

tion is strictly similar to the operation for knock-knees, but simpler, as the tibia is nearer the surface. The bone is attacked on its subcutaneous surface, the shape of the bone and its relation to surrounding parts being borne in mind. The fracture is completed by hand as before. It is necessary to remember that, in cases of bow-legs severe enough for operation, there is a considerable inward twist of the tibia, which causes marked inversion of the feet. When the knees point forward the feet usually turn in 15 to 30 degrees. In order to correct this deformity it is necessary to break or sharply bend the fibula after division of the tibia, to overcorrect the bowing, and also to rotate the lower fragment outward. This is not always easy, and is frequently neglected in practice, and I have in some instances seen poor results from the neglect of this precaution. For bow-legs the plaster splint should reach from the toes to the groin, and if firmly adjusted the patient may walk at the end of a week; in the hands of a non-expert it is better to keep the child recumbent for a month. Careful attention to splinting for some months after the operation is essential to a successful result.

In the past ten years 428 cases of bow-legs, knock-knees and anterior tibial curves in children were submitted to operation at the Hospital for the Ruptured and Crippled. In most of these the operations were double, and in several instances multiple. In 367 cases one or more subcutaneous osteotomies were performed, in 28 cases cuneiform osteotomies were done, and in 12 instances osteoclasis was used. Of the 428 cases, 375 were discharged cured, 31 improved and 1, which was not rachitic, but a badly united fracture of the tibia, unimproved.

For several years the subcutaneous method has practically always been employed; the cuneiform operation having been abandoned in these cases, even in anterior curves. When the bone is divided by a simple section and allowed to gape apart after correction the space fills up with new bone, and a good result is more certainly and safely attained than when a wedge is removed. It will rarely be necessary to divide the bone at more than one point.

Undoubtedly complications have arisen in connection with this operation, but I have observed none in my own practice, and have been unable to find any record or to hear of any mishaps of any consequence in the experience of the operators at the Hospital for the Ruptured and Crippled in the last ten years.

Mr. Edmond Owen called attention at the meeting of the British Medical Association in 1899 to the subject of ununited fracture of the tibia and fibula in children, relating several cases where union had failed to occur after an ordinary fracture, and if it were not for a large experience to the contrary one might fear this accident after osteotomy. A search through the reports of the Hospital for the Ruptured and Crippled for the last ten years shows but two operations for ununited fracture of the leg bones, both of the tibia, of which one followed a cuneiform osteotomy for a bad anterior tibial curve, the other a manual osteoclasis for a badly united fracture. Both finally united. Two other cases of ununited fracture following cuneiform osteotomy of the tibia in a girl of 3 and a girl of 13 have been observed by the writer. I have been unable to discover in this service a single case of this accident following subcutaneous osteotomy for knock-knees or bow-legs.

This experience agrees, so far as I am informed, with that of the principal operators for these deformities in this country.

CONCLUSIONS.

We may therefore conclude that:

1. Subcutaneous osteotomy of the shaft is a safe and certain operation for the correction of knock-knees and bow-legs.
2. It is nearly always to be preferred to cuneiform osteotomy, osteotomy into the joint (for knock-knees) or operation by the open method.
3. The risk of non-union of bone or other accidents, with asepsis and an experienced operator, are slight, and not increased in rickety subjects.
4. The commonest errors are imperfect correction, especially failure to overcome inversion of the feet, and relapse from improper dressings, or from operating before the subsidence of the rachitic process.
5. Plaster of paris makes an excellent splint, completely controlling the position of the fragments when properly applied. Plaster or other splints should be worn for some months.
6. Subcutaneous osteotomy may be likened to subcutaneous tenotomy:
 - a. In its simplicity, certainty and freedom from complications.
 - b. In the advisability of correction of the deformity at the time of operation, in the facility with which union occurs and gaps are filled up, in the importance of careful and intelligent postoperative treatment, and in the permissibility of locomotion before firm union has occurred, provided the parts are perfectly controlled by splints.

Each is indicated when the structures involved can not be permanently corrected by stretching in a reasonable time, and both mark a distinct advance in the treatment of certain deformities and are worthy of wider recognition.

