

In all these operations done by Dr. Thomas G. Morton and himself at the Orthopædic Hospital, making a total of about fifty operations, there had been no suppuration and no loss of tissue by sloughing. And in no foot in all this series had there been failure to get very much better position than it had before the operation. There had been freer motion after the operation of excision between the bones of the leg and the tarsus than normally exists; but this does not interfere with locomotion.

DR. THOMAS G. MORTON added that in the removal of the astragalus for inveterate club-foot, general tenotomy is always required, as well as section of all the flexor toe tendons, also the removal of any portion of the tarsus, or section of soft parts, which in any way obstruct the restoration of the foot to a normal position without tension. This has been the practice at the Orthopædic Hospital for many years, and the results have been most successful, the case exhibited being in nowise an unusual one, except in the excessive deformity of which it was the subject.

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*Stated Meeting, November 4, 1895.*

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#### DEFORMITY FOLLOWING GUNSHOT WOUND OF THE LOWER JAW.

DR. J. EWING MEARS exhibited a patient with "gunshot wound of the lower jaw involving the cavity of the mouth." The patient was a man thirty-six years of age, who, at the time of the injury, was a fireman on a passenger train which was passing through the Indian Territory. A short distance from a station the train was signalled, and, as it did not stop, a volley was fired into the cab by robbers. The only person injured was the patient, who was struck on the right side of the face by a ball from a Winchester rifle, the ball passing through the jaw into the cavity of the mouth, taking away a part of the tongue, and removing all of the teeth of the lower jaw except three on the left side, coming out through the lower lip, destroying a great portion of it. He recovered, but with great deformity, hav-

ing lost the greater portion of the lower lip and of the anterior portion of the chin, some of the bone having been removed by the ball. Owing to the inflammatory condition which followed, the tongue was fastened to the floor of the mouth. The injury was received in September, 1893, and six months afterwards the railroad company sent him to New York, where efforts were made to bring the two fragments together. This operation, owing to the pressure made upon the larynx was not completed, but the tongue was partially released. He was in New York for two months, and came under Dr. Mears's care the last of August, 1895. The saliva was constantly pouring out of his mouth, owing largely to the absence of the buccal space on the right side. The operative treatment was in two stages. It was desired first to secure a buccal space, and then to reform the lip, after which it was intended to have an artificial denture made which would fill in the space caused by the loss of bone. Ligatures were placed between the fragments of the jaw and the cheek, and in that way the tissues were gradually divided; three ligatures were used altogether. A flap was then turned up and brought into the space between the portions of the lip remaining, so as to quite fill it up, and it has now nearly a continuous border. The triangular opening which was formed was closed by pins and sutures. Union took place normally. In order to enlarge the buccal space incisions were made inside of the mouth from the left side around to the ramus on the right side, cutting loose the tissues clear to the alveolar border, and the wound was packed with a 5-per-cent. iodoform gauze. There is now a space which is certainly three-quarters of an inch in depth, in which an artificial denture may be placed. Saliva does not now escape from the mouth. An artificial denture, temporary in character, will be placed in the buccal space for some time. Already the mucous membrane has covered the raw surface on one side. He cannot at present project the tongue, as it still requires further loosening.

DR. THOMAS S. K. MORTON said that he had a somewhat similar case within a short time in a young man who, eight years previously, was firing a fowling-piece, when it exploded and tore open the left side of his face, including both lips and cheek up to the zygomatic process. The entire buccal cavity was laid open upon that side, making a huge wound. This finally healed, leaving his lips some half inch apart at the left outer angle. An enormous cicatrix bound the two jaws together like an iron strap, his mandible remaining fixed in firm contact with the upper maxilla for several years; he having

been nourished during that time on fluids, never having seen his tongue, nor been able to take solid food. The cicatrix was extensive, binding the entire left lateral portions of the upper and lower jaws together. The reporter determined to excise the left outer angle of the mouth, where the lips were wide apart; to attempt to remove the cicatrix from the jaws; to pry them open if possible, and then to unite the lips in a more presentable shape. All of this was accomplished, but the amount and density of the cicatricial tissue was almost incredible. The jaws were forced open with pliers to the extent of one and a quarter inches; the great mass of cicatricial tissue was cut away from its attachment to the bones, while that portion involving the lips and angle of the mouth was dissected out. This permitted accurate suturing of the freshened lips. At the end of three or four days the sutures were removed and another attempt was made to separate the jaws with the pliers. This proved successful in getting the jaws apart, but the wound partially separated out on the cheek. Fortunately, the lips did not separate where united. Quite a hole, perhaps half an inch in diameter, opened into the mouth, but subsequently closed by granulation.

