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SURGERY OF THE TEMPOROMANDIBULAR ARTICULATION.*

DR. L. W. DEAN AND DR. W. F. BOILER, Iowa City, Iowa.

The proximity of the temporomandibular joint to the middle and external ear makes it of particular interest to the otologist. The fact that it is so frequently involved in diseases of the tonsils and of the peritonsillar structures and in dento-alveolitis makes it of great importance to the laryngologist.

It is not unusual for patients to come complaining of sore throat with a disturbance of occlusion and feeling that the whole trouble is in the throat, when an x-ray picture of the temporomandibular joint will show a collection of fluid between the condyle and the socket. This condition may be secondary to a throat lesion or the result of a focus of infection in some other part of the body. In our experience the patient usually refers the trouble to the ear; but the x-ray pictures in the presence of an apparently normal ear, demonstrate the trouble to be in the temporomandibular joint.

It is not our intention to review the surgery of the temporomandibular joint. Murphy and Kreuzer¹ have recently published a comprehensive review of the matter and we anticipate you are familiar with this report. Following such a comprehensive and exhaustive treatment of the subject it would be a waste of your time to again have the matter reviewed. Consequently, we are going to confine the paper to a report of several cases with trouble in the temporomandibular joint which we have had during the past year and which have presented some very unusual features.

*Read before the American Academy of Ophthalmology and Otolaryngology, Memphis, Tenn., Dec. 11, 1916.

Case I. A case of bilateral complete true bony ankylosis of the temporomandibular articulation which was either congenital or acquired immediately after birth.

The case which we have to report was one of both true and false ankylosis, in that there was an osseous ankylosis of the joint itself, the true ankylosis, and in addition to this cicatricial tissue between the neck and ramus of the bone and the surrounding tissues and between the coronoid process, the zygoma and the neighboring structures, producing a false ankylosis. In our experience almost every case of true ankylosis has associated with it a false ankylosis.

The condition in which the mandible cannot be moved apart from the maxilla a normal distance is known as ankylosis. Brophy² quotes Blair's statistics and states that they are in accordance with his own observations. In his series trauma was the most common single cause. Nearly 50 per cent of all cases were due to this factor. A blow or a fall on the chin was the most frequent single trauma. He places scarlatina as the second factor causing ankylosis. Suppuration following this disease accounts for about 20 per cent of the cases. The following diseases play a part in the order named: Otitis media, dento-alveolar abscess, typhoid fever, pneumonia, measles, variola, diphtheria and rheumatoid arthritis.

So-called congenital temporomandibular ankylosis is very unusual, also that due to trauma at birth or during delivery. The prevalence of ankylosis of the mandible during childhood appears logical when we consider that accidents and many of the infectious diseases to which it is due are more prevalent during the early period of life.

Ankylosis of the joint may appear soon after the trauma or many months later.

The obstetrical forceps may cause fracture of the base of the cranium or of the mandible near the joint in the new-born and ankylosis may follow. Such cases may be mistaken for congenital ankylosis of the mandible.

A. E. White, female, six years of age. Referred by Dr. J. D. Cantwell, of Davenport, Iowa.

Entrance complaint: Lower jaw trouble.

The child has had the mandible retracted since birth and has never been able to open the mouth at any time more than one-eighth of an inch. Early in life the child was not able to nurse properly, and the mother attempted to force the mouth open by using her finger as a wedge. In this she was not successful.

The mother was a bleeder and during the birth of the two preceding children, she had had a great deal of trouble, and at the last delivery, almost died. During the delivery of the child under consideration, owing to very poor heart action and very little strength and after prolonged labor, it was necessary to apply forceps.

The attending physician discovered the ankylosis right after birth. He examined the child at the time of birth and his impression at that time was that the trouble was a congenital affair. During the first eight months of the child's life she cried almost continuously. She had mumps when four years of age, and measles at five.

Examination: Mandible retracted and ankylosed. Amount of movement of mandible enough to clear the teeth about one-eighth of an inch. The child throughout her life has never been able to insert even the tip of the tongue between the incisor teeth. The angles of the jaw are laterally very prominent and there are deep indentations inferiorly just anterior to the angles. The mandible is very poorly developed and there is an overhanging bite of fully three-fourths of an inch.

