

ART. XII.—*Five Cases of Neurotomy for Painful Affections of the Limbs*. By REDFERN DAVIES, Surgeon to the Birmingham Workhouse Infirmary.

CASE I.—*Past history*.—William Whitelaw, aged 54, formerly a soldier, and afterwards a labourer, in May, 1856, whilst at work upon the roof of a house, fell to the ground, a distance of some forty feet. He was immediately conveyed to an hospital, where he was found to have sustained a compound fracture of the middle-third of the tibia, and lower-third of the fibula, the bones, to use his own expression, “sticking out.”

He remained in the hospital about five months, when, his limb being to all appearance sound, he was discharged.

Notwithstanding, however, the apparent soundness of the leg, he was tortured with a similar pain to that he now complains of, and which had been coming on during the healing of the fracture. He has since been an inmate of several institutions, receiving but temporary relief. The wound at the fibula has twice opened, small portions of bone coming away.

*Present state*.—November 20, 1857. Upon examination, I found him to complain of a pain which commenced in the toes on their dorsal surface, extending over the foot, anterior surface of ankle, and leg, as high as the original site of the tibial fracture. The pain here stopped, but was again felt in a line running transversely from the last-named spot to the interval between the fibula and the edge of the gastrocnemius; thence it descended to the outer ankle and outside of the foot, joining with the pain on the dorsum. The pain was described as being constantly present, worse at times, and of a gnawing character; it was increased to intolerable agony upon moving the limb, or touching any portion of the surface included within the affected area. Upon jolting the heel, or bending the toes, a feeling like “pins and needles,” but of a very extreme painfulness, is experienced. This, however, only reaches as high as the fracture of the tibia. When the limb is embraced with both his hands, thus making firm pressure with the thumbs over the first intermuscular space on the anterior surface *above* the seat of the fracture, the pain situated over the dorsum of foot and front of leg becomes very much diminished; but that between the fibula and tendo Achillis, &c., remains unaffected. The limb is shrunken and flabby; the foot directed downwards; and the toes flexed and cold, and destitute of feeling; the axis of the limb is quite natural, and the bones in good apposition, with no undue amount of ossific deposit around their ends; the integument around the site

of the fracture reddened, depressed, and adherent to the bone; the ankle-joint is uncompromised; he denies syphilis, and there is no evidence of any other disease.

*Diagnosis.*—That a portion of the anterior tibial and musculo-cutaneous nerves were implicated by the fracture of the tibia, and its subsequent union. This would account for the pain on the dorsum of the foot and the anterior surface of the leg; and by reason of the communication between the communicans peronei and the external saphena nerve, so was the pain sympathetically experienced in the interspace between the fibula and tendo Achillis, and in the outer part of the ankle and foot.

*Operation.*—November, 1857. In the presence of many of my professional friends, Mr. Jauncey giving chloroform, I made an incision two inches long over the axis of the external popliteal nerve in the popliteal space, taking the inner border of the biceps tendon as a guide. The fascia being exposed, and a portion of it pinched up by forceps, it was divided on a grooved sound; by gently separating the areolar surface, the nerve readily came into view, and an inch of it was cut out. The edges of the wound were then brought together by suture. Directly upon recovering from the effects of the chloroform, he declared that the old pain was gone, and he could bear to have the limb jolted. For the three succeeding months, during which time he was under my observation, he steadily progressed; and the following is the report entered on the minutes of the Medico-Chirurgical Society of Birmingham, to whom I had the honour of presenting him, at the end of the above time:—

“The limb, when in a state of rest, has the toes drawn downwards, the foot turned inwards, and the heel raised. All power of extension is completely gone; sensation is less acute than on the opposite side, but it is gradually improving; he also perceives himself that the dorsum of the foot and anterior surface of the leg are much colder than the posterior and plantar surfaces; and to the thermometer there is a difference of four degrees in the temperature of the parts above and below the division of the nerve; a similar difference exists, likewise, between the temperature of the two legs.

“Since the operation, there has been no return of pain; and he has this day (February, 1858), walked, with the aid of a slightly-raised heel to his shoe, a distance of six miles, in perfect ease and comfort.”

*CASE II.—Past history.*—James Albert, aged 67, a locksmith. Three years ago he fell off a ladder, striking his right

thigh upon a rail; upon examination at an hospital the bone was found to be fractured at its middle-third. He was treated by Liston's long splint, and remained in bed for twelve weeks, when the bones had firmly united, with about one inch of shortening, and the condition of the limb was precisely as now.