His physician, two months after operation, reported that he was easily able to maintain the movement and full separation of the jaw by daily use of his pliers, and could partake of solid food. The wound had united firmly and his personal appearance had been much improved.

DR. J. EWING MEARS said that this case of Dr. Morton's belonged to a class of cases in which occlusion of the jaws occurs as the result of cicatricial tissue. He had had a number of these cases, one of the most interesting being in a woman, thirty-two years of age, living in Texas, who came to him with the jaws firmly closed, the closure having taken place when she was eight years of age. It was the result of cicatricial contraction following ptyalism. The lower jaw was not of any greater size than that of a little child of eight years of age. There was great projection of the upper jaw, which was largely developed. He emphasized this point because he had found in other cases, where there had been a bony ankylosis, that after operation the use of the jaw very much facilitates the development of the tissues of the face. One case, who was not able before the operation to grow any beard, after the operation grew and now wears a very heavy one. He had learned from some experience in cases of occlusion due to cicatricial contraction that simply to

divide this cicatricial tissue and to force open the mouth by means of wedges or levers generally resulted in failure. His plan was to introduce ligatures behind the cicatricial tissue and to allow them to remain loosely between the integument and the cicatricial tissue for a time, in order that the mucous membrane may be formed in this channel. The principle is the same which is observed in dividing web-fingers.

#### LIGATURE OF THE SPERMATIC CORD FOR CONDITIONS OTHER THAN HYPERTROPHY OF THE PROSTATE GLAND.

DR. J. EWING MEARS presented specimens from dogs upon which the operation of ligature of the spermatic cord had been performed, and remarked as follows :

At the meeting of the Academy in November, 1894, I read a brief paper on "Ligature of the Spermatic Cord in the Treatment of Hypertrophy of the Prostate Gland," in which this operation was advocated as a substitute for that of castration, which had in a number of instances been performed, but which it was thought would not receive general sanction by reason of the objections entertained by patients to the removal of the testes, to the mental and moral condition provoked by the operation, and the legal questions which might arise. The operation in itself was not regarded as entirely free from danger, although it did not involve the section of large tissue surfaces. Since the reading of this paper, I have taken occasion to perform the operation of ligature of the spermatic cord in dogs in order to determine (1) the conditions accompanying the operation; (2) the preferable method of operation; (3) the effect produced by the operation upon the testes and prostate gland. Three dogs of full growth—in apparent good health with the testes fully developed—of the setter and spaniel breed were selected, and the cord ligatured in the following manner :

In the first the cord on each side was exposed by an incision and an aseptic silk ligature was applied, the ends cut off, and the wound closed by interrupted sutures of aseptic silk and sealed by collodion and iodoform gauze.

In the second animal an attempt was made to ligature the cord subcutaneously. Owing to the absence of the proper needle the effort was a failure, and the ligatures could not be firmly applied to

the cord. It was hoped, however, at the time of the operation sufficient pressure had been exerted to occlude the artery.

In the third animal on one side the cord was exposed, a double ligature applied, and the cord severed between. On the other side the cord was exposed and tied with a single ligature. The material used in the operation on this animal, ligatures and sutures, was made of hemp, which had been immersed in a carbolic solution. The closure and treatment of the wound were the same as in the first instance.

As to the conditions accompanying the operation, the care of the animals after the operation, owing to circumstances beyond control, was of such a character as to make it not possible to decide whether the conditions which supervened in the first and second, suppuration at the site of the ligature, were the result of defective treatment or of the mutilation of tissue incidental to the operative procedure. The stitch abscesses were undoubtedly caused by the efforts of the animals to dislodge the sutures. In the third animal the wound healed without suppuration. The inflammation which occurred in the first and second animal was not of a severe character, and did not, as reported by the attendant, make any marked impression upon the health of the animals.

As a result of the conditions which appeared after the operations, it is difficult to make affirmation as to the preferable method of applying the ligature, unless it would be to the effect that the open method provided conditions most favorable to primary union. This method not only insures inclusion by the ligature of the entire cord, but it affords means for drainage in the event of the occurrence of suppuration.

