth which has previously erupted and already occupies the space belonging to the erupting tooth. Again, a previous inflammatory condition in the cancellous bone may have set up secondary deposits of dense bone which will prove an obstruction to the developing tooth and deflect it out of normal alignment.

This subject would not be complete without a few words relative to the supernumerary tooth.

*"Any tooth in excess of the normal number of thirty-two, altho clearly cases of reversion of type, in many instances, are included in the category of supernumerary teeth."

Albrecht and others maintain that the incisor teeth were originally six in number and thus supernumerary lateral incisor would be clearly a reversion of type. Their appearance in any situation is evidence that the normal number of tooth buds has been exceeded.

Guilford divides these teeth into two types, those having typical anatomical forms and those having the conical form.

Supernumerary incisors in either jaw having typical forms are not uncommon. In the upper jaw supernumerary centrals and laterals both may appear, the latter more frequently. Supernumerary teeth may occupy any position relative to the dental arch but are more frequently seen on its lingual surface. In addition to molars and incisors supernumerary bicuspids are occasionally found, while supernumerary cuspids are very rare.

PATHOLOGIC POSSIBILITIES.

We will now consider some of the pathologic conditions which are induced by these dental anomalies. We will take up first the impacted lower third molar.

Perhaps the most common disturbance we encounter is local infections of the

soft tissues surrounding the tooth. This condition is usually present in the partially erupted tooth when the gum tissue which should occupy the space between the anterior surface of the coronoid process and the third molar has been forced out over the disto-occlusal surface of the tooth and becomes confused in mastication. Bacteria laden saliva and food particles are forced into the interstice between the tooth and swollen tissue and infection takes place. Inflammation is set up and maintained, which is not limited to the injured parts, but more commonly extends to the adjacent structures involving the soft textures about the ascending ramus and frequently involving the para-ton-sillar region.

Deglutition becomes painful and trismus is set up. Many times the patient is unable to open the jaw more than two or three millimeters. After a time suppuration takes place and the movements of the jaws become less constrained.

In these acute conditions, it has been the writer's experience that immediate surgical procedure is contra-indicated. In his opinion the treatment of choice is to apply counter irritants, the application of cold compresses or ice to the face, and have all of the body eliminating processes active.

After the inflammation has subsided and the jaws have become less constrained, conditions should be restored to normal by surgical procedure to obviate repeated attacks. This condition will be rarely found around other impacted teeth than the lower third molar.

A pathological condition which may occur as a result of any impaction is pressure resorption. When the crown of one of these teeth is lodged or impacted against the root of the adjacent tooth, the hard enamel surface of the impacted tooth will cause a resorption of the tissues of lesser resistance of the other one. This may go on to such an

*Burchard.

extent that the nerve pulp of the adjacent tooth will be encroached upon.

A very serious condition may arise from an impacted lower third molar by pressure being exerted upon the inferior dental nerve. The position of these teeth in the jaws predisposes to impingement upon the inferior dental canal. In such cases a reflected pain may be set up which will be expressed in any part of the head which has its sensory nerve supply from the fifth or trigiminal nerve.

Neuralgia may have its etiology in such conditions. The late Dr. Henry S. Upson, former professor of Neurology in the Western Reserve University, ascribed many of the nervous disorders which "mankind is heir to" to impacted teeth. He stated that "certain types of nervous disturbances caused by dental impactions has almost the clearness of a laboratory experiment as in it, the severest symptoms are set up by the simplest irritant. Pain may be from the beginning to the end quite lacking." It is the constant tho mild irritation, perhaps not sufficient to produce pain, that sets up some of these nervous disturbances which may of themselves take on a violent form.

Alopecia areata, or baldness occurring in sharply defined patches, leaving the scalp smooth and white, is a condition due to a nervous disturbance. The impacted tooth must be considered an etiological factor in this affection.

During the last few years, we have had several cases of this nature in the University Hospital that showed marked improvement after the removal of impacted teeth.

Another abnormal condition that is quite frequently found associated with the presence of impacted lower third molars is a tendency for these teeth in their effort to erupt to force all of the lower teeth forward. Orthodontists have found it almost impossible to retain normal occlusion following orthodontic treatment with these teeth present

in the jaws. Many fine orthodontic results have been ruined by the presence and activity of impacted teeth.

What are the pathological possibilities of the unerupted tooth? It is a remarkable fact, and one which has not been fully explained, that unerupted teeth having lain dormant for years in the jaws suddenly become the seat of purulent inflammation with sometimes serious symptoms. Such cases are by no means rare. Some writers are of the opinion that under certain conditions these teeth may act as a foreign body and may even fall a prey to resorption. Under these conditions where an irritation has been set up and purulent inflammation has become seated, a bone abscess may form around the region of the unerupted tooth. This abscess may develop until a large portion of the jaw becomes involved.