The skull, bones of the face and superior maxilla are well developed.

The teeth are reported upon as follows by Dr. Fenton: "Upper lateral temporary incisors not present. Radiographs show permanent lateral incisors in alveolar process. Upper temporary right and left cuspids badly decayed with pulps dead. Lower left temporary lateral not present."

X-ray examination of the mandible: Unfortunately prints from these x-ray plates do not show the changes well. These can only be seen properly by a stereoscopic examination.

Right mandible: Body very thin, so much so that anteriorly there is only a paper plate of bone between the unerupted teeth and the margin of the jaw. The coronoid process appears with the apex above the upper margin of the zygoma. In front of the angle of the jaw, the body is bent obliquely downward. Just in front of the angle is the first permanent molar; above it high up in the ramus, really in the body of the coronoid process, is the second molar bud. The condyle seems to be crushed, the top is blunt and in the socket. The eminentia articularis which can hardly be seen is apparently flattened.

Left mandible: Appearance of body, ramus and coronoid process the same as the right. The condyle seems fractured, pushed down and back, being higher and further back than normal. Condyle fits into a square socket.

Diagnosis: Fracture of the neck of the condyle with crushing of the condyle on each side. Fracture of the angle on each side with mandibular bilateral true bony ankylosis.

Operation: Resection of the neck of the condyle following the procedure as described by Murphy in 1902, with resection of the coronoid process of the left mandible. Under ether anesthesia, the joint was exposed by making an incision one and one-eighth inches long beginning just in front of the ear and extending along the superior border of the zygoma. From the anterior end of this incision a short incision about one-half an inch long was made upward and forward so as to avoid injuring the temporal and orbicular branches of the facial nerve. At the posterior end of the incision a second incision perpendicular to the first, about two inches long was made. The edges of the wound were drawn downward, the lower lip being displaced down below the lower border of the zygoma. The tissues were displaced downward until the neck of the condyle was exposed. The skin and the tissues in the lower part of the wound could be tightly retracted using a blunt retractor without injuring in the least the facial nerve. The articulation was fully exposed and no evidence of a joint could be discovered, the head of the mandible seeming to fuse with the socket in the temporal bone. Using a wedge between the jaws to tell when there was any loosening of the joint, the neck of the condyle was attacked with chisel and hammer. A v-shaped groove was chiselled across the neck and pieces of bone removed with small rongeurs. This was continued until the wedge indicated that the bone was divided. The wedge was used by Dr. Fenton. It was especially constructed of very dense wood and was used by him as a pry to tell when we had a movable mandible. When the mandible was loosened, using rongeurs, the condyle and the upper part of the neck were removed. No protector was used for the internal maxillary artery; none seemed to be necessary. The small vessels were ligated and the hemorrhage controlled with hot water and adrenalin.

The next step was the preparation of the fascial flap. The triangular flap of skin outlined by the incision was elevated. A u-shaped flap of fascia and muscle one and one-half inches wide and two and one-half inches long having its base at the upper margin of the zygoma was elevated from the surface of the temporal muscle. The flap was freed from above downward; it was left attached to the zygoma, folded down into the wound, the lower end being tucked down underneath the upper margin of the ramus

of the mandible. The flap was held in position by means of two catgut sutures, one placed at the anterior-inferior angle, and one at the posterior-inferior angle of the flap. The coronoid process which was underneath the zygoma was found bound tightly to the zygoma and it was excised before the flap was placed in position. The jaws were now widely separated by Dr. Fenton, using a wedge and a plastic gutta percha wedge was placed between the teeth of the right side and fixed in position. This was done to prevent the upper end of the ramus of the jaw from pressing the flap and causing necrosis. The skin wound was closed, tincture of iodine applied to the wound and no other dressing was used. This operation was performed on August 6, 1916.

On August 23, 1916, a similar operation was performed upon the left side. So far as we could determine there was no involvement of any of the branches of the facial nerve following either operation.

About three weeks following the operation upon the right side there was some infection underneath the skin on that side. The skin was incised and a very slight amount of pus escaped.

