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TWO SUCCESSFUL CASES OF SECONDARY SUTURE, ONE OF THE POSTERIOR INTEROSSEOUS NERVE AND ONE OF THE MEDIAN AND ULNAR NERVES.

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*CASE 1.—Division of the posterior interosseous nerve and common extensor muscle of the fingers, followed by total loss of extension of the fingers; suture after three months; entire restoration of function.**

W. B. H., of Pine Bluff, Ark., aet.38, 6 ft. 4¼ in. tall, weight 260 lbs., first consulted me November 6th, 1900, at the instance of Dr. J. L. Goree, of Pine Bluff.

On August 1st, 1900, while camping out and standing in front of a guide, who was chopping down a tree, the ax-head flew off the handle and struck him on the back of the left forearm, 17 cm. below the olecranon and 12 cm. above the styloid process of the ulna, inflicting a wound 5.3 cm. long, and almost precisely transverse to the long axis of the forearm. The wound extended down to the bones, but did not fracture them. A surgeon, who also was camping out in his neighborhood, but with no surgical instruments or dressings with him, closed the wound without suturing the muscles or nerves. The wound healed by first intention.

On examination I found that he could extend the hand at the wrist by the radial and ulnar extensors, but extension of the fingers was impossible. (Fig. 1.)

Dr. Wharton Sinkler kindly examined the electrical condition of the muscles and reported as follows: "The extensors of the left forearm above the incision all respond to the faradic current; below the wound they do not, and galvanically there is reaction of degeneration in the lower portion of the extensor communis digitorum. I would infer from this that the nerve had been severed at the same time with the muscles, and that it would be desirable, if possible, to find the ends of the nerve and suture them."

Dr. Spiller made an examination of the sensation and found that there was no loss, except over a small area just below the scar.

*Read before the Philadelphia Neurological Society, April, 1901.

On comparing his two hands I found that he had a peculiarity of the two thumbs. Abduction of the metacarpal bone of the thumb was very poor on both sides, and was scarcely greater on the uninjured than it was on the injured side.

Operation, November 9th, 1900. I made a vertical incision 13cm. long in the long axis of the forearm. After reaching the muscle I was agreeably surprised to find that there was no visible evidence of any great gap filled with connective tissue at the point where it had been divided, but that there was only a recognizable linear cicatrix. I

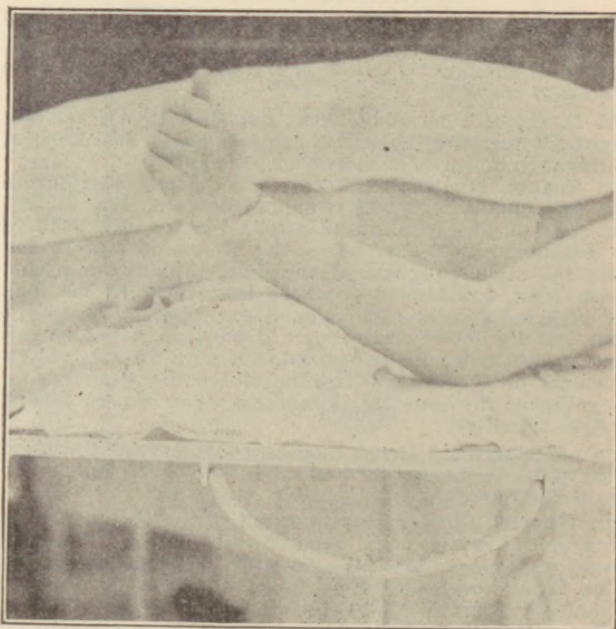


Figure 1.

Before operation, showing the scar of the accident, extension of the wrist but inability to extend the fingers.

made a blunt dissection down to the interosseous membrane and endeavored to find the prolongation of the posterior interosseous nerve toward the wrist joint, but failed to find it. I did find, however, the posterior branch going to the common extensor of the fingers. This I veri-

fied by the battery. At the point of injury the nerve was very much attenuated below the wound and immediately above the wound it was considerably thickened. I first passed a suture both above and below the wound, next removed 7 mm. of the nerve, and then approximated the freshened ends to each other and closed the wound.

