THE SURGICAL TREATMENT OF CERTAIN DEFORMITIES OF THE JAW ASSOCIATED WITH MALOCCLUSION OF THE TEETH*

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With the development in orthodontic practice it is surprising that so little advance has been made in the surgical treatment of prognathism, receding maxilla and other marked deformities of the jaw producing maloc-

Fig. 1.—Diagram showing the osteoplastic resection of the lower jaw performed by Hullihen, July 12, 1848. The dotted lines indicate the lines of bone division with the saw. The triangular sections were removed from each side and the mobilized anterior segment of the jaw tilted back into occlusion.

clusion. In the main the text-books on oral surgery contain no reference to the subject and little is to be found in modern treatises of surgery. In Von Bergmann's elaborate "System of Surgery," however, four lines relate that in a successful attempt to improve the deformity of a receding chin, Von Bergmann made an extensive resection of all of the processes, including the coronoid process, and subsequently displaced the entire jaw by the aid of an artificial dental apparatus.

HISTORY OF THE SUBJECT

Over sixty years have lapsed since Dr. S. P. Hullihen,¹ of Wheeling, Ga., successfully devised and performed an osteoplastic resection of the jaw, yet the modern

Fig. 2.—Diagram illustrating how the mobilized anterior segment was tilted back into occlusion in Hullihen's operation. This segment was held in position by a silver interdental splint. The nutrition of the separated portion of the jaw was maintained through its attachment to the lip. Similar types of operation are applicable to the upper jaw.

works on dental practice and orthodontia mention but a single operation, and that similar in principle to this one of antebellum days. Dr. Hullihen's patient, a girl

of 20, had an eversion of the lower lip with elongation of the lower jaw and protrusion of the process and lower incisors from the constant traction of a scar from a burn of the neck received fifteen years previous. Although an unsuccessful attempt to improve the condition had been made by two surgeons in New York City, Hullihen, without anesthetics, at a time when hemostatic forceps and antiseptics were unknown, boldly resected V-shaped sections from each side of the jaw, the section on the left side including the bicuspid. The V-shaped sections extended two-thirds of the way, through the bone, the apices being below. From the apices of the incisions the saw was turned horizontally forward, completing the section and leaving the upper two-thirds of the anterior

Fig. 3.—Diagram showing bilateral resection of the lower jaw advocated by Angle. A segment equal to that between the dotted lines is to be removed from each side of the jaw permitting the anterior part of the jaw to be brought into occlusion. The shape of the segments removed is to be modified by the conditions present in the particular case. Blair removed quadrilateral segments.

portion of the mandible attached to the soft tissues only (Fig. 1). The removal of the V-shaped sections of bone permitted this loosened portion of the jaw to be pushed back, securing occlusion with the upper teeth (Fig. 2). From an impression taken in soft wax a

Fig. 4.—S. K., previous to operation, showing profile the result of inferior prognathism and malocclusion.

silver plate was struck up which when applied held the section of the jaw in proper position. After this operation the tissues rapidly healed and Hullihen later transplanted a large flap of skin from the shoulder and upper arm to the neck to enable the head to be raised, and finally, by two further operations, corrected the eversion and deformity of the lower lip. Although these extensive operations were successful, nearly fifty years elapsed before a second bilateral resection to improve a

* Read in the Section on Stomatology of the American Medical Association, at the Sixtieth Annual Session, at Atlantic City, June, 1909.

1. Hullihen, S. P.: Case of Elongation of the Jaw and Distortion of the Face and Neck Caused by a Burn Successfully Treated. *Am. Jour. Dent. Sc.*, 1849, p. 137.

deformed jaw was undertaken. The patient, a young man with a progressive type of prognathism, under the care of Dr. James W. Whipple, of St. Louis,² was referred to Dr. Edward H. Angle, who suggested a bilateral resection of the elongated portions of jaw between the first molar and second bicuspid on the right side

ly preparing from models accurate vulcanite or metal splints to hold the fragments in proper position. In these cases, Dr. Angle writes, "any orthodontic procedure is powerless to render improvement and the double resection becomes the only resort." The same operation was independently advocated in 1896 by Dr.

