

ORIGINAL COMMUNICATIONS.

THE MODERN TREATMENT OF FRACTURES.

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CASE VI. Matthew Macarthy, aged 19, a bricklayer, was admitted into the Queen's Hospital on the 24th of August, 1853, with a transverse fracture of his left femur, immediately above the condyles. The patient, a robust and well-made man, was engaged building the second story of a house, when the scaffold on which he stood gave way, and he fell a distance of about twenty feet to the ground; his leg coming in contact with a tub close by. The deformity of the injured limb was remarkable; there was a large prominence at the upper margin of the patella, caused by the superior fragment of the femur, and a fulness in the upper part of the popliteal space from displacement backwards of the lower fragment; giving to the thigh a shortened and bowed appearance. The limb was semiflexed; the leg and foot somewhat everted, as he lay upon his back. By measurement, the injured extremity was an inch shorter than the sound one. The man having been brought directly to the hospital, he was still suffering from the shock of the accident, under the influence of which reduction was easily effected. The limb was then immediately bandaged firmly, beginning at the foot and ending at the crest of the ilium, with many turns over the left hip and buttock, so as to cover them as much as possible by what is called the spica bandage. A thick solution of starch was next laid on; then the millboard splints; over these more starch; and, lastly, more bandage, exactly similar to the former in extent and method of application. The whole process occupied forty minutes in execution, with the aid of two assistants.

The millboard splints consisted of two for the leg and four for the thigh: those for the leg were applied, one on the outer and the other on the inner side, including the foot, and extended upwards to the head of the tibia and fibula. Their width opposite the calf should not be more than a hand's breadth, and at the ankle not wider than the tips of three fingers: they should turn over on to the dorsum and sole of the foot about an inch, and should not encroach upon the metacarpal joints of either great or little toe, nor upon the back of the heel. Those for the thigh were about four inches wide, and consisted of an outer and inner, and anterior and posterior. Of the two former, one reached from the perinæum, the other from the crista ilii, to three inches below the knee, overlapping those on the leg: the posterior extended also from the crista ilii to the calf of the leg; the anterior, from the groin to the upper margin of the patella.

It will be observed, that no padding to protect the skin over the bony prominences from the pressure of the millboard splints was made use of; the necessity for such being obviated by careful adaptation of the apparatus: for example, in bandaging the limb, the roller should be laid on evenly with as few reverses as possible; the starch should not be lumpy; the millboard must be well-soaked, and moulded accurately to the subjacent surface; and their edges made thin by scraping. The absence of padding gives the apparatus a more symmetrical appearance, and allows a more even pressure to be exerted over the whole limb. It was supposed that the pressure of the apparatus when dry against the bone would cause sloughing of the intervening skin, but experience has proved otherwise.

The sensation experienced by the patient, directly after the apparatus was put on, in this and most cases, was a numbness of the limb, which passed off in a few hours. This man was kept as motionless as possible for forty-eight hours; the apparatus was then cut up from the toes to the

groin, along the anterior surface of the limb: the fragments were in good position; a fold of lint was inserted between the limb and the case, where, from the subsidence of swelling, an interval existed: the case was reclosed, and its edges kept together by bandaging from the foot to the groin; and, by smearing the surface with starch, slipping of the bandage was provided against, and the solidity of the apparatus rendered complete. This superficial coating of starch dried in a few hours; and then he was allowed to go about on crutches, supporting the injured limb with a sling from his neck to his foot.

From this time, the third day after admission, until his discharge at the expiration of six weeks, he never kept his bed for a single day, and required no attention from me during that time.

On the morning he left the hospital, I examined his limb: it was of the same length as its fellow; the muscles were rather shrunken; and the knee-joint very stiff. The fracture had firmly united, without any deformity of the bone: the only indication of the seat of injury was some thickening just above the knee-joint. During the last fortnight, he had discontinued the use of the sling, employing his limb in progression with the aid of crutches; and, to give freedom to the ankle and hip joints, for this purpose, the apparatus had been slit up at the dorsum of the foot, and at the groin. In the present instance, a simple bandage was put on; and he soon regained sufficient use of his limb to enable him to walk with a stick.

I saw him four months afterwards. He was then at work, and had entirely regained the use of the knee and the full development of the muscles.

REMARKS. Taking the age of this man and the position of the fracture into consideration, together with the very favourable recovery, I think we may fairly suspect the injury to be a separation of the epiphyses from the shaft; and this suspicion is strengthened by the slight amount of swelling immediately following the injury. Distinct crepitus was felt after the displaced fragments had been brought into apposition. Be the injury either fracture or diastasis, the disturbing influences are the same; muscular action had to be controlled in either case; and this was effected by fixing the neighbouring joints, and exerting such pressure upon the muscles themselves as would prevent their contraction.

