**Craniectomy for microcephalus : the later history of a case of excision of the hand-centre for epilepsy : a clinical lecture delivered at the Jefferson Medical College Hospital, November 19, 1890 / by W.W. Keen.**

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## THE LATER HISTORY OF A CASE OF EXCISION OF THE HAND-CENTRE FOR EPILEPSY.

*A Clinical Lecture*
*delivered at the Jefferson Medical College Hospital,*
*November 19, 1890.*

BY

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PROFESSOR OF THE PRINCIPLES OF SURGERY.



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GENTLEMEN: The first case that I shall show you to-day is that of the little boy upon whom I operated before you last December. At that time I removed the hand-centre from the cerebrum for the relief of epilepsy.[1] First, as a caution to you, I will tell you of a slight accident that occurred.

You will notice that the scar, instead of being pale as it should be, is somewhat red at one point. Shortly after the operation the boy disturbed the dressings, and I feared that the wound would become infected. A small abscess formed, which was followed later by the extrusion of two of the small pieces of bone, which you will remember I replaced. The large 1½-inch button is in good condition. At the second dressing after the operation I wished to remove the strand of horsehairs which had been placed in the wound for drainage, but on taking away the gauze I did not find them. The dressings were then carefully examined, as I thought that the hairs might have been pulled out when the gauze was removed. I then searched for

[1] THE MEDICAL NEWS, April 12, 1890.

them upon the floor and then carefully and gently in the wound itself, but not finding them I came to the conclusion that the child had pulled the hairs out at the time that the dressings were disturbed and that they had been lost. The wound healed nicely, except at the place where the two fragments of bone came out, which united slowly.

All went well till last June, when the cicatrix became red and irritated, and a little later a small sinus formed, in which the horsehairs were found and removed. They were probably cut too short, and when the child disturbed the dressings were pushed into the wound, remaining there from December until June without giving rise to any trouble. I have never before had such an occurrence, and I give you this history so that you may avoid the same accident. I once performed an operation upon a young woman who had been previously operated upon, and found in the seat of the old wound one of the horsehairs which had remained there a year without giving rise to any irritation.

In the present case, in spite of the horsehair, which must have caused some irritation, the boy's condition is much better, although he is not completely cured. The fits have been, as a rule, far less severe and less frequent than before the operation, and his disposition is very greatly improved. In fact, he is quite a different boy and more amenable to control, so that he can now play with other children. He is interested in matters of everyday life almost as much as one would expect in a child of his age. His vocabulary also is now quite large, and he is learning quiet kindergarten plays, which he would not have touched or looked at in his restless impatience a year ago.

How far this change in disposition is due to the operation and how far to the careful training of Miss Bancroft and Miss Cox, of Haddonfield, N. J., who have had him in their training-school for feeble-minded chil-

dren, I am not prepared to say; it is my belief, however, that it is largely due to the operation, as his disposition began to improve while still in the hospital, and especially after he went to his home.

For some weeks after the operation his hand was completely paralyzed, but later it gradually recovered and is now only slightly paretic. The bilateral function of the opposite cortex has reëstablished the function of the lost centre. He can feed himself without difficulty, and you would probably not have noticed the slight defect had I not called your attention to it.

## CRANIECTOMY FOR MICROCEPHALUS.

The operation that I next propose to do is the first one of its kind which, so far as I know, has been performed in this country. It has been done only twice in Europe, both times by Lannelongue, of Paris. Lannelongue's first case was that of a microcephalic idiot, the history of which I will read to you.[1]

The patient was a girl, four years of age, born at term and without accident; father aged thirty-eight years and mother thirty-five years, both in good health. No hereditary disease. Five brothers and sisters in good health.

The child's mental development was retarded. She could not take any food but liquids, and up to the age of three years had not walked nor even stood. Within the last few weeks before coming under observation she had babbled a few syllables but no words. Saliva escaped from the mouth constantly. She had the appearance of an imperfectly-developed child of two years. Her eyes were brilliant, but she did not seem to be interested in anything about her, nor could one engage her attention. She was constantly uttering inarticulate cries, and scarcely ever ceased moving. Her height was

[1] L'Union Médicale, July 8, 1890.

77 cm. (30⅜ inches), the circumference of the thorax 45 cm. (17¾ inches). Her legs, while they could not support her weight, were always in active motion. There were no contractures or paralyses; sensibility normal; reflexes not increased; no epileptoid manifestations. Head very much narrowed transversely and prominent at the vertex. Nose well developed and aquiline. Forehead retreating and very narrow. Antero-posterior diameter of skull 155 mm. (6⅛ inches), bi-parietal 109 mm. (4¼ inches), bi-frontal 86 mm. (3⅜ inches).

*Operation May 9, 1890:* A narrow strip of bone was removed on the left side of the sagittal suture, as the left side was smaller than the right. The bone was removed a finger's breadth from the middle line and was 9 cm. ($3\frac{9}{16}$ inches) in length and 6 mm. (¼ inch) in breadth. The dura was not opened. The incision in the scalp was made in such a manner as not to correspond with the incision in the bone. The periosteum was not replaced. Healing took place in a few days. During the operation, as well as for four or five days afterward, a serous liquid escaped in small drops from the surface of the dura mater.