The healing of the left side was uneventful. Following the operation upon the left side the teeth were held apart about one and one-half inches by the two gutta percha wedges which Dr. Fenton had placed, one on the right, and one on the left side.

It was interesting to watch the little child lie in bed, protrude her tongue, draw it in and protrude it again. It was an amusing thing to the child because she had never been able to even insert the tongue between the teeth. The mother said she had never seen the child's tongue before.

On August 30, 1916, that is one week following the operation upon the left side, Dr. Fenton removed the two wedges of gutta percha from between the teeth. At this time the patient could move the jaw nicely, so as to open the mouth one and one-half cms. The mouth could be shut tightly. The jaws could be closed so that the occlusion was fairly good. At this time Dr. Fenton began daily passive exercises, using a wedge to pry the mouth open. These exercises were continued for two months, being given daily. At this time the patient went home. The patient could open and close the mouth finely. The opening was about two-thirds that of the normal.

In connection with the operation for ankylosis of the temporo-mandibular articulation we would like to make one point, namely, always make the fascial flap much longer than it seems necessary in

order that it may be tucked down in the wound without any tension on its attachment to the zygoma.

Case 2. Ununited fracture of the body of the mandible on the right side anterior to the angle. Healed fracture of the neck on the left side with true bony ankylosis.

H. L., white, male, fifty years of age, came under our observation on August 22, 1916, because of ununited fracture of the right side of the mandible with inability to move the mandible.

On April 23, 1916, the patient was kicked upon the right side of the lower jaw by a horse. There was a comminuted fracture anterior to the angle. This was wired at the time.

Examination showed that the fractured ends of the bone on the right side were widely separated. The posterior fragment extended laterally beyond the anterior. There was nothing about the fracture to suggest why the left side of the mandible was immobile and why the jaw was kept in the open position. Inquiry failed to reveal any history of injury on the left side.

X-ray examination: Right side, fluid in the temporomandibular socket. The margins of the fragments were widely separated. Left side, an old fracture of the neck was discovered.

With this patient we felt that we had to deal with a very difficult problem indeed. This patient had come to us because of an ununited fracture on the right side. In order to get a good result here we felt that it was necessary to bring the parts in apposition, hold them there by some appliance, keep the mandible at rest until healing took place.

We had discovered also a bony true ankylosis on the left side. In order to get a good result here we thought it would be necessary to exsect the condyle, make a fascial flap and then exercise by passive motion this new joint for a number of weeks. The matter was explained to the patient and we advised, first, the correction of the ankylosed joint. This to be followed weeks later, if necessary, by a correction of the ununited fracture.

The operation previously described was performed upon the left side. One week later, the exercise of the mandible with the wedge was begun.

One week following the operation when the gutta percha was taken out, the patient had good occlusion. The motion of the mandible was a little over one-half inch. The passive motion was continued for five minutes daily and continued for three or four weeks, at the end of which time the patient could open and close his mouth in a normal manner.

Following the exsection of the neck on the left side the pieces at the point of the old fracture were brought in fairly good apposition. Much to our surprise without any operative procedure or appliance being applied to the point of fracture and with the daily passive exercises in order to get motion of the joint, the ununited fracture healed, giving the patient a fairly good result without a second operation, to us a most unusual condition.

Case 3. A case of bilateral forward dislocation of the mandible of almost five months' standing reduced by manipulation.

The interesting thing in connection with this case is the length of time that the dislocation existed before it was reduced. The dislocation occurred in September, 1915. At that time the family physician, Dr. Doering, of Fort Madison, Iowa, wrote and stated that he had a patient with a double dislocation of the mandible and he would like to have her come for treatment right away. For some reason or other the patient postponed her visit to us until a period of almost five months. We had come to the conclusion that the patient did not have a dislocation of the mandible because we could not conceive of a patient with a condition like this not having something done to correct it.

What was our surprise when at the end of this time the patient presented herself at our office with the open mouth and all of the characteristic symptoms of a bilateral dislocation of the mandible.