Fig. 5.—Model showing malocclusion in the case of S. K., left side.

Fig. 6.—Model showing malocclusion in the case of S. K., right side.

and the first and second bicuspid on the left. A year later, in 1897, Dr. V. P. Blair performed this operation through angular incisions below the jaw. Despite imperfect retentive appliances, making it difficult to hold the fragments in proper position and the infection of the wounds, the patient, after nine very troublesome

R. Ottolengui,⁴ to whom the idea was suggested, by observing a resection of the lower jaw for cancer. Since the time of Blair's operation double resection of the jaw has been performed but few times, and this apparently important subject has not been further developed by the orthodontist, while the surgeon, although interested in resections of the jaw for necrosis, tumor or ankylosis, apparently has not realized the field for sur-

Fig. 7.—S. K., four months after section of both rami, showing change in profile. The scar from the incision is shown.

Fig. 8.—Model showing occlusion in the case of S. K., four months after operation.

weeks, finally obtained bony union and marked improvement. Dr. Angle³ in 1898 reviewed this operation and emphasized the importance of removing V-shaped or wedge-shaped sections of bone (Fig. 3) and of previous-

gical measures for deformities beyond the range of the usual orthodontic practice.

REPORT OF CASE

My attention was attracted to this subject by observing a patient whose history is as follows:

2. Double Resection of the Inferior Maxilla for Protruding Lower Jaw, *Dental Cosmos*, 1898, p. 552.

3. Double Resection of the Lower Maxilla, *Dental Cosmos*, 1898, p. 635; see also, Bellin: *Items of Interest*, June, 1908, p. 422; Blair: *Items of Interest*, November, 1908, p. 829.

4. Discussion, Union Convention, Rochester, New York, *Dental Cosmos*, 1897, p. 143; Fowler: *Items of Interest*, January, 1897.

Patient.—Samuel K., aged 18, family history negative. No serious disease of childhood was recalled. During the past two winters he had had recurrent attacks of tonsillitis, but apart from this and a slight cold, he has had no illness for ten years.

Examination.—The tonsils were large; there was a moderate increase of adenoid tissue in the nasal pharynx; the nasal septum was inclined slightly to the right, and there was a chronic rhinitis of the hypertrophic type. The patient breathed almost exclusively through the mouth; the palate was highly arched, the dental arches were symmetrical and the teeth fairly regular, although small, short and poorly developed. Only the third molars on the left and the second and third on the right side could be occluded, the minimal separation between the upper and lower central incisors being 7 mm., and the lower centrals being in a plane at least 5 mm. in front of the upper centrals. The chin was rather pointed and prominent, and the patient said that, although the teeth were probably never in good occlusion, the condition had progressively increased during the past four years. The lips were long and the teeth did not show in ordinary conversation, so that the patient had been repeatedly asked if the teeth had been lost. In smiling and in talking the lips tended to curl in over the teeth, producing an unpleasant expression. In talking the tip of the tongue rested against the lower lip instead of the teeth so that enunciation had a mumbling character resembling that of an edentulous

Fig. 9.—Diagram showing a condition of malocclusion, the dotted lines indicating various directions in which the ramus may be divided in order to overcome the deformity.

person. The patient could not bite hard or thin masses of food except by introducing them far into the mouth. Mastication was very imperfect, the food being bolted after a slight attempt at mastication. The lips were kept almost constantly open except during speech (Fig. 4). The patient was moderately well developed, but the chest was long and narrow. He was constipated but did not complain of indigestion.