Another condition which is frequently seen in mouths of men and women under thirty years, is the cystic growths connected with these teeth whose eruption is retarded. While in the light of our present knowledge the explanation for the formation of these cysts is largely theoretical. Tomes has given the writer the most plausible theory. He states that when the development of the enamel of the tooth is completed, its outer surface becomes perfectly detached from the investing soft tissue and a small quantity of transparent fluid not uncommonly collects in the interval so formed. This fluid ordinarily is discharged when the tooth is erupted, but when from some cause the eruption of the tooth is prevented, it increases in quantity and gradually distends the surrounding tissues, causing a resorption and disintegration of the osseous structures. These cysts may go on developing until a large portion of the jaw is involved.

Again, the unerupted tooth may, by coming in contact with the roots of the normal erupted teeth, cause pressure resorption and thus produce a perma-

ment injury to them. When these teeth lie in close proximity to a nerve trunk, they may cause undue pressure and set up the same obscure nervous disturbances which have been attributed to impacted teeth.

The last of the dental anomalies which we are considering in this paper is the supernumerary teeth. One of the most common resultant consequences of the supernumerary teeth is the obstruction they present to the normal eruption of the permanent teeth. They may

Figure 3.

retard or entirely prevent the eruption or they may erupt first and force the normal tooth to erupt out of alignment. Warnekros, has written quite extensively on these teeth as an etiological factor in the causation of cleft palate. It is a well recognized fact that in cleft palate there is not a lack of palatine tissue, but a failure of union of the tissue. Warnekros believes that the failure of union is brought about by an excessive number of teeth. He says "as the normal number of teeth during their development requires a comparatively large space, it is explicable that in very many instances, a supernumerary tooth, with the limited conditions of space in the intermaxillary bone which is not yet completely ossified may itself cause a

cleft formation in the maxillary bone." In support of this contention which he says he no longer brings forward as an hypothesis, but he declares to be a fact, he cites an extensive series of cases as proofs in which he emphatically states that a supernumerary tooth can always be proved to have been the cause of the cleft. Figure 3.

While we are not yet ready to accept the deductions of Warnekros in its entirety, there seems to be some relation between these anomalies and cleft palate. We frequently find that supernumerary teeth are present in these cases.

The writer, however, is not able to follow his reasoning in clefts of the lip alone or in clefts that do not involve the maxillary processes. It has always been a question with the writer as to whether the supernumerary tooth is the etiological factor in cleft palate, or that the changes which take place in embryonic life which results in cleft palate do not in some manner affect the development of the normal number of teeth.

TREATMENT.

We have now considered briefly the etiology and pathology of some of these dental anomalies; now what about the treatment?

All supernumerary teeth, whether erupted or their presence only made manifest by means of the röntgenogram, in the writer's opinion should be removed. They are of no value to the patient and in the large percentage of cases are either proving or will prove a positive menace to the normal functioning of the teeth.

The unerupted tooth should be removed when it is suspected of any disturbance. Successful diagnosis is only made by a process of elimination and when these teeth are present in the jaws and the patient suffering from obscure nervous disturbance, the removal of them is indicated in order to eradicate a possible source of trouble. Their removal, together with the entire cystic lin-

ing must be accomplished in cases of dental cysts. This should not be attempted without the evidence of a good röntgenogram, which should point out the location of the tooth and the dimensions of the cyst.

In fact, the removal of any unerupted tooth should not be attempted without a good röntgenogram for the reason that any unnecessary cutting or laceration of the tissues is not permissible in these operations. In the removal of these teeth the writer prefers the uncovering of them by means of a chisel and mallet, thus the landmarks are not destroyed which otherwise might be the case in the use of the bur and engine. After the location of the tooth and the character of its environments have been determined, the use of the bur or drill is permissible in the further removal of the osseous tissues in permitting of their dislodgement.

The operation for the removal of the impacted tooth is a subject which of late has been attracting considerable attention, particularly that of the impacted lower third molar. In the removal of the impacted tooth other than the lower third molar, no definite technic can be followed as each case will present entirely different conditions.

In the removal of the impacted lower third molar, however, the writer believes that it is possible to follow a definite technic in practically every case. In other words, the operator should have a clear conception of the whole situation and know exactly what has to be accomplished in order to remove the tooth with the least amount of traumatism. Dr. C. Edmund Kells, in a paper on *Impacted Lower Third Molars*, in February, 1918, *Dental Cosmos* says: "There appears to be two methods of removing these teeth. (1) One in which the patient's jaw is chiseled away to such an extent that the tooth may be taken out whole, ether or novocain being used, according to the fancy of the operator.

(2) The one in which the tooth itself is cut in two under novocain. The patient's jaw is handled gently and the tissues surrounding the tooth are injured slightly.

