

## Part First.

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### ORIGINAL COMMUNICATIONS.

ARTICLE I.—*Refracture in Cases of Deformity from badly-adjusted Fracture.* By JAMES SPENCE, F.R.S.E., F.R.C.S.E., Surgeon in Ordinary to the Queen in Scotland, Professor of Surgery in the University of Edinburgh.

REFRACTURE of a badly-united broken bone can scarcely be regarded as a novelty in surgical practice, for in early surgery, especially amongst the Arabian physicians, it seems to have been frequently practised; so much so indeed, as to call forth a strong protest from Abulcasis, who reprobated the frequency with which surgeons had recourse to it, and, at the same time, expressed his preference for resection of the fracture, which he speaks of as a simple and successful method of treatment. Mr John Bell, writing on this subject, says, "It was at one period so common an operation, that it looks indeed as if they had broken legs out of mere caprice. Here I cannot help remarking, that wherever there existed hot wars betwixt the bone-setters and the regular surgeons, this practice prevailed in a particular manner. The surgeons, by laying a leg across a stool or across the knee, and breaking it, taught the country people what sort of punishment awaited those who ventured to put themselves into the hands of professed bone-setters; and one example of this kind now and then served to keep a whole province in awe, and suppressed all petty treasons against the regular professors of surgery." It was, however, only in recent cases that this bending or breaking badly-set fractures was had recourse to, for we find Heister stating that it is not to be done "but where the callus is tender, and the patient young and vigorous;" and in cases of recently united fractures attended with deformity, the practice of remodelling, or, if necessary, refracturing the limb, by bending it over the knee or over a chair or block, has continued to be occasionally resorted to. In cases of fractures of long standing, attended with great distortion and shortening, in which firm union had been long completed, attempts to refracture the limb seem to have been deemed hopeless, on account of the degree of force required to accomplish the object in view, the pro-

bability of the refracture not taking place at the proper part, and the risk of injury to the large bloodvessels or nerves in the neighbourhood. When attempts to remedy such deformities have been made, section by various forms of osteotomes seems to have been preferred—a method not free from special dangers, not easy of performance, nor yet very successful in cases where much deformity and overlapping exist.

Mr Butcher of Dublin, in a number of his Reports on Operative Surgery, published in 1874, drew attention to the subject by recording a case of great deformity resulting from fracture of the femur, which had thoroughly consolidated about five months before he saw the patient. The young man was mate of a ship, and had met with the accident at sea by falling from a height of 40 feet. He sustained a bad fracture at the middle of the femur. The ship put back into Liverpool, and he was placed in hospital, but the injury resulted in great shortening and distortion of the limb; and on account of this, he consulted Mr Butcher, who, after considering all the risks, determined to refracture the thigh by means of a powerful osteoclast. The result was a most perfect and triumphant success. It so happened that I was considering what could be done in the case I am about to narrate, when Mr Butcher's paper reached me. I communicated with Mr Butcher, who agreed with me that though the case of my patient was a most unfavourable one for anything being done, and a very severe test for his method of treatment by refracture, yet that seemed to afford the best chance of at least diminishing the extreme deformity. The following history of my case is taken from the Hospital journal:—

#### CASE OF REFRACTURE OF FEMUR FOR A BADLY-UNITED FRACTURE.

Thomas I., æt. 24, unmarried, a farmer, residing in Ottawa, Canada, was admitted to Ward XIII., S., on 8th October 1874, for badly united fracture of the femur.

*History.*—Twenty-one months ago, when up country, his thigh-bone was broken by a tree falling upon it. It was three days before it was set, and then merely short splints were applied. He lay in bed for three months but as the limb was never seen to after being set, the bone united very badly.

*On admission* there was a marked deformity and shortening of the limb. It was four inches shorter than the right; whilst at the junction of the middle and lower thirds of the femur there was a great knee of bone projecting outwards, caused by the upper portion of bone riding on the lower. The knee was thrown outwards and forwards, the foot everted, and when the patient was in the upright position, it did not touch the ground. The muscles on the front and outside of the leg were paralyzed, owing to the pressure of the bone on the external popliteal nerve.

9th November.—The extension apparatus was applied shortly

after admission, but did little good. The tendo Achillis was then divided, and the interrupted galvanic current applied to the paralyzed muscles. The electro-contractility and sensibility were both found to be diminished in the injured leg.