Choice of Measures of Relief.—The young man had presented himself for acne vulgaris, but the ugliness of the facial profile led me to examine the jaw and then to consider the possibility of surgical relief. At once it occurred to me that a section of both rami would be the operation of choice, but on investigation, to my surprise, I found no evidence that such an operation had ever been done previously. The patient was referred to Dr. S. H. Guilford to make sure that relief could not be obtained by any form of dental appliance. Dr. Guilford agreed as to the necessity for surgical intervention and suggested the operation of Angle. This operation seemed to me objectionable for the following reasons:

1. It would necessitate two compound fractures of the lower jaw.
2. At least one tooth with the adjacent process would have to be removed on each side, and in the removal of these two

teeth the exposure of the roots of two adjacent teeth on each side of the mandible would be almost inevitable. Thus two teeth would be sacrificed, and four additional teeth placed in jeopardy.

3. The inferior dental canal with its vessels and nerves would be divided on each side.

4. The arch of the lower jaw would be broken into three portions, would be contracted and would require a special retentive appliance.

5. As the surface of bone would be exposed to the action of saliva and to infection in the mouth a greater or lesser degree of necrosis would be almost inevitable.

In one instance this operation was followed by loss of the mandible from necrosis.

The division of the inferior dental nerve seemed the least of these objections, as this nerve often reunites after division and even were the local anesthesia resulting from the division permanent the condition is not a very troublesome one. As contrasted with this operation a section through the ramus (1) would be free from dangers of a compound fracture within the mouth; (2) would not reduce the size of the dental arch or jeopardize any of the teeth; (3) if carried out above the level of the spine of Spix need not involve the inferior dental nerves or vessels; and (4), as the bone could be reached from without the mouth under aseptic precautions, the danger from aspiration would be slight even should suppuration or necrosis ensue. The septic fluids would be discharged externally and not pass into

Fig. 10.—Result of a vertical division of the ramus. This line of section interferes with the leverage of the temporal muscle by approximating the coronoid and condylar processes and tends to cause a marked posterior displacement of the lower part of the smaller fragment.

the mouth to be swallowed or be aspirated in the lungs; (5) the proper occlusion could be produced if necessary by external pressure through a chin-cup, if need were, without the use of any interdental appliance.

As an objection to a section of both rami, my attention was called to the narrow antero-posterior diameter of the pharynx, and the danger of producing suffocation by carrying the lower jaw and the attached tongue backward. As the support of the hyoid bone would not be changed by the operation, and as it seemed to be quite feasible to reproduce the deformity should signs of suffocation follow from the procedure, the following operation was undertaken:

Operation.—The patient was narcotized by scopolamin-morphin reinforced by a small amount of ether, Dec. 5, 1908, and an incision carried through the skin and subcutaneous tissue over the posterior border of the ramus of the jaw from the zygoma to a point under and anterior to the angle of the jaw. This incision was not carried through the deeper tissues for fear of injuring branches of the facial nerve and parotid duct. The outer fibers of the masseter muscle were separated and the external surface of the middle of the ramus exposed. With a small chisel a transverse section was then made through the

ramus. The operation was repeated on the other side, and the body of the jaw then forced back, and the teeth placed in the best possible occlusion. To facilitate this a triangular segment of the ramus was removed on one side, a procedure probably unnecessary, and especially undesirable if the wedges, to be later described, had been used. The opening in the muscle, fascia and external wound was then carefully closed by buried sutures of catgut, certain of the lower teeth wired to the upper and an external plaster bandage applied. No symptoms of suffocation were produced, but on awaking the patient complained that there was insufficient room in his mouth for his tongue and that he had difficulty in breathing through his nose. The occlusion of the jaws closed the lips, and made them appear redundant.

Postoperative History.—In the after course of the case it was found that the contraction of the masseter muscles and the depressors of the jaw, by closing the triangular gap in the ramus, tended to separate the jaws anteriorly and the wiring of the teeth was found to be insufficient and was discarded. Through Dr. Guilford an interdental splint was constructed, but this likewise was not found of much advantage, so that recourse was had to pressure of an ordinary aluminum chin-cup connected by elastic bands to a head-piece. By regulating the tension of the bands it was found possible to bring the teeth into occlusion. This appliance was worn about nine

this I would not controvert accepted theories, but would suggest the thought that mouth-breathing and oral deformities may at times be the primary and enlarged tonsils, adenoids and nasal obstructions secondary conditions.