The specimens taken from the animals at the expiration of seven weeks from the time of operation were presented for examination. In those removed from the first and third animals there are present marked evidences of atrophic changes in the testes and prostate glands. Reduction of the testes to what may be fairly stated to be one-third the normal size, with evident reduction in the size of the prostate gland, has taken place. Microscopic examination of sections which had not been very well made showed that the changes which had occurred in the testes were those of disintegration, due undoubtedly to the absence of proper nutrition. Some changes in the structure of the prostate gland were also observed, but not sufficiently marked were they to establish their character.

If from such limited observations conclusions can be drawn, it

might be proper to affirm that (1) ligature of the spermatic cord will produce atrophic changes in the testes and prostate gland. There is reason to believe from the observations made that the changes which occur are sufficient to obliterate the functions of these organs, consisting as they do undoubtedly in structural disintegration. The vascular supply interfered with by the ligature of the cord is that which gives nutrition to the secreting elements of the testes. Sufficient blood-supply it is believed is derived from other sources, and is distributed in such manner to the testicular coverings as will prevent gangrene of the organ.

(2) The effect on the prostate gland produced by ligature of the cord is shown to be the same as that produced by castration,—that is, atrophic changes. Castration undoubtedly destroys functional activity of the prostate gland, and is accomplished through the well-established anatomical and physiologic relations of the two organs. Structural disintegration through which the function of the testes is entirely obliterated will accomplish the same result, and this can be produced by ligature of the spermatic cord.

Ligature of the cord is an operation to be preferred to castration, for these reasons: (1) If any distinction can be made as to danger it should be in favor of the former. (2) The mental and moral effect produced by the removal of the testes would in most cases be very marked; the mere suggestion of the operation would be sufficient in many cases to elicit a refusal. The proposition to perform an operation similar in character to that for the relief of varicocele with the statement always that obliteration of the function of the testes is expected to result, it is believed would be more readily entertained.

Believing the operation of ligature of the cord to be devoid of danger and effective in destroying the function of the testes, I suggest its performance as a curative remedy in a class of patients which finds its home in the public institutions of the commonwealth devoted to the care of the feeble-minded, the idiot, the pervert. I think it is the experience of those having charge of institutions of this character that perversion of the sexual function is largely responsible for the mental and moral condition of a very large class of inmates, and that curative measures are of little avail so long as the function remains. Castration has, from time to time, I think, been suggested, but has never been practised, owing to the difficulty of obtaining the consent of parents and guardians, on one hand, and the refusal, on the other, of the physician to assume the responsibility of performing an

operation not sanctioned by public opinion or authorized by legislative enactment. To obtain the consent of parents or guardians to the performance of an operation which involves such palpable mutilation as removal of the testes would always be difficult, if not impossible, whether they might belong to an ignorant or cultivated class of people. It would be still more difficult to obtain authority under legislative enactment, since in such matters law-makers would be prone to regard the opinion of the public, and up to this point it is safe to say public opinion is not educated.

It would be different, it seems to me, with regard to the operation of ligature of the cord. In this operation, mutilation, as understood by parents or guardians, is absent,—the atrophic changes which occur progress slowly—reduction in the size of the organs is gradual,—if within the power of the patient to appreciate it, the mental and moral effect would be slight. In the performance of an operation of this character for curative effects, under such regulations as the authorities of institutions might provide and enforce, would legislative sanction be required? Cannot the same liberty of action be granted the conscientious surgeon in the performance of this operation as in that which involves the removal of the healthy ovaries in the female for relief of conditions which menace her health and endanger, possibly, her life? As is well known, the operation of oöphorectomy has not only been advocated, but practised in females suffering from certain forms of insanity with a view to obtain curative effects. Why not apply the same rule of practice in the case of the male, and especially, it seems to me, it is proper to do so, when in the male relief may be afforded by an operation of very much less magnitude than that requisite in the female.

DR. W. W. KEEN asked if Dr. Mears had any means of determining the original size of the two prostates which are apparently atrophied. [The result of the experiment on the testes certainly appears to have resulted in very considerable atrophy of both, on comparing the testes of the normal dog with the other two, but he could not see very much diminution in the size of the prostate gland. He thought surgeons had a very sure foundation for the belief that castration will do a great deal in most cases of hypertrophy of the prostate, but whether the atrophy of the testicles, resulting from ligature of the spermatic cord, will be followed later by decided shrinkage of the prostate, is a thing we cannot judge of at present. A few days previously he had operated in a case of enlarged prostate with

about five to six ounces of residual urine in the case of a man past seventy, but had not yet been able to observe any marked improvement.