His recovery was uneventful, the highest temperature once being 99.6°. He left the hospital November 17th, 8 days after the operation. At that time slight extension of the fingers was already beginning to be possible.

I directed that, after his return home, he should use the hot and cold douche in alternation, active and passive exercise and massage, and especially electricity, beginning with the galvanic current and later the faradic. All this treatment he carefully carried out with the exception of the electricity, for which there was no apparatus available. His wife wrote under the date of January 3rd, 1901: "Mr. H.'s arm has improved most wonderfully, and the loss of muscular force is hardly noticeable." A letter received May 1st, 1901, transmits two photographs showing that the fingers and wrist can be extended in a straight line, but he states that when the wrist is in extension he is not quite able to extend the fingers completely. (Fig. 2 shows the same arm with the wound and my incision making a X).

CASE 2.—Division of median and ulnar nerves; secondary suture after six months; entire recovery.

Chas. D., aet. 16, first consulted me about the middle of April, 1892. In October, 1891, he lost his balance, and, to prevent his falling, thrust his left hand through a pane of glass. The forearm was cut transversely, 2 cm. above the pisiform bone, and when I saw him showed a scar extending from a point 2 cm. from the radial border of the forearm to the internal edge of the ulna. (Figs 4 and 5). Dr. Horton, of Peekskill, New York, where the boy was at school, states that the cut extended completely down to the bone, severing all the tendons, and divided the median and ulnar nerves and the ulnar artery. Dr. Horton ligated the artery and desired to suture the tendons and nerves at the time of the accident, but was overruled by an older practitioner.

On examination I found that he had control over the thumb and forefinger in flexion and extension, but they were weak. The thumb could not be apposed to the

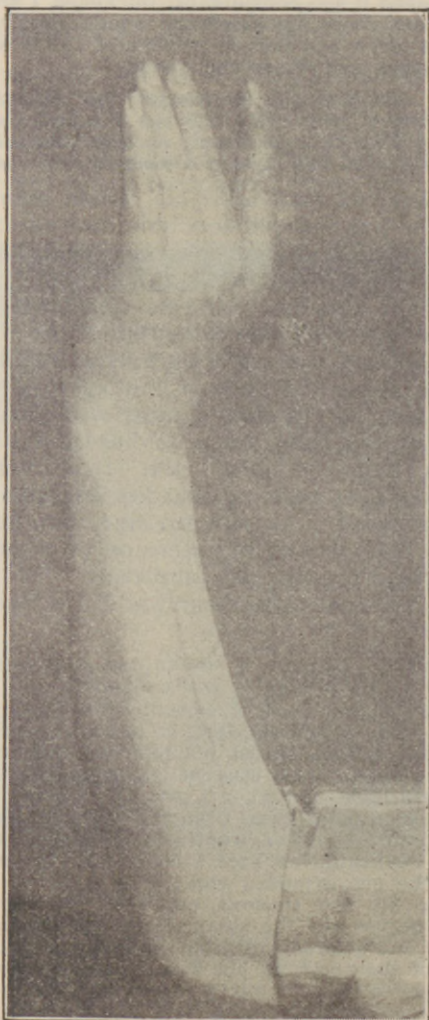


Figure 2.

Appearance of the arm six months after the operation, showing the gain in extension of the fingers.

other fingers. The three ulnar fingers were all in a state of flexion and could not be extended except partially upon strong flexion of the wrist. The thenar and hypothenar eminences were entirely wasted. His grasp was good if anything was placed in the flexed fingers. Sensation was with difficulty ascertained, but it was evident that there was no absolute anesthesia at any point. The radial surface of the little finger was the dullest, and even there a light touch was perceived, though not sharply. The whole hand was purplish and very cold.