METHOD OF DIVIDING THE RAMUS

In determining the best direction for the line of section to be made through the ramus in the above case a series of interesting observations shown in the accompanying diagrams were made (Fig. 9). By a vertical section through the ramus (Fig. 10) the lower portion of the posterior fragment is pushed far back, leaving a large V-shaped gap with the apex above. The angle of the jaw is, therefore, carried much farther back than normal, while the distance between the coronoid and condyloid process is much decreased, reducing the leverage of the temporal muscle. In those conditions in which the mandible is not undershot but in which it is merely desirable to approximate the anterior teeth such a line of section might be worthy of consideration.

A section through the base of the condyloid process, as shown in Figure 11, produces less deformity but also

Fig. 11.—Result of correcting the deformity by a section through the base of the condyloid process. This line of section reduces the leverage of the temporal muscle, and from lack of fixation of the smaller fragment would seem to involve a greater tendency to pseudarthrosis than certain other lines of section.

weeks to give sufficient time for the new bony tissue to fill the gaps in the rami, but two weeks or more before the appliance was removed the patient began voluntarily to separate and to use the jaws. There was no tendency to ankylosis and the lateral and vertical movements of the jaw were well retained. As a result of the operation the patient's appearance has been greatly improved (Fig. 7), the lips have become shorter, the chin less prominent, the mouth is kept constantly closed, the enunciation of words is better, nasal respiration has been spontaneously established, food is properly masticated, the tongue is no longer kept between the teeth, the chronic constipation has disappeared, and, possibly as a result of the operation, or the cessation of mouth-breathing, there has been no attack of tonsillitis this winter, although the tonsils remain enlarged and the nasal catarrh continues.

For those who consider enlarged tonsils, adenoids and nasal obstruction a cause of mouth-breathing and of faulty development of the jaws, we have here some suggestive evidence that the correction of deformities of the jaw may conversely at times be followed by the spontaneous disappearance of the nasal obstruction and by failure of the large tonsils to produce symptoms. By

Fig. 12.—Results of a section between the ramus and the body of the jaw. The inferior dental canal is divided, the angle of the jaw increased, and the section is not so well adapted for the correction for prognathism. For lateral displacements of the jaw, this line of division, made on the side of the displacement may be useful.

reduces the distance between the condyloid and coronoid processes. The small size of the posterior fragment and the lack of extensive muscular attachment might favor the production of a false joint after such an operation.

An oblique section running from above, downward and backward through the lower part of the ramus, as shown in Figure 12, leaves the bulk of the ramus intact and produces a moderate grade of deformity. A section of this type, or one more nearly vertical, could be employed for lateral deviations of the mandible, the line of section, of course, to be made on the side toward which the jaw deviated, as the separation of the fragments by a wedge would cause the jaw to be carried to the opposite direction correcting the deformity.

In Figure 13 is shown the result of correcting the deformity by a transverse section of the ramus on a line approximating the masticating surfaces of the teeth. As this line of section gave the least secondary deformity and as both fragments are well fixed by muscular attachments, this line was the line of section decided on in the present case. The strong masseter muscle splints the

two sections and binds them firmly together. Indeed, the pull of the masseter muscle by tending to close the gap in the ramus so strongly tends to tilt the chin downward that a firm counter-support is necessary.

To obviate this we have now devised wedges of ivory or magnesium to be slipped between the separated portions of the ramus (Fig. 14), so as to put the posterior fibers of the masseter muscle on the stretch and to tilt the chin upward. In this way the chief difficulty in the after-treatment, the tendency of the chin to drop, is overcome. The wedges are very much the shape of an ordinary collar-button, the extended flange at each side tending to prevent displacement. To provide for the varying thickness of different rami I have had the wedge constructed like a small bolt, the thin flat head of the bolt being approximated to the inner surface of the ramus of the jaw, and an outer flat nut being screwed down, holding the parts firmly in apposition. Ivory and magnesium are the substances selected for the appliances, as each is susceptible to sterilization, and to absorption when buried in the tissues.