TREPHINING FOR BRAIN TUMORS; REPORT OF TWO SUCCESSFUL CASES—ONE OF NINE YEARS.*

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Operable brain tumors are rare. Only 6 per cent. of all cases are suitable for operation. In a recent compilation by Haas¹ 122 were tabulated. Permanent successes after operation are rare, even in the experience of such masters in this special field as Horsley, McEwen, Bergman and Keen. Therefore, every case carried to a successful issue is worthy of record. While I have trephined eight times for a supposed neoplasm, I was but twice rewarded by success. In a third case, a syphilitic thickening of the dura equivalent to a tumor formation was found. As a success from a diagnostic standpoint it is equivalent to a successful trephining for tumor. In each of these cases the tumor was in the psycho-motor area, thus again emphasizing the fact that only when in this limited field can brain tumors be recognized with any degree of certainty. My first case was operated on June 28, 1893. After nine years the patient continues well except for a slight paresis of the left extremities and epileptic seizures at intervals of three or four months. The case was reported by Dr. H. H. Hoppe.² The following is a short history:

CASE 1.—A. L., aged 32 years, admitted to the Cincinnati Hospital, June 1, 1893. Family history negative; patient

* Read at the Fifty-third Annual Meeting of the American Medical Association, in the Section on Surgery and Anatomy, and approved for publication by the Executive Committee: Drs. H. O. Walker, A. J. Ochsner and DeForest Willard.

denies ever having had syphilis, and claims that he had never been sick before. He states that the present trouble began three years ago, with cramps in the left foot and leg, which came on at intervals of a few months. About six months before his admission to the hospital they became more severe and more frequent. The convulsions extended from the foot to the leg, then involved the arm and face. He states that these convulsions invariably began in the foot, and rapidly extended over the entire side, including the face, and lasted for a few minutes. The convulsions are followed by unconsciousness. This lasts for several moments, and leaves a somnolent state for several hours. He states that he has violent headaches and frequent attacks of vertigo. He states that he has never vomited. His mental condition has deteriorated somewhat.

An examination of the fundus shows a somewhat injected papilla on the left side and rather indistinct margins. The left side of the body, both arm and leg, are decidedly weaker than the right. While in the house the patient had a number of very typical convulsions, which were observed. They began with a spasm of the left toes and foot, which extended rapidly to the upper extremity, thence to the face. Unconsciousness followed. There is a marked weakness of the left arm and leg with increased tendon reflexes. There is no disturbance of sensation. Diagnosis: Tumor in the right foot-center.

Operation, June 28, 1893. Morphia-chloroform narcosis. Horseshoe incision over right upper Rolandic area. A trephine opening, oval in shape and measuring about three inches in length by two in width was made. There was but little bulging of the dura mater. When the latter was opened the tumor presented itself in the right foot center, extending into the parietal lobe. It was the size of a hen's egg, and readily shelled out. It seemed to spring from the pia mater, and when removed left a clean cavity. The wound was packed lightly, and except for this healed by first intention. Immediately after recovering from the anesthesia there was found a total paralysis of the left arm, and the patient was not able to make even slight movements of the fingers. This, however, was rapidly recovered from.

The patient left the hospital six weeks after the operation, with the wound entirely closed. He has presented himself to Dr. Hoppe from time to time during the last nine years. From time to time he has light epileptic seizures and there remains a slight paresis of the left arm and leg with slight rigidity. In this case the operation saved the life of the patient, relieved his heart symptoms and diminished very markedly the number of epileptic seizures. Although it failed to completely cure him, there is no recurrence of the growth after nine years.

CASE 2.—E. O'B., aged 30, single. Father living, mother died of heart disease. Five years ago the patient suffered from pulmonary tuberculosis, which was manifested by hemorrhages, infiltration of the left apex, and the presence of tubercle bacilli in the sputum, evening rise of temperature and loss of weight. He was referred to Dr. J. T. Whittaker, who treated him with tuberculin. He recovered entirely from the pulmonary tuberculosis, and followed his vocation, that of a traveling salesman.