DR. MEARS thought that we had already sufficient experience with this subject to decide one or two points very positively. If the testicles are removed, in cases of pure hypertrophy of the prostate gland, the operation will be curative. It will reduce the size of the prostate materially. It will set up changes in its structure which will reduce it in size. When we can, by an operation which is less in gravity than that of castration and which is not opposed by the objections which patients very properly urge against the latter, accomplish all that can be obtained by castration, it seemed to him that we should make the effort. If by ligature of the spermatic cord we can obliterate the function of the testes, we affect the function of the prostate gland. If by ligature of the spermatic cord we can produce atrophic changes in the testes, he thought we could do the same in the gland, owing to the anatomical and physiologic relations existing between the two organs. His efforts had been directed simply to the substitution of one operation for another, believing that that which is most desirable to accomplish—the relief of patients who are suffering from the horrible conditions which attend hypertrophy of the prostate gland—can be secured by the simpler operation. With regard to the question that he ventured to suggest, the performance of this operation for conditions other than hypertrophy of the prostate gland, he thought it to be a very important one. Since the presentation of his paper, one year since, he had had letters from different persons, and some had called upon him. They all expressed in very strong terms the necessity of some curative means to relieve the conditions which exist in the institutions referred to. His object had been to bring the matter before the profession for consideration.

#### CASTRATION FOR PROSTATIC ENLARGEMENT.

DR. THOMAS S. K. MORTON said that he was able to add one case of successful result following castration for prostatic hypertrophy. The patient, aged seventy-one years, was admitted to the Pennsylvania Hospital, August 25, 1895. There was given a history of increasing difficulty in micturition, extending over a considerable time and culminating in total retention. Attempts by a physician to relieve the bladder failed of their purpose, but originated alarming hæmorrhage. Subsequently he was removed to the hospital. Upon admission it was found that the man was still bleeding and had a dangerously distended bladder.

Ordinary instruments failed to pass the prostate, but finally a vertebrated catheter of large size gained admission and drew off the urine. Then it was proved by rectal examination that an enormously hypertrophied prostate existed. It was as large as an orange and exceedingly soft in consistency. The urine was black with decomposed blood, ammoniacal, and contained much pus and detritus. Hæmorrhage ceased after catheterization, but recurred upon each subsequent introduction of the instrument. The difficulties attending the withdrawal of urine constantly increased until it became apparent that operative interference must be resorted to or the man would speedily perish. It was decided, if consent could be obtained, to perform castration, and, if this failed, to do a cystotomy later. The experimental nature of the proposed operation having been explained, written consent of the patient and some of his relatives was secured. The testicles were removed on August 28. Although catheterization had to be continued, blood ceased almost immediately after operation, and the urine began to clear up and become less decomposed. On August 30, the urine had become entirely clear of blood, pus, and odor; and two days later was and has since continued to be normal. On the second day after operation he began to pass a portion of his urine. This amount steadily increased until a week later the catheter was discontinued and there was no residual urine. Examination of the prostate by rectum at this time demonstrated its reduction in size to that of a hen's egg, and in consistency to that of the normal gland. Following this he passed through a period of partial incontinence, which was ascribed to weakened sphincteric action. But this slowly improved, so that in three weeks from the time of operation the action of the bladder was normal.

On October 29 he was in excellent health and could not sufficiently express the extent of relief that the castration had afforded him. He urinated from four to six times a day, had no distress whatever, and passed normal urine. The prostate was much smaller than when examined two weeks after operation, and had become very dense in structure as well as perfectly insensitive.

Owing to the patient repeatedly removing the dressings, both wounds suppurated, but no harm resulted.

#### FIBRO-ANGIOMA OF QUADRICEPS EXTENSOR CRURIS.

DR. JOHN B. ROBERTS presented a specimen of a fibro-angioma-tous growth of the quadriceps extensor cruris muscle, with critical remarks upon such tumors. (See page 431.)

CASE OF RECOVERY FROM EXTENSIVE COMPOUND  
FRACTURE OF THE SKULL, WITH WOUND OF  
THE SUPERIOR LONGITUDINAL SINUS  
AND LOSS OF BRAIN-SUBSTANCE.