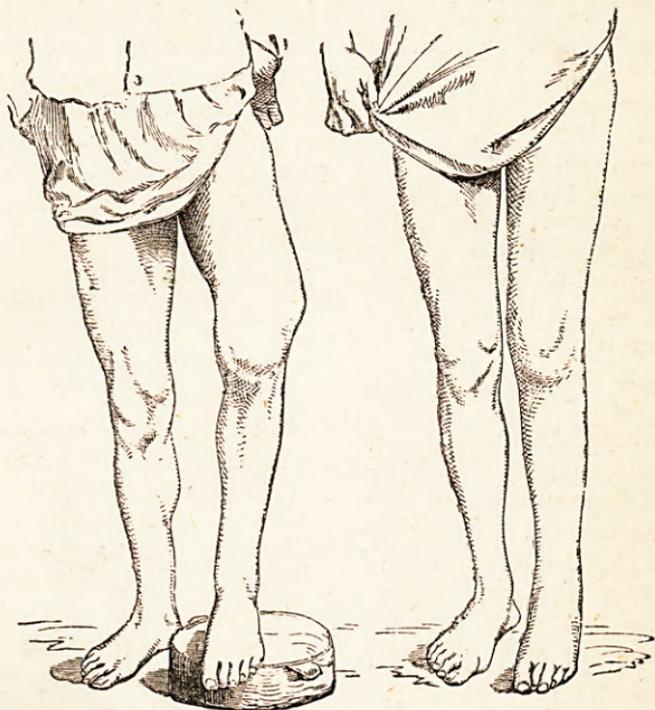


Fig. 1.

*30th March 1875.*—Since last entry little was done beyond the application of the interrupted current thrice a week.

*31st March.*—To-day, the patient having been placed under chloroform, Butcher's osteoclast was carefully adjusted to the limb, so that the pad lay over the projecting piece of bone. The instrument was then screwed home. A slight creak was heard during this, but as there appeared no sudden giving way of the bone, the sound was believed to proceed from the instrument. It was not until the screw was undone that the femur was found re-fractured obliquely, just where the union had taken place. Traction was now made on the limb, the long splint applied in the usual way, and well-padded Gooch's splints placed around the thigh to maintain the bones in position. The extension apparatus, weighted with 11 lbs., was also used to assist in extending the limb.

*2d April.*—Pulse and temperature have been normal since the operation, except on that evening, when the temperature rose to 100°. Other 2 lbs. added to extension.

*15th April.*—The long splint and perineal band were removed

ten days ago. The extension weight has been gradually increased, so that now it amounts to 21 lbs. To-day the patient was put under chloroform, and forcible extension made on the limb;  $\frac{1}{4}$  inch was thus gained, and it is now only  $1\frac{7}{8}$  inch shorter than its fellow.

*30th April.*—Patient's general health continues, as it has been throughout, perfectly good. He complains of pain on pressure on the outer aspect, at the seat of fracture; and, consequently, no further extension is to be attempted in the meantime.

*6th June.*—The extension apparatus (weighted with 15 lbs.) has been resumed for a time. Limb now  $1\frac{1}{4}$  inch short.

*26th June.*—Patient allowed to get up.

*15th July.*—Sent to Convalescent House.

*2d Aug.*—Readmitted.

*10th Aug.*—Went home to Canada. The limb is quite straight, but the extensors of foot and peronei are still paralyzed.

As Mr Butcher's paper on refracture may not be easily obtained now, I think it advisable to add the accompanying illustration and description of the osteoclast and the method of applying it.

The apparatus consists of a solid piece of wood 15 inches long, 10 inches wide, and  $3\frac{1}{2}$  or 4 inches in depth. Into the centre of this block a strong bar of steel is firmly implanted, and then rises perpendicularly at one side for 12 inches, and is then again curved over towards the centre of the block of wood, and terminates in a female screw, 2 inches deep; through this a male screw plays. The male screw is fully 12 inches long, with an expanded plate of metal of bell shape at its lower end, in which the end of the screw turns; through an opening at its upper end a strong rounded bar of steel 6 inches long passes, which is used as a lever to turn home the screw. When the operation is to be performed, the long screw is elevated fully, the limb laid on the block of wood, as represented in Fig. 2, and then a piece of wood, 2 inches thick, 6 inches long, and 3 wide, well cushioned, is laid over the most prominent or deformed part, and held steadily by an assistant. The screw is then brought down on the small block of wood so as to fix it firmly, and by gradually bringing down the screw, whilst the limb is kept steady, sufficient force is employed to refracture the bone; then by forcible steady extension, whilst the screw is still gently worked down, the deformity is remedied. The limb is then placed either in such a fracture-box as recommended by