On Jan. 29, 1901, while eating, there was a sudden twitching of the lip on the right side followed by a twitching of the right thumb, index and middle fingers. The entire arm was drawn upwards and backwards and then he lost consciousness. A second attack occurred as he was closing his satchel. This time it began in the fingers, which seemed to clutch the satchel; the arm and shoulder were then drawn up and he again lost consciousness. I saw the patient shortly after this attack, and his description thereof was very clear up to the moment of the loss of consciousness. How long the unconsciousness lasted he is unable to tell. A third attack came on July 20, and a fourth one August 20. When seen about this time by Dr. Zenner, slight attacks of a different character developed. Sometimes they consisted of only a peculiar sensation of numbness in the thumb; again, there was a stinging sensation in the thumb, index and middle fingers. More rarely

there were also slight clonic spasms in these fingers. Sept. 14, 1901, he had a paroxysm of clonic spasms of the right side of the mouth, beginning in the lips, and of the hand and arm, followed by a general convulsion. After consciousness returned, he suffered with very slight headache and a sense of prostration, which continued for several hours. Aside from this he never had headache and has not vomited. His mind has been as clear as ever. The patient's general condition is good, although he has lost about twelve pounds in weight since his first attack. Pulse a little more rapid than normal, tongue slightly coated. Bodily functions otherwise normal. Urinalysis negative. Heart and lungs normal. The pupils, optic-disks, the movements of the eye, vision, hearing, knee jerks and plantar reflexes are entirely normal. Patient speaks of a constant numb feeling in the tips of the fingers of the right hand, but a careful examination of tactile pain, muscular and stereognostic sense, reveals no impairment. He speaks of objects often dropping out of his right hand. Dynamometer indicates right hand 69, left 66. Percussion over the skull elicits no tenderness.

On the suggestion of Dr. Zenner, the patient was placed on the bromid of potassium, in 15-grain doses. This treatment was continued during three months, during which the patient had no convulsions. When seen by Dr. Zenner, November 11, the patient had no convulsions, though he had not infrequent peculiar sensations for a short time in the lips and fingers on the right side. There were still no symptoms of increased intracranial pressure. No headache, vomiting or optic neuritis. There were now slight symptoms of paresis. The right thumb and index fingers were weaker than the left. There was slight paresis of the right side of the mouth. In speaking there was more movement on the left side of the face, and when the patient forcibly compressed his lips they were more easily separated on the right side than on the left. After the discontinuance of the bromids the convulsions soon recurred. They began as in the previous attacks with a twitching of the lip or of the thumb and index fingers. They recurred at intervals of four or five days. Clonic spasms in the fingers and mouth appeared very frequently and a decided paresis in the former was easily recognized. The patient was unable to write without great difficulty and could not fasten a button, although the sense of touch was unimpaired.

Notwithstanding the entire absence of the general symptoms of brain tumor, the focal symptoms were so characteristic that the diagnosis of brain tumor was made, and from the previous history of the case, it was believed that a conglomerate tubercle would be found. The patient was examined about this time by Dr. H. Hoppe, who concurred in the advisability of an operation.

Operation, Good Samaritan Hospital, Feb. 11, 1902. Large horseshoe-shaped incision over left psycho-motor area with its central point over the middle of the Rolandic fissure. Trephine opening enlarged with rongeur forceps to limits of the incision in the scalp. The bleeding was very profuse from the diploë, but was easily arrested with bone wax, except for a very free hemorrhage from a large branch of the temporal diploë vein, which could only be checked by blocking it with a sterilized toothpick. The dura presented a normal appearance but was devoid of pulsation. The opening in the skull was three and one-half inches long, and three inches wide. Temporary sutures of silkworm gut were used to close the wound.