*Results:* On June 15th, that is to say, in five weeks, the child was calmer, the incessant cries had ceased the day after the operation, she took notice of what went on about her, laughed and seemed very happy, comprehended what occurred, tried to talk and pronounced several words. She can now stand alone; she walks with regular steps, tottering a little when she hastens. She no longer drools. Her intelligence seems to have kept pace in its development with the physical improvement. She is now able to eat at the table. She has been under instruction, which may account in part for the improvement.

A second, similar, case, but more pronouncedly idiotic, was operated on June 20, 1890. The incision to

the left of the middle line was the same, but another similar portion of bone was removed from the frontal on the left side, leaving a little bridge at the fronto-parietal suture. In other respects the operations were the same. Of course, the time was too short to judge of the result.

The history of the case upon which I am about to operate is as follows:

M. E., aged four years and seven months, was first seen by me on November 3, 1890. Three grandparents are living and in good health. Paternal grandmother had scrofulous glands in her neck. Her mother is aged thirty-three years, father thirty-five years, and both are in good health. She has one sister, nine years old, in good health physically and mentally. The patient's birth was normal and she was a breast-fed baby. At four or five months of age she weighed 25 pounds, at fifteen months 40 pounds, at three years 31 pounds, and at present only 30 pounds. She has never walked, but began to stand at about two years of age. When twenty-one months old she could say "baby," "pretty," "bye-bye," and other words, but since then entirely lost the power of speech. Two years ago she had twenty-four convulsions in one day, probably from teething, which was late; but these are the only convulsions she has had. Had measles and whooping-cough in rather rapid succession when about a year old.

*Present condition:* She is evidently a healthy but poorly-developed child. Her bones are small, and her head is very small and moderately prognathic, with defective development, most marked in the frontal region, and also in the occipital. Two photographs, one taken at twenty-one months of age, the other a week ago, show the greatest difference in expression, the earlier one being that of a bright, intelligent baby, the later showing a plainly idiotic face. There are no contractures or paralyses. She is constantly moving and wringing her hands, but evidently not from pain. She drools a good

deal. The condition of her reflexes is hard to determine because of the constant movements and the want of intelligence. Her mother thinks that she knows her parents and sister. She watches strangers somewhat, but notices little else. Seems to be pleased by having her hat put on, as though she knew it meant that she is going out of doors. All the sutures are firm. The anterior fontanelle, which existed at birth, is entirely closed. Percussion gives a uniform sound all over the skull, and is not painful. She has "drowsy spells" from time to time, often several times a day, when her head falls over and she sinks down almost asleep, but awakens immediately and is as well as ever. These attacks last only two or three seconds. Her intelligence varies considerably; some times she is much brighter than at others.

Measurements; Height, 92.5 cm. (36⅜ inches); circumference of chest, 50 cm. (19⅝ inches); head, antero-posterior diameter, 15.3 cm. ($6\frac{1}{16}$ inches), bi-parietal, 11.3 cm. (4½ inches), bi-auricular, 11.6 cm. ($4\frac{9}{16}$ inches), bifrontal, 9.5 cm. (3¾ inches). Circumference of head, 43.5 cm. (17⅛ inches). The two sides of the head are of equal size. You observe that the head is very small, being about the size of the head of a child eleven or twelve months old.

The result of the examination of the eyes, which was made by my friend Dr. Hansell, is as follows: "The examination was difficult and prolonged on account of the constant movement of the hands and arms, and lack of intelligence preventing coöperation. The pupils responded to light and association, the pupil of one responding in contraction and dilatation to the alternate exposure to light and darkness. Media clear; fundus normal; nerves (optic disks) of good color. The internal squint, said to be present at times, was to-day absent. The patient seemed to have good vision."

The inherent cause of microcephalus we do not know. Formerly it was supposed to be due to premature ossifi-

cation of the cranial sutures, but the examination of several such skulls has shown that while this may sometimes be the case, yet in the cases examined there was no abnormality in the bony development of the cranium. On the other hand, we know that the growth of the skull keeps pace with the growth of the brain within it; and if the growing power of the brain be weak, a slight resistance on the part of its osseous envelope may be sufficient to check and stunt it. Reasoning in this way, Lannelongue concluded that it was a rational procedure to attempt to remove at least a part of the force that was preventing this enfeebled brain from attaining a larger and more natural growth; and his operation was planned to effect this end. It is too early yet to pass judgment upon the operation as a remedial measure, for so far we have only the report of his two cases. It seems to me an experiment well worth trial. The operation itself, if it does not produce the hoped-for result, is at least little, if any, more dangerous than trephining; and, inasmuch as the dura is not opened, the real danger of the operation should be very small. Of course, the operation is only applicable to children.

I propose to do the operation with slight modifications. Lannelongue's incision in the scalp was made parallel to the line of the sagittal suture, commencing in front of the lambdoid and extending forward to the coronal suture, then turning off at an obtuse angle downward on the forehead, with a bridge of bone at the coronal suture.