CASE VII. Thomas Coyle, aged 56, a bricklayer, was admitted into the Queen's Hospital on November 2nd, 1853, having, a short time before, sustained a fracture of his left thigh, and of the radius of his left arm. He fell backwards from a ladder while in the act of ascending it with a bucket of water in his left hand, and came to the ground, the distance being about fifteen feet. When seen, he was suffering severely from the shock, and complained of much pain in the left shoulder, wrist, and thigh. The shoulder and side of his chest were contused, but not otherwise injured. Immediately above the wrist, on the palmar aspect of the forearm, there was a considerable prominence; and on the dorsal surface, one inch above the carpus, a depression, most marked towards the radial border: the fingers were partly flexed. By grasping the hand, and making extension, the deformity was greatly lessened; and, by rotating it at the same time, distinct grating, one inch above the wrist, could be felt, leaving no room to doubt that the radius was fractured at this spot. When extension was discontinued, the deformity returned; the upper fragment projecting forwards, the lower backwards.

The treatment adopted in this case was that recommended by Dupuytren; the forearm being midway between pronation and supination, the hand was adducted by drawing it downwards over the extremity of the ulna. To maintain it in this position, a curved wooden splint was applied to the dorsal surface of the forearm, reaching from the outer condyle to the ends of the fingers; and a well-padded straight splint on the palmar aspect, from the wrist to the bend of the arm. Although great care was taken to prevent displacement of the fragments, still, at the end of the third week, when the splints were finally re-

moved, some deformity remained, with inability to flex the fingers; and it was many weeks before he regained the use of his hand.

The femur was broken at the junction of the upper and middle thirds; the superior fragment was tilted forward; the lower was drawn upwards, and could not be felt amongst the muscles; the limb was everted and shortened, the left heel being on a level with the inner malleolus of the right leg. The patient was a healthy-looking man, but of an irritable and anxious disposition. The treatment consisted in applying an apparatus similar to what has been described in the preceding case, with the addition of a wooden splint outside the apparatus, reaching from the axilla to the foot, to prevent him from moving until the apparatus had become dry.

On the third day, the wooden splint was dispensed with; and then the apparatus was cut open with a pair of stout curved scissors, along the sole and dorsum of the foot, up the anterior of the leg and thigh to the groin. The limb was then inspected; one-half of the apparatus only being drawn aside from the limb, while an assistant with both hands kept the other firmly applied. The examination of this side having been completed, this half of the apparatus was replaced, and made to serve the purpose of the other, while that was withdrawn to permit a like inspection of the other side. The patient had complained of pain at the knee, which was found to proceed from pressure upon the patella by a portion of the millboard splint, which being removed gave relief. The upper fragment also appeared to be somewhat tilted forward, probably since the apparatus was opened; but, to make sure of the ends being approximated, a broad pad of lint was laid along the thigh, in the course of the superior portion of the bone. The apparatus was then closed, and firmly bandaged over; after which a light coating of starch was laid on: the apparatus was then perfect. He might, without apprehension of mischief, be lifted about from one couch to another; or, if needful, have taken a journey. The injured limb was so packed as to be perfectly immovable within its case.

This poor man suffered severely from the effects of the fall, having a sharp attack of inflammatory fever for several days, accompanied by a most troublesome cough. The contusions of the shoulder and chest gave him much uneasiness; so that it was not until the third week that he was permitted to be dressed and placed on a bed by the fire. He was unable to go upon crutches, because of the injury to the left wrist. At the sixth week, he contrived, by having the apparatus cut so as to set his ankle and hip joints at liberty, to get about with the aid of a crutch and stick; and, when discharged from the hospital, a fortnight afterwards, he merely wore a part of the apparatus about his thigh, and walked with a stick only.

CASE VIII. G. Wilkinson, aged 26, employed on the railway, was admitted into the Queen's Hospital at 3 A.M. on October 8th, 1853, having a short time previously sustained a compound fracture of his right thigh; he was getting over a boarded fence five or six feet high, on the other side of which an excavation several feet in depth had been made unawares to him, and which, from the darkness of the night, he did not discern; instead, therefore, of alighting upon the ground, level, as he supposed, with the opposite side, he fell with much violence to the bottom of the cutting, and upon attempting to rise, found he had injured his right thigh.

When brought to the hospital, he was suffering greatly from shock; his trousers were torn and bloody; opposite the rent could be seen a wound an inch and a half long, rather above the middle of the thigh, on its outer side: as he lay upon his back, the limb was found to be three inches shorter than the other, and everted. The femur was fractured at the junction of its upper and middle thirds; the superior fragments was tilted forwards, the inferior drawn upwards. By extension, the limb was restored to its natural length, and by pressing down the upper fragment, coaptation was readily effected; it was now seen that the wound led directly to the fracture. The long splint was

temporarily applied, the wound having been first cleansed from blood and dirt, and its edges approximated by plaster. A few hours afterwards, the system having rallied from the shock without hæmorrhage coming on, the long splint was carefully removed, extension being kept up by an assistant, and the apparatus was applied as described in Case VI.