DR. W. W. KEEN presented a man whom he had seen first in May, 1893, twenty-two hours after he had been injured by the falling of a heavy wheel from a height of thirty feet, striking directly upon the top of his head. Much blood, and, as reported, nearly half an ounce of brain tissue had been lost immediately after the accident. When seen by Dr. Keen he was perfectly conscious and had neither paresis nor paralysis of any part of his body. Just an inch and a half to the right of the middle line was a linear wound three inches long, the anterior end of which somewhat overlapped the fissure of Rolando.

After suitable incisions to expose the parts, the bones were disclosed in fragments and driven into the brain to a depth of nearly two inches. The two largest fragments extended from the fracture towards the middle line, and were bent downward at the sagittal suture as on a hinge. A pair of hæmostatic forceps were all that was necessary to remove nine fragments of bone, leaving an opening of three by two inches. When the largest fragments implicating the sagittal suture were removed, two rents were discovered in the superior longitudinal sinus, one large and one small. The large one was seized with two hæmostatic forceps, which controlled the hæmorrhage, which was profuse. The small one was stopped by packing with iodoform gauze. The dura, at the seat of fracture, was completely torn through and the edges could not be approximated. The gap was filled with pulpy brain substance and blood, in which were found later several small fragments of bone which were carefully sought for and removed. Nearly a tablespoonful of brain tissue was unavoidably lost in the manipulation necessary for extracting the bone and checking the hæmorrhage. A linear fracture also was found extending towards the ear.

The wound was again disinfected with care and then sutured, excepting at the middle half where the forceps, which had been placed on the sinus, were left in place surrounded with iodoform gauze (which made a ball of nearly an inch and a half in diameter) prevented such suture. The entire wound and the forceps were covered with sublimate gauze, and the patient put to bed in very good condition, in spite of the large amount of blood lost.

Two days later, he still was perfectly conscious and without any evidence of paralysis of any kind. The wound was exposed and the forceps and gauze removed with but little loss of blood, and the entire wound was sutured rather closely, to prevent a probable fungus cerebri. The surface of the wound showed evidence of a beginning fungus cerebri, and the manipulation incident to the dressing caused the loss of half an ounce more of cerebral tissue. Some of it, which was evidently pulpified blood and brain tissue, was intentionally removed.

Under the care of his physician, Dr. North, he made a speedy and uninterrupted recovery without any fungus cerebri. Several small sinuses remained unhealed and discharged considerable pus. At no time was there any paralysis of either motion or sensation.

On the fourth day his temperature rose to 104.6° F., but steadily fell and reached the normal at the end of a week.

At the end of five weeks he had a slight epileptic attack, It began at 4.45 A.M., with slight convulsive movements of left side of the chest. This gradually extended up into the left shoulder and down the arm, then the entire arm shook up and down, the movement being chiefly in the upper arm and elbow rather than the hand and wrist. This lasted about a minute and then gradually diminished, when the same twitching movement began in the left hip, extending down the leg to the foot. The nurse describes the character of the twitching by saying that when the hip was grasped it could not be steadied. The head was drawn towards the right side. He did not lose consciousness, and when asked to put out his tongue did so without trouble. The attack lasted until twenty minutes of six.

At 9.20 A.M., shortly after his head was dressed, he had a similar attack, lasting four minutes. He did not lose consciousness and had no pain and no discomfort except the twitching. He was perfectly comfortable during the day and had no increased headache. The wound was still discharging, partly a thin watery discharge and some pus. There was no loss of power in the left arm after the attack, but he complained that his leg was tired. His eyesight has not been good since the accident. Over a week before he had made an attempt to write a letter, but after writing one word complained that he saw double. Sight was weakest in the right eye. Both pupils were much dilated.

In September, 1893, he entered the Orthopædic Hospital. At

the middle of the left border of the swelling, at a point in the median line, were three openings which discharged a small amount of pus. The probe revealed dead bone in each of the three. That at the posterior portion was loose. At the anterior and middle openings the bone was still firm. The anterior and posterior part of the scar was united by first intention. In the middle there was a large bulging tumor, the size of a medium-sized orange, along which ran, in the middle line, the old scar. This had been broadened to about an inch in width, and the greater part of it was ulcerated and discharging slightly. The large tumor was soft and in part fluctuating. His mental condition was fair, although his memory was sometimes at fault.