Second operation, February 14. This was begun without anesthesia. The wound was easily opened. The dura now presented a feeble pulsation. It was opened by a horseshoe incision. A flap with base below was formed and reflected toward the temple. While the cerebral convolutions did not bulge into the wound, inspection and touch failed to reveal anything abnormal. The patient was now brought into a sitting posture. This so allowed the brain mass to recede that palpation beyond the wound margins was made easy. A distinct induration was thus made out beneath the ascending frontal convolution. The operation thus far had been almost painless. Chloroform was now administered. With

rongeur forceps the cranial opening was enlarged. The convolution over the indurated space presented a normal appearance. Except for the abnormal size of the pial vessels. The ascending frontal convolution was incised. Perhaps half an inch below the surface a tumor was exposed and easily shelled out. Its position was such that its narrowest part presented toward the cortex. Its long axis was inclined backwards and inwards through the corona radiata and toward the ventricle. The hemorrhage while free was easily controlled by pressure. One cortical vein required tying. The opening in the dura was closed with fine silk and the external opening closed by interrupted sutures, a strand of silkworm gut being left for drainage. The center of the flap was buttonholed, and through the opening a gauze tampon was lightly placed against the dura. The patient recovered promptly from the operation. The first dressing was changed on the tenth day, when a complete primary union had taken place. During two or three days after the operation there was a slight paraphasia, and an inability except with great effort to move the right hand and forearm. Within a week the muscular control had been largely regained.

An examination of the tumor, made by Dr. Wolfstein, showed it to be a solitary tubercle, with the usual number of giant-cells and the degenerating area which take the stains badly.

Subsequent History.—Three and one-half months have elapsed since the operation. The patient has gained fifteen pounds in weight. He has had no convulsions of any kind since the operation. The numbness has entirely disappeared. There still remains a decided weakness of the flexors of the thumb, index and middle fingers. I would be tempted to use Faradization were it not for the experience of Heidenhain, whose patient went into a Jacksonian convulsion while the current was applied. He believes that perhaps this was the exciting cause of the general epilepsy which followed. Although there has been no indication of a convulsion in the second case, I have placed the patient for one month on the bromid of potassium, intending to keep it up for several months. The patient can neither write nor fasten a button.

The case just reported presents many interesting facts from the view points of diagnosis and treatment. The general symptoms of brain tumor were altogether absent. Nevertheless, when the skull was opened the absence of dural pulsation indicated an increased intracranial pressure which was relieved by the trephining alone. After three days the pulsation of the dura was normal. The tumor when removed displaced 12 grams of water, a mass pressure to which the brain accommodates itself. Much larger growths develop without the usual pressure symptoms, headache, choked discs and vomiting. Kroenlein³ recently reported a case in which the operation failed to reveal a tumor. A year later an autopsy revealed a subcortical growth as large as an apple. The symptoms were altogether focal. Similar cases are recorded by Hitzig⁵ and Bramwell.⁶ In the former the operation failed to disclose a tumor. Death developed in three months. In the left centrum ovale a tumor was found 9 cm. long and nearly 7 c.c. wide. There were no compression symptoms at the time of the operation, notwithstanding the large size of the growth. The value of general symptoms in the diagnosis of cerebral tumors is shown by a statement of Bergmann's,⁶ that to make the diagnosis of a cerebral tumor without the existence of headache as the most prominent of them is always venturesome (*gewagt*). Cases like the second recorded, and they are not rare, go to show that the diagnosis is indeed most easily made while the symptoms are altogether focal; while they are still unmasked and unaffected by increased intracranial pressure. With the development of the latter the value of the focal symptoms decreases, since both pressure and irritation symptoms seemingly focal are very common as a result of increase of intracranial tension (*fern-druck*). This explains the fre-

quency of failure to find a tumor when seemingly unmistakable localizing symptoms are present. Against 104 cases in which operations were successful as to finding and removing a growth, there are 157 in which the operation was unsuccessful in one or other regard. The proportion of negative results is doubtless greater than even these figures indicate. Of eight trephining cases I was successful in three. Bergman in the Moscow Congress conceded four negative results to one positive. He has since, however, reported five cases in which the search was followed by the finding of a tumor or cyst.