On the second day, the limb was examined: the edges of the wound had adhered, the thigh was not much swollen, and the fragments of the bone were in apposition. The apparatus, which had been cut open to allow inspection of the limb, was most carefully reclosed, and the patient ordered to keep as quiet as possible.

He went on well—that is to say, without pain or any febrile disturbance—until the ninth day, when these symptoms, with rigors, were present. The limb was examined, and found to be somewhat swelled at the seat of injury, while skin around the wound was reddened; an opening, four inches square, was made in the apparatus, to permit inspection of the wound, and the application of poultices without disturbing the limb. Suppuration soon followed; the wound opened, and discharged much ill-conditioned purulent matter for several days; after which, the discharge became less in quantity and more healthy in character. The bone could now be felt with a probe denuded of its periosteum for some extent; but as the patient improved in strength, and the limb was so completely supported by the apparatus that he could be moved in and out of bed without disturbing the fracture, it was hoped that exfoliation might take place, and the wound ultimately heal. This hope was not to be fulfilled: the man did well for a time, but fresh abscesses formed, hectic fever set in, and amputation became imperative. The limb was removed after the circular method by Mr. Sands Cox, exactly two months from the occurrence of the accident, the man ultimately recovering.

REMARKS. The utility of the apparatus for the fractured thigh was in this case most remarkable; for during the two months an endeavour was made to save the limb, the patient could be moved without suffering any pain or inconvenience; the wound could be dressed as often as required without any disturbance of the fragments; and although the apparatus was worn until the limb was brought to the operation table for amputation, yet it was neither shortened, deformed, nor excoriated. In fact, the treatment adopted fulfilled all the indications necessary for the reunion of bone under ordinary circumstances, and therefore the want of success must be attributed to the severity of the injury and the weak constitution of the patient. It was afterwards found that an inch and a half of the entire thickness of the lower shaft was necrosed, and that the process of separation had commenced, while in the surrounding structures formed the walls of a large cavity lined by a thick pyogenic membrane.

CASE IX. E. M., aged 77, was admitted on 3rd October 1853, having a few hours before fallen down stairs while intoxicated, and broken her right thigh bone transversely about the middle. She was a spare woman, of small stature; and as she lay upon her back in bed, the upper fragment was plainly visible beneath the integument rather to the outer side of the thigh, while the leg lay upon its side with the foot completely everted, and the limb shortened nearly two inches. By means of steady extension, coaptation of the fragments was effected; after which, the same method of treatment was adopted as in the former cases. She suffered from incontinence of urine; and to prevent the apparatus from becoming wet, oiled silk was placed over the upper and back parts.

After a few days, she was propped up in an arm-chair by the fire for several hours daily, which contributed much to the maintenance of her health and strength, as well as comfort.

She wore the apparatus for six weeks; it was then cut off above the knee, the thigh part only being worn as a support for a week or two longer. The bone united firmly

without deformity or shortening, and she regained a good use of the limb.

REMARKS. May not this old woman's rapid recovery be attributed to the treatment employed? Had she been subjected to the ordinary treatment by the double inclined plane or the long splint, how much trouble and inconvenience would the incontinence of urine have given rise to, besides the almost certainty of bed-sores from lying constantly in one position?

CASE X. M. A. Girling, aged 7 years, was placed under treatment for fracture by direct violence of the right thigh bone at the middle of the shaft, on the 21st February 1854. The apparatus was applied precisely the same as for an adult. In some cases, however, the millboard employed should not be of the same thickness, that it may be more conveniently fashioned to the size and shape required. During the first two days, while the apparatus is becoming dry, it is advisable with children to attach a wooden splint outside, to reach from the axilla to the foot, because from their restlessness the limb might bend at the seat of fracture, and so produce deformity; it serves also to fix completely the hip-joint. When the apparatus has dried, it is sufficiently strong of itself to act as a splint; while from the equal pressure it exerts, it effectually controls muscular action, and so prevents displacement of the fragments and shortening of the limb.

When the long splint was removed from this little patient, the apparatus was cut open, and a thick fold of lint having been laid over the upper fragment, it was reclosed by bandaging, and worn without further interference for the next three weeks—she being dressed daily, and allowed to move about on the bed or couch as much as she chose; that portion of the apparatus from the knee downwards was then removed, the part upon the thigh and hip only being retained, but not so firmly applied, that she might begin to regain the use of the limb.

She was discharged on the 17th March, having been under treatment twenty-seven days; the bone had then perfectly united without shortening, and she was fast obtaining her former gait.