*Present state, October 1st, 1858.*—He states that ever since the occurrence of the fracture he has been unable to put his foot to the ground, or bear any weight upon it, in consequence of the so doing being attended with such great pain; he is thus incapacitated from getting about, save on crutches; and the pain, though constant, is less when in bed. Upon examining the limb, the original site of fracture is easily recognised; but there is no deformity, save the shortening before alluded to, and the axis of the limb is natural. The ankle-joint is free, but its movements are attended with very great pain. The foot points downwards, the toes flexed, and to all appearance immovably fixed, any attempt to stir them causing great agony. The muscles on the posterior surface of the leg were very hard, rigid, and a good deal atrophied; the temperature of the limb was much colder, both to the feelings of the patient and to the thermometer,—a difference of five degrees being given by the instrument, as compared with the opposite extremity; and he said it always felt “clammy.”

For the purpose of further eliciting the condition and nature of the injury, I placed him under the influence of chloroform, and insensibility was produced; the toes resumed their normal position, and became freely movable; and likewise the muscles of the calf were soft—in short, the leg was natural.

As the effects of the chloroform went off, and consciousness returned, so did his limb resume its usual condition. A few days after, I visited him in his ward at night, when he was fast asleep; and, having gently uncovered his leg, I found the foot and toes in their natural state, and freely movable, till I awoke him, when they instantly became flexed and rigid. The last and most conclusive experiment that I instituted upon him was as follows:—

On October 8, 1858, by means of a conical bag containing a freezing mixture (having carefully protected the adjacent parts), I endeavoured to freeze the site of the posterior tibial nerve in its lower-third.

During the process, he complained of the usual pain attendant upon such applications; but was surprised to observe his toes gradually resume their natural condition, and that he could bear to have them handled without pain. Upon the withdrawal of the freezing mixture, they became speedily flexed, &c.

*Operation.*—Guided by these indications, I determined to excise a portion of the posterior tibial nerve; and on October 12, 1858, with the aid of my friend, Mr. Benjamin Hunt, I cut down to the nerve in the lower-third of the leg, a little above where it passes through the annular ligament, after the usual manner adopted for the ligature of the artery in that position,—cutting, of course, a little to the side of it: the nerve was easily exposed, neither the artery nor vein being seen.

Before the nerve was divided, he was allowed to recover partially from the chloroform, in order that the immediate effects of the section might be seen; when the toes became normal in direction, and could be moved freely without any pain; he could press, flat-footed, against the wall, and even desired to walk from the operating table.

About one inch of the nerve was removed—metallic sutures and water-dressing applied to the wound. Shortly after being put to bed, he mentioned to a companion in the ward the increased amount of warmth he felt in his leg; and at night the thermometer showed no difference in the temperature of the two.

The history of the case up to the present time (October, 1860) is, that he progressed favourably, the wound healing well; and he can now, aided by a high-heeled shoe—the necessity for which results only from the shortening of the limb, in consequence of the fracture—walk about, and work, standing at a vice, some nine hours a day, feeling no more inconvenience from one leg than the other.

*CASE III.—Past history.*—Hannah Eyre, aged 50, in May, 1858, received, in a brawl, a wound from a knife just below the pisiform bone. The wound healed speedily and well; but there has ever since existed, upon the slightest touch over the ring or little finger, or from any jar of the fore-arm, a most intense pain coursing up from those fingers to the shoulder. She has been unable, likewise, to make use of the other fingers, fearing lest she might touch those affected. Her arm was consequently useless, and carried in a sling. Both during sleep, and when awake, she had frequent and very painful twitchings in the fingers, and pains darting up the arm.

*Present state.*—December 13, 1858. Upon examining the hand, all the fingers are carried semiflexed; they could not be moved without causing much suffering to the ring and little fingers, which were cold and clammy to the touch. A normal cicatrix below the pisiform bone was seen, presenting no appearance worthy of note.

*Operation.*—December 14. An incision over the track of

the ulnar nerve was made above the pisiform bone, and half an inch of the nerve removed. She was not under chloroform; and, immediately the nerve was divided, her fingers were roughly handled, and she could firmly grasp anything without any sensation of pain.

She stated that, upon the section of the nerve being completed, she felt "a glow of heat run into the fingers;" and I could perceive them to be decidedly warmer than before the operation.

The result was, as examined by Dr. James Walker, of Peterborough, and subsequently by Dr. Augustus Waller (Professor of Physiology), a few months ago, that a complete immunity from pain was afforded. She was able to use both her arm and fingers as before in all the operations of life; and, in short, the only difference which existed in the limb, as compared to the time before the accident, is, that she cannot so well appreciate slight differences in textures from touch only, or pick up a *crumb* of bread or a *hair* from off the table as readily as before.

CASE IV.—*Past history*.—George Stephens, aged 59, a labourer, received an injury to the left wrist-joint from a fall of timber, in 1845. For five years he continued off and on under treatment, and in 1850 his fore-arm was removed (by Mr. Thomas Harding, of Stourbridge) at the upper-third. He went on very favourably for three weeks. In endeavouring to remove the last ligature, owing to the patient starting, it was suddenly twitched away. Instantly there ensued a pain in the middle of the stump. This pain gradually increased, and became constantly present. To his feelings, it was as though something was "working" at the end of the stump, and "like a live thing endeavouring to get out." He had, likewise, sensations as of his fingers being forcibly "ground together." Any movement, especially rotation of the limb, was attended by a feeling as though his fingers were being stretched. The end of the stump was very tender when touched, and he could not even bear the slightest pressure upon its surface; it appearing to him as if there was a "handful of pain." In rainy or cold weather these pains were increased.