Fig. 13.—Transverse line of ramus division selected in the case of S. K. This line of section produces the least deformity, and if placed above the level of the spine of Spix enables one to avoid injury to the contents of the inferior dental canal and, moreover, does not interfere with the normal leverage of the temporal muscle. Both fragments have extensive muscular attachments serving to splint the parts after operation. The dotted line indicates the outer plate of the wedge of ivory or magnesium suggested by the author to maintain the elongation of the ramus, and to overcome the traction of the masseter muscle.

The section may be carried out by means of a small chisel, a burr actuated by a surgical engine, or the spiral osteotome of Cryer. The chisel has the advantage of the fact that it may be manipulated through a very small incision and with very little exposure of the bone. A vertical incision one inch long placed in front of the ear will enable one experienced in the use of the chisel to make the required section. Indeed, a narrow chisel may even be carried through the skin through a mere puncture and the bone division accomplished by the sense of touch alone. The section may likewise be carried out from the inside of the mouth with no external incision. The mouth is widely opened, a vertical incision made over the anterior border of the ramus through the mouth, as in Paravicini's operation, the tissues separated from the inner surface of the ramus, care being taken to avoid the internal lateral ligament, and, guided by the finger introduced through the incision, the bone divided by means of an appropriate burr or chisel.

There is some danger of necrosis of the ramus from infection from the mouth after such an operation. In a number of instances, however, in which I have exposed the inner surface of the ramus in this manner and have injected solutions of osmic acid into the inferior dental nerve, no troublesome necrosis has resulted despite the contact of the bone with saliva and an irritating chemical solution.

Fig. 14.—Wedge introduced into the line of section, viewed from behind. The introduction of this wedge overcomes the tendency of the anterior part of the jaw to tilt downward.

Besides necrosis a disadvantage in this method, however, is that an accurate approximation and support of the fragments by wedges can not be obtained and recourse must be had to interdental splints or the use of the chin-cup until the bone be united and the gap filled. Of course, in most instances, interdental splints firmly applied previous to the operation, to be later wired or bolted together, afford the best method of retention.

In considering the operative treatment of a deformity of the jaws one should not limit himself to the consideration of a single operation but should, until further advances have been made, consider the following possibilities:

1. By surgical measures it is possible (a) to change the relation between the body of the lower jaw and the rami so as to produce protrusion, recession, tilting or lateral displacement of the body of the jaw upon the ramus; (b) to change the shape of the arch of the jaw, either increasing or decreasing the size of the arch or altering its form; (c) to change the relative position of an anterior section of the jaw as related with a posterior section of the body and ramus; (d) to transplant and change the position of segments of the alveolus with

Fig. 15.—Diagram showing line of section suggested to enlarge the arch of the jaw. After the mandible has been divided as indicated by the dotted lines the segments are separated sufficiently to secure the proper occlusion and are maintained in position during the process of healing by an appropriate interdental splint or other appliance. By resecting the segments of bone indicated by XX the same line of section may be used to diminish the size of the arch of the jaw. By placing the incision anteriorly, the arch may be widened; by placing the line of section laterally one or both sides may be lengthened as desired.

contained teeth, the arch of the jaw not being completely divided, nutrition being maintained by the preservation of attachments to the soft tissues.

2. When it is found by a study of models in the particular case that a correction of the deformity and a fair occlusion may be obtained without dividing the dental arch, the preferred operation is the section of one or

both rami along the lines found to be best adapted to the particular case. This operation is useful for many cases of prognathism, receding chin, and certain lateral deviations of the jaw. In certain instances, as in hypoplasia, it may be necessary to combine it with other operations designed to increase the size of the arch.