As the mallet and chisel in conjunction with surgical drills and elevators are the instruments that the writer has found most satisfactory in his hands for the removal of these teeth, he must take exception to the erratic statements made by Dr. Kells. It is true that a novice or a bungling operator may mutilate or lacerate the tissues unnecessarily by the use of the mallet and chisel—so would the same conditions obtain by the practice of what Dr. Kells terms "his method," in the hands of the same class of men. It is unfortunate that Dr. Kells did not attack the personal ability of the operator instead of methods. The writer feels very sure that Dr. Kells can remove an impacted lower third molar by "his method" with the least possible amount of traumatism. The writer also feels very sure that there are many operators who, by the use of the mallet and chisel, drills and elevators, can perform the same operation with no greater amount of traumatic injuries and no greater inconvenience to the patient. He says "under the mallet and chisel operation a large block of the external oblique line is cut away and a large surface of the porous bone is left exposed." The writer has never had a case where it was necessary either in his private practice or in the clinics at the University of Michigan, neither has he observed this condition with other operators who were proficient in the use of the mallet and chisel.

The lower impacted third molar as we have stated, follows the path of least resistance in its attempt to erupt. The path of least resistance is certainly not in the dense cortical bone such as is represented by the external oblique line but rather at the base of the retramolar fossa and it is not necessary to go out-

side of the retramolar fossa with the chisels in order to remove the osseous structure above the tooth. In a large percentage of cases little or no more traumatic injuries are made upon the osseous tissue than in the extraction of the first or second molars.

The difference in the character of the process of repair of the two wounds being due to the extent of the pre-operative inflammatory process present, which is usually very much greater in the case of an impacted molar.

Figure 4.

We will now outline the technic which has been most satisfactory in our hands.

After the field of operation has been sterilized of its gross sepsis and anesthetized, an incision 1 c. long is made along the upper surface of the process covering the tooth. Then a vertical incision is made about 2 mm. distal to the second molar extended to a point half way between the gingival margin and the root of the second molar. (Figure 4). The triangular flap is then raised up exposing the osseous tissue surrounding the tooth. (Figure 5).

The next step is to remove by chisel and mallet a section of the process overlying the tooth to an extent that there will be sufficient space between the sec-

ond molar and the osseous structure covering the tooth to permit it to be displaced. (Figure 6). A Henahan surgical drill is then used to remove a section of the cortical bone 2 mm. in width contiguous to the buccal surface of the tooth. (Figure 7). The wedge of cancellous bone between this surface and the tooth socket is readily removed with the chisel. Then the chisel is driven between the buccal surface of the tooth and buccal process with the bevel of the chisel next the process and by a

Figure 5.

prying motion the buccal and lingual plates are sprung apart sufficiently to loosen the tooth. (Figure 8.) Figure 9 is a cross section of impacted third molar, showing thin lingual plate. Then, by means of an elevator, preferably the LeClure, the tooth is rotated backward and out. (Figures 10, 11, 12). At the stage in the operation of using the elevator, the chisel itself may be used as an elevator and the tooth removed. The elevator should never be used until the tooth is seen to slightly rotate in its socket under the stress of the chisel. Until that time, the impaction has not been relieved, and any attempt to use the elevator might result in fracture of the tooth or of process.

This same principle is followed with any degree of impaction and also with one that is not only impacted but un-

erupted as well. The cutting should all be done from the buccal surface, as there are no vulnerable tissues at this point, while on the lingual surface the

Figure 6.

lingual nerve and artery might be injured if much cutting were attempted. Under novocain anesthesia there is very

Figure 8.

There is one great point for the operator to keep in mind and that is that the impacted tooth is wedged into the jaw and the impaction has to be relieved

Figure 7.

before the tooth can be removed. This may be done with burs, drills, stones, cutting forceps or chisels. The wound

Figure 9.

The wound

made from the chisel is a clean sharp one and not rough and ragged such as made by burs. Consequently repair will take place around a wound made with a chisel much quicker than if the tissues are lacerated by burs.

POST-OPERATIVE TREATMENT.

The procedure which has been very satisfactory in the writer's hands is to incorporate euroform paste in either plain or iodoform gauze for 24 hours immediately after the operation. This preparation is antiseptic and its sedative action is most beneficial.

Figure 10.

At the end of 24 hours the dressing is removed and the patient instructed to use a warm 5% salt solution as a mouth wash.

The wound is to be kept free from all food deposits and debris by the use of sprays of 5% salt solution, until repair takes place. No curettements are necessary in these cases unless an abscess condition is present in which case curettement of the socket is indicated. In cases of post-operative pain, asperin 15 gr. may be given as a nerve sedative.

In closing I will only add that a

thoro knowledge of the pathologic possibilities of these dental anomalies, a definite technic for their eradication and

Figure 11.

a scientific treatment for pre-operative and post-operative conditions are all essential for success and that the per-

Figure 12.

sonal ability of the operator will be the predominating factor in the success or failure in their diagnosis and treatment.