Brophy³ reports that Hay successfully reduced a dislocation after twenty-three days; A. Cooper and Stromeyer after forty-two days; Hutchinson, sixty days; Demarguay, eighty-seven days; Donovan, ninety-eight days; Milton, one hundred and fourteen days; Pollock, one hundred and twenty days; Nichor and Gosselin, one hundred and thirty days; Golding, one hundred and thirty-six days, and McGraw⁴ has corrected a bilateral dislocation of four months' standing. Our patient had the double dislocation of almost five months' standing at the time of the operation.

The patient, M. R., white, female, thirty-three years of age. In September, 1915, while yawning, she found that the lower jaw remained immobile in the open position and it has remained so since. It was painful at the time and remained so for a few days. Since then there has been no pain, but the patient has not been able to close the mouth. Naturally, the patient could not bite or chew. Attempts were made to replace the dislocation before the patient came under our care, but these were unsuccessful. She presented the typical facies of a bilateral dislocation of the mandible. The inferior incisors protruded one centimeter beyond the superior.

X-ray examination: The right side shows the condyle dislocated forward underneath the zygoma in the zygomatic fossa. The protrusion of the whole mandible is nicely shown.

The patient was able to open the mouth three centimeters. Anterior to the ear was a depression formerly occupied by the condyle. The condyles could not be felt as they had slipped forward underneath the zygoma in the zygomatic fossa. Malocclusion of the third degree. No deviation to the right or left.

Operation: January 31, 1916. Ether anesthesia with a preliminary injection of morphin. Under deep anesthesia an effort was made to replace the dislocation by placing between the molar teeth a rubber wedge containing an iron core, and exerting pressure upon the symphysis upward. This was not successful. The condyles were not moved in the least.

Over the zygoma of the right side an horizontal incision through skin and fascia down to the bone. Incision posteriorly extending slightly upward, the length of the incision being two inches. The incision extended down to the bone. The zygoma was separated from the malar bone anteriorly. The posterior incision through the zygoma was made as far back as possible, using a Gigli saw. An attempt was made to leave the zygoma attached to the masseter muscle when it was turned down, but in this instance the piece of bone fell off on the floor and was lost. The masseter muscle was turned down and the condyle exposed in the zygomatic fossa. Using a wedge, and using the base of the skull as a fulcrum, applying the point of the wedge to the condyle and also exerting pressure upon the symphysis, the condyle was forced back in position.

The same operation was performed upon the left side, except in this instance the zygoma was not lost but remained attached to the masseter muscle.

When the left condyle was forced back in position the right came out of the socket. A second wedge was used to hold the left condyle in the socket and then following out the procedure as outlined above, the right condyle was again forced back in the socket.

On the left side the piece of the zygoma was placed in its proper position, sutures being placed through the periostium of the zygoma and the neighboring bone. On the right side the masseter muscle was stretched back in position and the wound closed with silk worm gut. During this time the mandible was held in position by firm pressure. A Barton bandage was now applied.

The patient made a nice recovery, having no deleterious effects from the operation or from the anesthetic. Saline and brandy were

administered per rectum immediately following the operation. Six hours after the operation, water was administered through the nose by catheter. The patient was fed in this way until the Barton bandage was later removed. Four days after the operation the stitches were removed. Fourteen days after the operation the Barton bandage was removed and left off. At this time the patient had good motion of the jaws. The occlusion was perfect, at least as good as before the dislocation and the patient could open her jaws three centimeters.

The patient went home on February 25, 1916, that is, about three and one-half weeks following the operation. At this time she could open her mouth to a distance of four centimeters and mastication was excellent.

So far as we are able to determine, the method of replacing the condyle, using the wedge, is original.

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State University of Iowa.

Speech Conflict as an Etiological Factor in Stuttering. MAY

K. SCRIPTURE AND O. GLOGAU, *Jour. Nervous and Mental Dis.*, Jan., 1916.

The analysis of the authors' statistics makes them conclude that speech conflict is an etiological factor in stuttering. Among 171 male patients the stuttering in 33 was apparently brought about by speech conflict exclusively; in 4 cases negligent lisping in their own language had existed. However, in 29 female patients there was only one in whom the stuttering could be attributed to this cause. The striking feature concerning the stutterers from speech conflict is the fact that the stuttering was acquired at the ages of from 5 to 7 years. In 38 cases the etiologic factor proved to be a conflict between the mother tongue at home and the English to be learned at school.

P. F.