3. Where it is desired to enlarge the dental arch I would suggest the operation indicated in Figure 15. In this operation a vertical section of the alveolus is carried two-thirds of the way through the jaw, the line section is then carried at right angles for a variable distance and the remaining third of the jaw then divided parallel to but in a different plane from the first vertical section. The arch is then to be opened by sliding the segments of the jaw on each other and fixation in the proper position secured by adjusting an appropriate interdental splint or other appliance which previously has been prepared. By doing this operation on the anterior part of the jaw the arch may be widened, and if placed laterally one or both sides of the arch may be lengthened. With a resection of the divided bone ends, this operation may likewise be used to reduce the arch at any point, or the arch may be reduced by a simple resection of a V-shaped or wedge-shaped section of bone as may be found desirable.

4. To change the plane of occlusion of only a segment of the jaw, a bilateral V-shaped or wedge-shaped resection after the method of Angle may be used or an osteoplastic section after the plan of Hurlihen.

5. Somewhat similar operations are to a lesser degree available for the deformities of the upper jaw. Kocher has shown that a transverse supra-alveolar resection on the superior maxilla is feasible, and as this operation may be used to mobilize one-half or the entire dental arch, it is obvious that it will enable decided changes in position for the correction of deformity. The separation of the superior maxilla in the mid-line or a plastic displacement of a portion of the alveolus with the contained teeth is likewise feasible. Unfortunately most of these operations are more difficult and attended with more serious hemorrhage and other complications than the operations on the lower jaw. The fixation of the mobilized portions of jaw after these operations, however, involves less difficulties than in the case of the mandible.

The above operations are briefly mentioned to indicate the surgical procedures which may be employed for the correction of deformities when the less serious orthodontic measures are unavailing and to stimulate the development of this field. A consideration of forms of malocclusion resulting from the diseases of the temporomaxillary articulation and malformation of the bone which interfere with the normal movements of the jaw is considered beyond the scope of the present paper.

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ABSTRACT OF DISCUSSION

DR. J. E. NYMAN, Chicago: I think that the successful operation reported presents a solution of the distressing conditions which are so frequently brought to our attention, and for which orthodontia can do little or nothing, and that is unilateral hypertrophy of the jaw between the shaft and the ramus. I have had three cases of unilateral hypertrophy in a practice of about fifteen years. Unfortunately I could suggest no operation which bade fair to produce favorable results. It seems to me that this operation will be of especial service in unilateral hypertrophy.

I think that frequently the fact that there is delayed union along the lines of section where a saw or burr has been used, is not so much because heat has been developed, but because of

the fact that innumerable spicules of bone have been left which act as foreign bodies which must be absorbed or thrown off before regeneration and formation of new tissue can take place.

DR. GEORGE V. I. BROWN, Milwaukee: Dr. Babcock's paper is a beautiful exposition of his subject and of the method of his operation. The result is phenomenal. I did not believe such a result could be secured and have hitherto felt it safer to cut off the entire anterior portion of the jaw and have some dentist put in bridge work to complete the case, as was done in one of my cases in which the jaw extended so far forward as to make this possible. In another case the jaw was too short and we gave prominence to the chin, yet both resulted from burns.

I have looked with a good deal of skepticism on operations that have been described and recommended from time to time for patients requiring removal of sections of the jaw as described by Dr. Babcock, but his description is so complete and the result so perfect, that I see the promise of great good results in the future.

DR. S. L. McCURDY, Pittsburg, Pa.: In a case similar to this which came to me a few months ago there was much separation of the incisors. The molars came together and there appeared to be a projection. I decided as the easiest and best operation to extract the lower molars and then chisel away the alveolar process as far as necessary, so that when the mouth was closed the incisors came in contact; the upper molars did not come in contact with the place where the lower molars had been extracted, and after that I removed two teeth, one on each side. Later the dentist made an appliance which increased the number of teeth which could be used for mastication, and the result was satisfactory; not, however, so satisfactory as that obtained by Dr. Babcock, and I think this will be the operation selected in the future.