From the posterior opening, by making a small incision, a sequestrum was removed, two and a half inches long and one-third of an inch wide at its widest part. A large part of it consisted of the inner table only. It corresponded to the sagittal suture, and showed on its inner surface the grooves for the longitudinal and the lateral sinuses near their junction at the torcular Herophili. Through the operation wound escaped a considerable amount of cerebro-spinal fluid, reducing somewhat the size of the tumor, but through the opening the major part of the tumor was seen to consist of a subcutaneous fungus cerebri. The wound was approximated by close sutures, excepting at one point for drainage, the object being to obtain speedy union and prevent an external fungus cerebri. He made a speedy convalescence.

At the present time, November, 1895, he remains perfectly well without any further epileptic attacks.

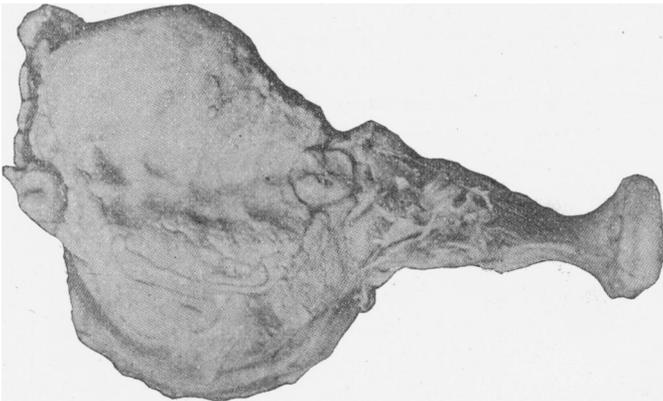
Over the site of the bony defect, which is four and a half inches long and two and a half inches wide, the scalp is wrinkled and very flabby, but he does not suffer from headache or other cerebral disturbance, though still unable to do any work.

Dr. Keen said that this was the worst and most extensive compound fracture of the skull that he had ever had occasion to operate on; all other cases of equally extensive fractures being moribund at the time when he first saw them. It was of extreme surgical interest to him to observe, first, the relative ease with which he was able to control the bleeding from the superior longitudinal sinus; secondly, the lesions being in the occipital region and to the right side, it was of interest to notice that there was hemianopsia, the left side of the field of vision being blind and the right side with normal vision;

thirdly, the very extensive necrosis of the bone after the operation necessitated a second operation for its removal; and the fact that this necrosed portion of bone was so much more extensive on the inner than the outer table of the bone, and also that the large fragment removed shows the groove for both the superior longitudinal and the lateral sinuses, approaching the torcular Herophili; fourthly, the absence of any paresis of the leg in spite of the extensive loss of brain-substance (over two ounces) in the region for the leg-centre.

### EXCISION OF LOWER JAW FOR SARCOMA.

DR. THOMAS S. K. MORTON presented a specimen of about three-fourths of the inferior maxilla, which he had removed from a colored man, aged twenty-one years. The disease had existed for eighteen months, and had started in the socket of a diseased tooth on the left



side of the jaw,—probably the first molar. A superficial operation had been performed by another surgeon soon after the vegetative process manifested itself. Now, at the end of eighteen months, the growth had attained the size of a small orange and had ulcerated upon the inner or mucous membrane surface. The incisor and bicuspid teeth on the diseased side of the jaw were distorted to a right angle with their fellows.

The customary operation was performed, not dividing the lip, and all of the jaw removed from the first molar on the right side to and including the condyle upon the left. Preliminary ligation of the

facial artery and of the inferior dental, when reached, as it entered the infradental canal largely prevented hæmorrhage. It was found that the tongue was not infiltrated. All suspicious mucous membrane was dissected away, and then the mucous margins of the wound were accurately sutured, thus cutting off all raw surfaces from communication with the mouth. The skin wound was then separately stitched, leaving a little acetanilide gauze packing running from the posterior angle of the incision up into the cavity of the former temporo-maxillary articulation. No shock resulted, and the patient reacted well.

The sutured mucous membrane held tight for two days before leaking. Then partial infection took place. Prompt and satisfactory recovery, however, ensued, and he was able to return to his home in another state in four weeks.

Microscopical examination demonstrated the growth to be a large spindle-celled sarcoma.