In 1852, a tenotomy knife introduced beneath the surface of the stump completely separated it from the textures below. In 1853, a tumour was removed from the end of the stump; and in 1857, the tumour, being reproduced, was again removed. Each of these operations was followed by an improvement both in the condition and feelings of the patient: and after each, he for a time thought himself cured. This improvement

lasted, however, only for a time, and in the course of six months the old pains had returned with their usual force.

In June, 1859, he came under my care; and, though by no means sanguine as to the result, I operated on him. His condition and symptoms were precisely the same as above; and the pains in the fingers were not confined to any one in particular, but he could feel distinctly all and each.

*Operation*—With the help of my friend Dr. Thomas Walker, of Peterborough, about half an inch was removed from the musculo-spiral nerve, by making an incision over its course in the upper-arm, between the brachialis anticus muscle and the supinator longus, from the ulnar nerve, by cutting down upon it behind the inner condyle, and from the median, by exposing it in the middle of the upper-arm. The result was, that for a time he was very much better; and he could use his arm freely, and without pain,—the motions, &c., of the stump not being in any way interfered with by the removal of the nerves.

July, 1860. This, however, continued only for a brief space, the old symptoms gradually returning, and he is now in precisely *statu quo*.

CASE V.—*Past history*.—John Stephens, aged 32, by occupation a sailor on board a man-of-war, was admitted into the Workhouse Infirmary, May, 1860. He stated that he had enjoyed perfect health up to six years back, when, off the coast of Sierra Leone, he, with thirteen other men, were taken with yellow fever (of these, nine died, and one was sent home with a similar affection to that he complains of in his left arm). After lying six months ill with fever, and afterwards dysentery, he came home. In 1857 he again went to sea, in a merchant vessel, having been rendered unfit for the royal service from the toes commencing to contract slightly, and feeling pain in them. He remained in the merchant service up to midsummer, 1859, when the pains and contractions in his feet rendered him unable to continue.

*Present state*.—May 12, 1860. He complains of a pain situated on both sides of the big toe (of the left leg), and contiguous side of the next. This pain runs along the dorsum of the foot, and anterior part of the leg, nearly as high as the tubercle of the tibia. Firm constriction above by grasping with the hands, and making pressure with the thumbs, relieves this pain. He has also pain extending all over the plantar surface of the foot and heel, and running between the internal maleolus and heel, up to the posterior surface of the leg, till it was gradually lost in the popliteal space. This pain was described as “like the shock of a galvanic battery,” attacking him suddenly, and

continuing from one hour to twelve, leaving him faint with torture. There was also a constant pain as of pins and needles in these parts, which had very much increased during the past few months, so as to render him unable to bear any weight upon the foot; and any movement of the toes instantly generated pain like a galvanic battery. The foot felt cold and clammy, the muscles of the leg wasted and irritable, &c. The heel was raised some two inches from the ground; the inner edge of the foot drawn upwards, and the anterior two-thirds of the foot twisted inwards, so that he walked on the outer edge. The toes, especially the big one, were very much contracted and rigid.

*Operation.*—Pain being the most prominent and severe symptom, I determined to attack that first; and so, on May 12, I divided the anterior tibial nerve in the lower-third of the leg, removing about three-fourths of an inch,—the result being a total removal of the previous feelings in the big toe and anterior portion of the leg.

Allowing two weeks' interval to see the success of this step, I then divided the posterior tibial, which was followed with complete removal of pain—the patient, on leaving the operating table, could strike his foot on the ground, and walk with perfect ease. The deformity, of course, remained. This, however, has been remedied by dividing the tendo-Achillis, tibialis anticus and posticus muscles, and plantar fascia, and treatment with Scarpa's shoe; so that now his foot is restored to its natural position, and the limb is a useful member.

I should mention that the nerves were examined by Dr. Waller, who was present at the operation, but no microscopical or other changes were observed in their structure. During the operation, Dr. Waller applied a very fine thermometer to the limb, and found, almost immediately after the division of the nerve, an increase of temperature to the amount of three degrees.

ART. XIII.—*Some Remarks on a Peculiar Affection of the Knee-Joint.* By FRANCIS JAMES LYNCH, M. D., Physician to the Loughrea Workhouse, and Fever Hospital.

MR. MAYO, in the eleventh volume of the *Medico-Chirurgical Transactions of London*, directed the attention of the profession to a form of disease in the knee-joint, termed by him “An acute form of ulceration of the cartilages of the joints;”