CASE XI. Emily Parsonage, aged 3 years, was admitted on January 20th, 1854. A ladder fell upon her, causing concussion of the brain and fracture of the middle third of the right femur. It was some time before consciousness returned. The same method of treatment was pursued as in the former case. She had regained full use of the limb in a month without shortening or deformity.

CASE XII. Henry Tyerback, aged 6½ years, met with fracture of his left thigh bone on August 6th, 1853, and was under treatment, until September 16th, seven weeks; he was of a very delicate constitution; and although without much danger the apparatus might have been removed sooner than it was, yet as the injury had occurred almost spontaneously, it was thought prudent to treat it constitutionally as well as locally. On one occasion, while showing this boy to the surgeon at his visit, as a case successfully treated by the modern method, he observed to my chagrin that the injured limb was shorter than the sound one. The boy was lying full length upon his back, and stretched out the sound limb, while he had no power over the injured one with the apparatus on. In this position, I made measurements of the legs, and found shortening to half an inch in the left—the respective points being the anterior-inferior spinous process of the ilium and the malleoli on each side. Upon raising the boy into a sitting posture, this apparent shortening no longer existed; both limbs were of the same length.

CASE XIII. Ellen Wilson, aged 6 years, broke her thigh at the junction of the middle and upper thirds transversely; she was running and slipped down upon the pavement. She was brought to the hospital on April 27th, and was immediately placed under the treatment adopted in the foregoing cases, and was discharged on the 20th May 1854, having been a patient twenty-three days. The fracture had united, and she had acquired tolerable use of the limb.

CASE XIV. Sarah Ann Field, aged 5 years, was brought to the hospital on the 5th May 1854, having sustained fracture of the middle third of the left femur. She wore the apparatus for three weeks, and was discharged from the hospital five days afterwards. In this case, as the amount of swelling was trivial, the apparatus was not disturbed from the time it was put on until it was finally removed. The treatment was perfectly successful, requiring less attention or time than any other method I know of. I have now tried it upon many children from the age of 16 months upwards, and never had a single failure: the worst result being a temporary lameness, protracted in some instances, but never lasting beyond three months. Stiffness of the knee or ankle-joint, common amongst adults for a time after injuries of the lower limbs, requiring them to be kept rigidly in one posture, I have observed to be rarely present with children after fractures.

[To be continued.]

Birmingham, June 1855.

THE SOUND OF THE *BRUIT DE POT FÉLÉ* AND ITS MODIFICATIONS, AS OCCURRING MORE PARTICULARLY IN THE CHRONIC BRONCHITIS OF CHILDREN.

By JOHN COCKLE, M.D., L.R.C.P., Physician to the City Dispensary, etc., etc.

THE peculiar but easily recognised sound of the *bruit de pot félé* appears to have eluded the patient search of Auenbrugger; at least, there does not appear in the *Novum Inventum* any passage which would bear the construction of familiarity with it. Nor was his great and impartial commentator, Corvisart, more successful. This non-acquaintance with the sound, however, may have resulted, not so much from the method of percussion employed by these early investigators, as from an inexperience of the conditions upon which it depends. Perhaps, in point of priority of claim, though disavowed by him, Laennec may be mentioned as the person to whom modern science stands indebted for the first description of the phenomenon. In his work upon *Auscultation*, as also in an article in the *Revue Médicale* for the year 1824, he pointed out the peculiarity of the sound, and regarded it as specially characterising tuberculous excavation of the lung. In this view, he has been supported by the greater number of systematic writers upon the subject almost to the present time.

Contemporaneously, or nearly so, with the discovery of Laennec, Husson and Martinet indicated the existence of a peculiar "*tintement métallique*" upon percussing the upper part of the chest of a phthisical subject. At a later period in the history of percussion, Raciborski announced a fact interesting in a physiological rather than in a pathological point of view—that a *quasi* cracked metal sound might be occasionally elicited by percussing the thorax of children during the act of crying, and even of thin-chested persons during expiration. The occurrence of percussion metallic resonance under these last named circumstances has still more recently attracted the attention of Professor Wintrich of Erlangen, who has given the subject a yet greater extension. Dr. Stokes, restricting his observations to the department of special pathology, admits the occurrence of a metallic resonance, resembling the sound of the *bruit de pot félé*, in the effusion stage of bronchitis in children; and considers the subject worthy of greater attention in this particular than has hitherto been bestowed upon it. Dr. Walshe also regards the sound as a frequent one in infantile bronchitic disease. My own observations confirm the opinion of these distinguished physicians, that the sound has no necessary restriction to the excavation stage of phthisis. I further believe, however, that it is frequently developed with remarkable intensity in the chronic bronchitis of children, both in its dry and secretive stages, and under circumstances where there does