An examination of the relevant literature discloses the fact that subcortical tumors particularly often escape attention. In the second case presented, nothing of the tumor was found when the dura was opened. By placing the patient in a sitting posture the brain receded to such an extent that palpation was permitted far beyond the limits of the cranial opening. I am sure that if this point is remembered by operators subcortical tumors can often be recognized that would escape detection without it. If, as in a case recently reported by Bramwell, the small tumor is situated an inch and a half beneath the cortex, even this postural aid may fail to locate the growth. That the tumor was subcortical was inferred by Dr. Zenner, from the fact that even the first convulsion was followed by complete unconsciousness. Furthermore, the entire absence of headache or of tenderness on percussion and of percutory changes spoke for the noninvolvement of the dura and cortex. The operation in the second case was performed in two sittings, as advised by Horsley and Keen. In the other cases in which I adopted the method the opening of the dura and the search for the neoplasm was done under cocain. There was no shock from either operation. If, in the second case reported, an enlargement of the opening in the skull had not been necessary, the second operation would have been completed as it was begun, with local anesthesia.

In the statistics of Haas already referred to, 122 operations, successful as regards the removal of a tumor, present a mortality of 61 per cent. A large share of the death rate is ascribed to shock and hemorrhage. With the more general adoption of the operation in two sittings this mortality will doubtless be decreased. In the two years, 1900-1901, Bergmann operated on four tumors with three deaths directly due to operation. One from sepsis, one from uncontrollable hemorrhage, the growth being an angioma. In two other cases of cyst the operation was successful. Bergmann operated on all cases in one sitting. Whether or not the hemicraniotomy, the opening of the skull with the large trap-door method, contributes to this large mortality of the operation is a subject still *sub judice*.

The statistics of Hale, White and Bernart, quoted by Seguin, show that tubercular growths are nearly twice as common in the brain as any other type. In 23 per cent. of all cases the tumor is tubercular in nature. Of the cases subjected to operation the percentage is much smaller. Of the 122 cases tabulated by Haas, only 12 of the tumors removed were tubercular. This discrepancy between the proportion of tubercular growths of brain tumors in general and the number found by operation is readily accounted for by two facts. First, these tumors are often multiple, as in a case recently in the service at the City Hospital, where the multiplicity of the tumors necessarily increased enormously the difficulties of localization. Second, tubercular tumors, because of the infectious nature of the underlying disease, have

been thought to be unfavorable for operation, because of their tendency to recur.

Two years ago Bergmann held the solitary tubercles are ordinarily not suited for operation. In a very interesting paper published by A. Preyer,⁹ from the clinic of Roux of Lausanne, are collected all the cases of brain tubercle operated on up to that time. There were 16. One case has since been reported by Heidenhain.⁷ The case above presented makes the eighteenth. Three patients died as a result of the operation. Six patients survived a number of months. Two patients died a number of years after the operation. A case of Czerny's lived four years and two months. A case of Horsley's died seven years and eight months after the operation of tuberculosis of the spine. So far as can be learned there are now living four of the cases operated on for solitary tubercle of the brain. Two cases of Roux, the one above reported and one of Kroenlein's, the latter living six years after the operation. Although these data are far from brilliant, they militate against the dictum of Bergmann above alluded to. When it seems certain that the tubercle is solitary and unaccompanied by changes in the meninges as made manifest by lumbar puncture, an operation is followed by the three-year limit of recovery in over 25 per cent. of cases, the justification of operation for brain tubercle seems thoroughly established.

REFERENCES.

1. Haas: *Beit. z. Chir.*, 1899, 25, p. 602.
2. Hoppe: *JOURNAL A. M. A.*, Feb. 2, 1901.
3. Kroenlein: *Arch. f. C.*, 1901, 64, p. 112.
4. Bergmann: *Chir. d. Hirn. K.*, p. 246.
5. Hitzig: *Therapeut. Monatsch.*, 1896, Nos. 19 and 20.
6. Bergmann: *Lang. Arch.*, 1902, vol. lxx, p. 936.
7. Heidenhain: *Lang. Arch.*, 64, p. 850.
8. Bramwell: *Med. Press*, Oct. 31, 1900.
9. Preyer: *Rev. Med. de la Suisse*, May and June, 1900.