DR. A. R. DRAY, Philadelphia: I feel indebted to Dr. Babcock for demonstrating his operation for the cure of a condition which hitherto has baffled the best efforts of the orthodontist and the dental surgeon. I did not exactly catch how Dr. Babcock immobilized the lower jaw while union was taking place. He referred briefly to an interdental splint, a poor thing at best. In case of ordinary fracture I think he would be tempted to discard appliances placed beneath the chin in order to prevent mobility. Wiring together the teeth of opposing jaws I have found is a splendid way to maintain a fixed position for fractures, and the operation described by Dr. Babcock is of course for a fracture of the inferior maxilla.

DR. S. L. McCURDY, Pittsburg, Pa.: I should like to place myself on record at this time in connection with the question of repair of bones. I have been practicing the wiring of long bones by allowing them to remain *in situ*, recognizing the fact that when a bone was disturbed at the point of fracture or when we had an ununited fracture which required wiring, if during the process of freshening the ends of the bones or sawing them off they were torn and dragged about, and the soft tissues attached to the ends of these bones torn loose and the peritoneum stripped, we could not expect to have repair of the bone. I make this statement because I have seen a number of these operations performed, and the general surgeon usually does a through and through wiring which requires a great deal of destruction of soft tissues. The soft tissues must be preserved about the field of operation or nutrition will be destroyed and exfoliation will result in addition to the fact that there will be no union.

In a paper I read in Boston recently I described an operation of wiring which did not include a complete through and through drill, but a wiring of just half the bone. With the notched drill one can pull the wires through from the central canal.

DR. W. BABCOCK, Philadelphia: The advantage of the chisel is that it enables one to work through a very small opening, does very little injury to the adjacent bone, and at the same time forms a very linear incision. The operation may be done in a very simple way, similar to an osteotomy of a long bone, by puncturing the soft tissues and carrying the chisel to the bone, the division of which occurs under the sense of touch. It is possible, therefore, to make this line of section with prac-

tically no external disfigurement, and with little injury to the adjacent tissues. The objection which is raised to the chisel when used on the skull, the concussion of the brain, hardly holds when one deals with the mandible, since this bone is fairly insulated from the skull proper.

Regarding the great field of purely orthodontic methods, I would again emphasize the fact that the oral surgeon in this field of work should be the associate and assistant of the orthodontist, and he must depend on those skilled in orthodontia to tell him when operation is necessary. In this case, I felt it was not proper for me to operate without putting this patient in the hands of my dental colleague to see if something could be done without operation. Moreover, after the operation has been done, as in this case, there often will remain some residual deformity to be corrected by appliances. The surgeon hews out the rough structure and leaves the finishing touches to be worked out later by the dentist.

In answer to the other questions, I would say that I first wired the teeth and depended on a plaster bandage, but the tension pulled the wires from the teeth. The degree of the pull during the first days is amazing. The condition is one in which the surgeon is really lengthening the ramus, and the attached muscles contract to prevent this lengthening. The result is that one has at the long end of the lever a traction which requires firm retention, preferably a full interdental splint. In this case, after wasting two or three weeks with plaster bandages and other appliances, I depended entirely on a chin cup with strong traction by rubber bands. In the interval the jaw had slipped slightly forward and the bone had partly filled in and something of the original correction was lost. This was left on in all about nine weeks. During the last three the patient began to chew food and use his jaws. It has been said that there is a danger theoretically of death with this type of operation. I think the mortality will be extremely small, as there is no danger from the inhalation of septic material, as when the mucosa is incised.

The oral surgeon is very fortunate in that he deals with bones especially well supplied with nourishment. He can do more than can the general surgeon—he can produce more mutilation and get better final results than perhaps can be obtained in any other part of the body. Those of you who have seen the crushes of the bones of the face, and have seen how the fragments unite after being placed in position will realize this. The perfect immobilization of bone fragments in the treatment of fractures seems to reduce the amount of callus formation. Too much callus, on the other hand, might give deformity. Although there was some play in this case, not enough callus was thrown out to be disfiguring. The bones of the head as a rule produce very little callus.