Instead of continuing my incision forward on the forehead as Lannelongue did, I shall there make a curved incision with the convexity backward and all in the hairy scalp. I shall then raise this flap of skin and under it cut out the bone, thus avoiding any scar on the forehead. The incision in the skin will not be in the same line as that in the bone, so that the wound in the cranium will be covered by the scalp. I shall leave no bridge of bone at the coronal suture. The object

of the operation is to make the side of the head, as it were, into a bony flap, with an attached base below and a free border above. This flap can be readily expanded even by feeble force from within, and will allow the brain "elbow-room," so to speak, for development. I shall extend it into the frontal and occipital regions, so that these lobes, and especially the frontal, which is probably the seat of the intellectual faculties, may be able to enlarge. As the skull grows stronger and stiffer it will still have strength enough to prevent danger to life from ordinary blows or other traumatisms. It is a matter of indifference in this case upon which side the incision is made, as the cerebral development is symmetrical. A cast of her head has been taken, and at different periods of the child's growth other casts will be taken and the progress of the growth of the head may thus be determined. As the usual mode of making a cast by plaster cream alone is rather objectionable, and in the case of this child, indeed, impossible, I devised the following plan: The head was shaved and rubbed with a little sweet oil. A thin coat of plaster-of-Paris cream was then evenly applied to get a smooth surface. Upon this three or four layers of a common plaster-of Paris bandage were put on as a "recurrent" bandage, followed by a thin layer of plaster-of-Paris cream, and so on ultimately until the mould was completed. If either the occiput or the frontal portion of the head is so prominent as to prevent the removal of the mould, it may be cut over these places before it dries, the edges of the cut being carefully restored to their original position immediately after removal. No cutting was needed in this case.

In my operations upon the brain I use sterilized gauzes instead of sponges. This gauze is steamed for three-quarters of an hour in a Sattegast steam sterilizer, without chemicals, as I prefer not to use corrosive sublimate in these cases. All the instruments are boiled in a Schimmelbusch sterilizer, and the water in the appa-

ratus is kept boiling during the operation so that any instrument may be quickly sterilized if necessary. One per cent. of carbonate of sodium is added to the water to prevent rusting the instruments.

I have explained the operation to the father and mother of the child, telling them that it is only an experiment, but that I consider that there is little danger in it, and a possibility of doing her great good. Upon these grounds they at once consented to the operation.

Upon making my scalp incision I find that there is unusually little bleeding. I have at former times in operating upon the scalp placed an Esmarch narrow band around the head to prevent bleeding, but this is unnecessary. It adds to the length of what is always a long operation, and I find the hæmorrhage is easily controlled by hæmostatic forceps. The flap is pulled to one side, and I now carefully remove with a half-inch trephine a button of bone from a point about a finger's breadth to the right side of the sagittal suture, so that there is no danger of entering the superior longitudinal sinus. The dura is very carefully separated from the bone, and in this case I think is more adherent than usual. The instrument that I shall use in removing the bone is a pair of rongeur forceps, much more curved than ordinarily, and only one-fourth of an inch wide. In case of hæmorrhage from a branch of the middle meningeal I would quickly bite away the bone over the bleeding part with a forceps and pass a ligature under the vessel by means of a curved needle. The middle meningeal always requires to be ligated in this way. It runs in a tightly-stretched membrane and does not contract and retract like other arteries and thus easily and spontaneously cease bleeding. As the patient should have all the chances for recovery that are possible, I shall operate upon only one side to-day, thus reducing the danger of shock. She will be constantly under my observation ; if her mental condition does not improve as much as I desire I shall operate

later on the other side. The line of incision in the bone is now complete and extends to within three-fourths of an inch of the supraorbital ridge and backward nearly to the occipital bone, measuring six and one-fourth inches in length and one-fourth of an inch in width.

One rather large branch of the middle meningeal artery is seen crossing the cleft. The forceps are all removed and the flap is carefully inspected to see if there are any bleeding vessels. The hæmorrhage is usually stopped by the forceps, but in case I find any bleeding points I will pass a stitch under them, as I wish all bleeding to be completely arrested before the wound is closed. The periosteum is next cut away from the edges of the groove so that it will not cover it and cause union of the bone. A few strands of horsehair are placed in the groove and are cut sufficiently long to prevent danger of their slipping under the scalp in this case. These hairs will all be removed, except two or three, at the end of two or three days. In sewing up the flap I am careful to get absolute coaptation, so that there shall be no overlapping, as this would expose a surface which must heal by cicatrization. The wound is carefully dressed with sterilized gauze and she will be laid upon her right side to favor drainage. Now, gentlemen, the operation is completed, and we have only to await the future. Her mental traits have been closely observed, so that it may be readily seen whether there is any change in her intelligence.

[NOTE.—She was entirely well and all the sutures were out in five days. The operation took an hour and convinced me that it could be done in probably one-half that time by a proper pair of rongeur forceps. These I have had made, and I will report upon their usefulness in the future.—W. W. K.]