Operation, April 21st, 1892. A longitudinal incision was made over the ulnar nerve, the incision being extended finally downward over the hypothenar eminence about 4 cm. below the wrist and 9 cm. above the wrist. The upper bulbous extremity of the ulnar nerve was easily found, but was fused in a mass of connective tissue. In order to find the distal end, the cut was prolonged, as stated, over the hypothenar eminence. The ulnar nerve was found there, not wasted, but above the normal size, the upper end being directly continuous with one of the superficial flexor tendons. Both ends of this nerve were loosened, resected and both stretched, the upper end especially yielding. With some little tension the two ends could then be brought together and were sutured with one fine silk thread. Through the same incision the median nerve was then found with some difficulty. At the level of the cicatrix, the two ends had united, and at the same point another flexor tendon joined them in a bulbous mass. I debated for some time whether to excise this mass and attach the two ends of the nerve together after stretching, but finally decided to sever the connection of the tendon with the mass and let the nerve alone. If the nerve did not improve a later resection could be done. The tendons I found in one general cicatricial mass. As it was impossible to differentiate the individual tendons, I contented myself with elongating the deep flexors by the method of tenotomy which I devised. (Trans. College of Physicians, March 4th, 1891). The superficial flexors I severed obliquely and attached them at a distance by several strands of catgut suture. The gap between the two ends was 2 cm. The hand was then placed on a splint.

April 25th, (fourth day). No opportunity was offered for testing sensation through the dressing, excepting by touching the last two joints of the fingers that were exposed. This showed that the ring and little fingers were devoid of sensation, the ring finger not only on the ulnar, but on the radial side. The sides of the other two fingers and the thumb showed sensation. To-day he perceived a prick over the ulnar fingers for the first time. He returned the next day to Peekskill.

June 2nd (six weeks later), Dr. Horton reports the circulation in the forearm good, motion of the wrist, thumb and forefinger normal, with the exception of extreme extension of the wrist. Sensation of the three ulnar fingers is not very acute, but is improving. The blueness of the nails which was first noticed is rapidly passing away.

November 25th, 1892, (seven months). I examined him to-day. The general condition of the hand is good, the ring and little fingers are a little purplish and also a little cold, but not at all to the same degree as before the operation. Sensation exists in all parts of the hand. He can move any part of the hand, except the ring and little fingers, and even over these two fingers he can feel and localize a pencil point. Motion in the thumb, middle and index fingers is excellent, and he can grasp objects, though not with great strength. Flexion in the two ulnar fingers is limited to the last phalanges, there being as yet no flexion at the knuckles of these fingers.

Ever since the operation he has been using continuously massage, electricity, hot and cold douche, active and passive exercise.

April 9th, 1893, (one year later.) His hand has improved immensely. He can touch the tip and the base of each finger with the end of his thumb, can make a fist, the fingers being in almost complete flexion and his grip is good, little, if any difference being perceptible in the grasp of the two hands. Each finger can be moved independently of the others, the motion of the little and ring fingers now being nearly normal and the others quite so. Sensation is also perfect.

December 22nd, 1899, (seven years). I re-examined the hand to-day. His grip is wonderfully strong, his fist is as last described. Practically the hand is as useful as ever.

May 15th, 1901 (nine years). He sends me the accompanying photographs (figs. 3 and 4) just taken to show his power of flexion and extension of the fingers. Though he cannot quite close his fingers, yet practically his hand is as useful as a normal hand.