It makes little difference what else one uses so long as the teeth are kept properly together there is very little tendency for the fragments to slide one way or the other, as they are immobilized by the muscles.

INFANTILE ECZEMA *

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Infantile eczema occupies an important place in the clinic of children's diseases, and frequently presents great difficulties in its management. The etiology and pathology of this affection are as yet but little understood, and knowledge concerning them is needed. Even the most distinguished pathologists are not agreed as to the entire clinical history of this morbid process, whether by infantile eczema we mean a definite disease or merely a symptom of some unknown process. It is the purpose of this paper to discuss briefly some of the more recent views expressed on this matter, and to present the clinical history of the affection.

ETIOLOGY

At the outset attention must be directed to the confusion which might arise through considering this form of eczema with other skin eruptions produced by irritation, such as that caused by dirt, perspiration, etc. The most rational view, based on clinical observation, would be to consider eczema an external manifestation of some internal disorder. Careful observation of these cases confirms a first impression that the lesion on the skin may be compared with a barometric index which fluctuates with the prevalence of internal storms. The skin lesion may have exhibited a tendency to disappear or at least to abate somewhat, though concomitantly with an attack, moderate or severe, of indigestion, or because of some error or indiscretion in diet, the disease reappears and spreads with great activity. In a word, it may be stated that true eczemas in children are dependent on constitutional disturbances. The presence of bacteria in the secretions or on the denuded surface may be the result of a secondary infection and should not be considered as positive evidence that there exists between these germs and the disease a causal relationship. Some of the older authors may be quoted in corroboration of this belief.

Henke¹ thought that eczema was due to overfeeding, both in quantity and quality. Jorg² noted that these eczemas occurred more frequently in well-fed, fat babies, and thought that overfeeding played an important part. Similarly, Bohn³ thought that the disease was due to overfeeding and constipation. The French authors lay great stress on hereditary influences as causes of the disease. Thus, Comby⁴ thinks that arthritis, eczema, gout, obesity, asthma and various neuropathic states in the parent tend to cause eczema in the offspring. That this view is based on facts is corroborated by every observer's clinical experience. In very many of these cases it is found that the family history shows distinctly evidences of gouty and arthritic states and allied conditions.

L. F. Meyer thought that overfeeding, especially of such organic foodstuffs as casein and fat, gave rise to an excessive elimination of salts in children. Leighton,⁵ on the other hand, is convinced that eczema is frequently of neurotic origin, even in those cases in which some external irritant is active. He recognizes two forms of eczema, (1) the idiopathic or ganglionic form, originating along the tract of the sympathetic nerves, and (2) the peripheral or traumatic form.

Variot⁶ asserts that well-developed children, especially, and breast-fed, as well as artificially nourished children, are attacked by the disease.

Gaucher found an inhibition of metabolism in every case of eczema, with an increase in the nitrogen extractives and the chlorids and a diminution in uric-acid excretion. He regards eczema as an autointoxication, the poisons being eliminated through the skin, and these poisons being the result of incomplete oxidation of the nitrogenous products.

Marfan⁷ classifies these cases in two forms: The first form is characterized by the localization of the eczema on the scalp, the eruption being moist and crusty. Associated with the scalp eruption is a wet or crusty eruption on the cheeks and ears, the rest of the

* Read in the Section on Diseases of Children of the American Medical Association, at the Sixtieth Annual Session, held at Atlantic City, June, 1909.

1. Henke: *Handbuch für Kinderkrankheiten*, 1809.
2. Jorg: *Handbuch für Kinderkrankheiten*, 1826.
3. Bohn: *Jahrb. f. Kinderh.*, 1868.
4. *Rev. mens. d. mal. de l'enfance*, v. 521.
5. Leighton: *Brit. Med. Jour.*, June 27, 1908.
6. Variot: *Gaz. d. Hôp.*, Paris, 1906, p. 951.
7. Marfan: *Semaine méd.*, 1894, p. 138.