SOME FACTS ABOUT VACCINATION.*

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Owing to a lack of exact knowledge from absolutely reliable sources on the subject of vaccination, there is a good deal of misapprehension in the public mind as to the efficacy of vaccination as a protection against smallpox, and the constant inquiry is made: "When shall we vaccinate?" "How long does it protect?" and "How often should we be vaccinated?" Many members of the medical profession, busy with other things to do and not compelled to face the epidemic horrors of a hundred years ago and not exact in their knowledge on the subject of vaccination, have a halting, uncertain, confused state of mind on the subject, which goes far to create doubt in the public. There are doctors, and good ones, too, who have had so little experience with vaccination that they do not know what constitutes a successful vaccination. I visited a neighboring town where a reputable physician of unquestioned ability told me he had a case of what he believed to be smallpox in a child he had vaccinated six weeks previous with a typical result. With the doctor I visited the child, found smallpox present, but absolutely no evidence of vaccination. There had been a scarification—too deep and too large—a black scab and a sore, but no vesicle, no febrile reaction and no scar. Had not some one who knows a vaccination seen this child the story would have been published to the world that a child had small-

pox who had been vaccinated six weeks before the attack—a circumstance that never occurred and never will occur. Within a year there have been cases of smallpox reported by doctors as having occurred in persons after a recent vaccination. I am perfectly satisfied in my own mind that such cases are either chicken-pox, mistaken for smallpox, or more frequently the supposed post-vaccinal victims are not vaccinated at all, but have sore scarifications which are mistaken for and put down as vaccinations.

Many physicians not familiar with the glycerinated lymph had read that the new lymph produced results less severe than that produced by the "points" they had formerly used; secured spurious lymph from an active, enterprising firm and mistook the mild or severe sore, as the case might be, caused by the scarification and sometimes extraneous infection, for a true vaccination. This inert lymph even in the hands of competent doctors has caused doubt and confusion in the minds of many as to the efficacy of glycerin lymph, and has also caused to go on record cases of smallpox in persons supposed to have been recently vaccinated. Thousands are now relying on a false security produced by the use of this inert lymph. Dr. F. J. Runyon of Clarksville, Tenn., based his paper condemning glycerin lymph almost wholly on this firm's inert product. Dr. Runyon says: "Ninety to 95 per cent. of those vaccinated in 1900 with this lymph are still liable to smallpox." This is a fruitful source of error in the records against vaccination which should be eliminated. Inasmuch as I have evidence that this firm is producing potent lymph now, I need not mention names.

Another source of error is that it has been customary to record as vaccinated persons vaccinated after exposure to smallpox. This is now done in London, England, and the blunder has been pointed out by the British medical journals.

The report comes from London, England, that half the persons dying from smallpox had been vaccinated. I care not where such statements come from, they are not true. Such a statement means that the records are not made from facts; that they are perpetuating the old errors, taking the patient's word for fact and recording cases as vaccinated who were never vaccinated until after exposure. I have had reputable physicians tell me that they have had typical vaccinations with no resulting scar. Such a result is not to be relied on as protective. Re-vaccinate all such and another source of error will be eliminated. A successful vaccination may be known by the presence of vesiculation, umbilication, pustulation, mild and limited inflammatory area with febrile reaction. In about twenty days from the beginning of the vesicle the resulting scab comes off. This leaves a characteristic scar unlike that produced by any other agency. This refers to a typical result only. We must look with suspicion on any vaccination lacking these characteristics.

No person is insusceptible to vaccination. That is, vaccinia can be induced at least once in every person. I have known eight, ten, and in one instance—in the practice of the late Dr. Garrott of the Chicago Health Department—thirteen attempts to be made before a successful result was attained. Had Dr. Garrott stopped at the twelfth attempt the child would have been considered insusceptible. It is mischievous and untrue to teach that there is such a thing as insusceptibility to vaccinia.

In some persons one vaccination will protect for a lifetime, but in many cases the protective influence will be

* Read at the Fifty-third Annual Meeting of the American Medical Association, in the Section on Hygiene and Sanitary Science, and approved for publication by the Executive Committee: Drs. Arthur R. Reynolds, George Cook and Heman Spalding.