The photographs presented are the best evidence of the excellent results of the two operations here recorded. Both hands were useless, practically, for the same reason—the want of the power of extension—but from wounds of two entirely different nerves. The wound of the posterior interosseous prevented extension at the knuckles by the common extensor of the fingers, while the wound

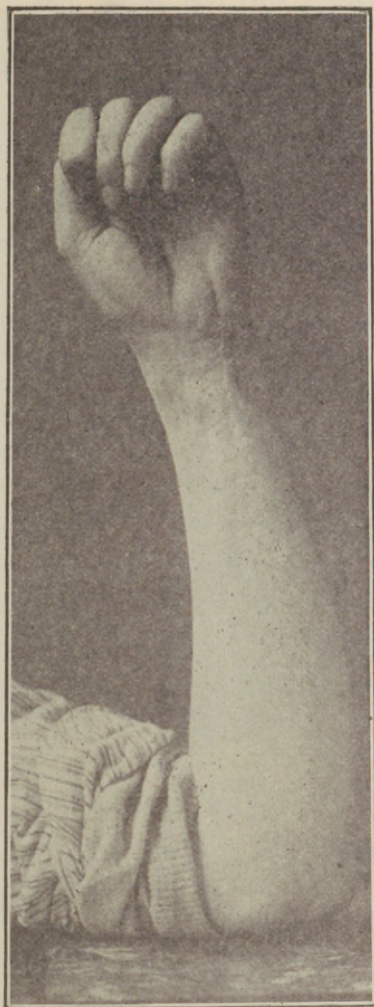


Figure 3.

Nine years after the operation showing good flexion of the fingers

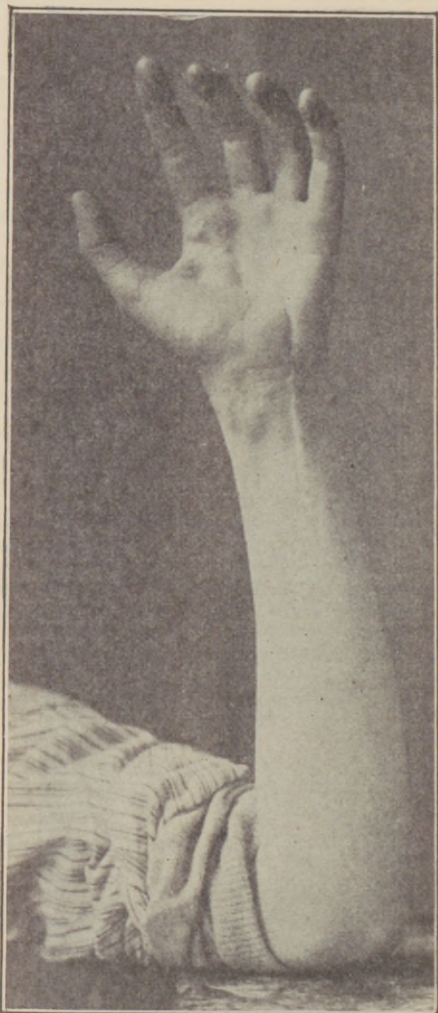


Figure 4.

Nine years after the accident, showing good extension of the fingers.

of the ulnar and median, in the second case, prevented extension of the last two phalanges by the interosseous and lumbrical muscles. I would call attention to the late periods (three and six months) at which the secondary suture was done. In the first case, also, the very speedy return of motion was surprising. It began within a week after the operation and was practically complete within two months. This is the more gratifying, as the posterior interosseous is so small a nerve that I doubted whether I could find it in so muscular a patient, or if I did whether it would hold a thread. Suturing it before excising the point at which it had been wounded was excellent. Had I first excised, the cut ends would have been considerably, and possibly, irreparably injured by forceps or other means used to seize them and steady them while passing the needle. So far as Dr. J. C. Merrill, of the Surgeon General's Library, in Washington, who kindly had his records looked over, or my own references, show, this is the only case as yet recorded of operation on this nerve.

The second case shows how a younger man, well up in the latest surgical procedures, may be hampered by an older practitioner, who has not kept up with the progress of surgery. Had Dr. Horton's advice been followed and tendon been sutured to its appropriate tendon and nerve to nerve when the accident occurred, in all probability no later operation would have been necessary. That the operation has resulted so happily is remarkable, especially as the tendons had to be united haphazard, one above to one below, with no possibility of ascertaining which belonged to which.

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