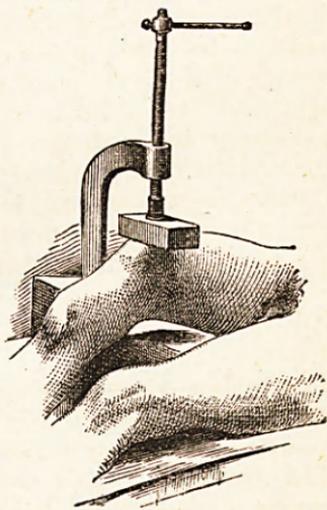


Fig. 2.

Mr Butcher, or treated by the ordinary extension apparatus. The accompanying illustration will give a better idea of the apparatus and its application than any verbal description.

The case narrated above presents some points of interest in reference to the treatment of such badly-united fractures. As regards the probabilities of success, it would be difficult to conceive a case more unfavourable. The length of time which had elapsed since the injury, the amount of overlapping and deposition of new bone, which appeared to be due to some detached comminuted portions, the great distortion and lateral projection, together with the contraction and alteration of the muscular and other tissues of the injured limb, were very serious obstacles to refracture and extension of the limb being readily accomplished. And then there was the very hopeless feature of paralysis of the extensor and peronei muscles, too obviously due to lesion of the external division of the popliteal nerve at the time of the injury, and the great retraction of the heel, as a consequence of the unopposed action of the gastrocnemius and soleus muscles; whilst the vitality of the leg and foot seemed considerably impaired, owing to obstructed circulation and diminished innervation from the pressure of the bony mass near the popliteal space.

The question of interference was therefore a very serious one; for besides the ordinary risks of the bone not breaking at the proper place, or of injury to the great vessels by any fragment of the bone, there were added the dangers arising from great direct force; the bruising and extravasation likely to arise from such force, applied to a limb whose vitality was so weakened; and also the risk of laceration of the contracted and consolidated soft textures of the limb in attempts at extension after refracture was effected.

The early part of the treatment by extension was with the view of exercising a gradual extension on the soft textures of the limb, to prepare for further extension after the operation.

The use of galvanism was resorted to, to try and restore the muscular contractility of the extensors, and in the hope that the nervous power might be in abeyance owing to pressure rather than absolutely destroyed, and it was obvious that the muscles in question could not act until relieved from the opposition of the gastrocnemius and soleus by division of the tendo Achillis.

Having continued the preliminary treatment for some time, I proceeded to refracture the femur. Owing to the oblique nature of the fracture, and the outward projection of the deformed part, it was more difficult to adjust the force to bear exactly upon it than if the projection had been directly forwards. Still, this difficulty was overcome, and refracture accomplished. Forcible extension and counter-extension was made by assistants, but the full length of the limb could not nearly be restored. As I was prepared for this, from the considerations I have already stated, I

determined to effect extension gradually by the pulley and weight. The elongation effected was maintained by applying the long splint before the patient was removed from the theatre, and subsequently extension by weight and pulley was substituted, combined with the short splints around the thigh to obviate lateral displacement.

The result was such as I could hardly have expected. So far from the dreaded bruising, laceration, or swelling at the part where the force was directly applied, there was no ecchymosis, and scarcely any appearance of swelling, and no rise in general temperature or pulse. In fact, after the effects of the chloroform had passed off, there never was any constitutional disturbance nor complaint of pain.

The loss of nervous power was not much ameliorated, but the success in the restoration of the limb to nearly its original length, and the removal of the great deformity, may be judged of from the accompanying woodcuts from photographs of the limb before and after the operation. In conclusion, I think that such a testing case as this proves satisfactorily the efficiency and safety of Mr Butcher's method of effecting refracture.

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ARTICLE II.—*On the Alleged Occasional Epidemic Prevalence of Puerperal Pyæmia or Puerperal Fever, and of Erysipelas.* By J. MATTHEWS DUNCAN, M.D.

(Read before the Medico-Chirurgical Society of Edinburgh, 2d February.)

I HAVE repeatedly alleged that puerperal pyæmia or fever does not occur as an epidemic, but I have never solemnly adduced evidence to that effect. This I now propose to do.

The prevalent, if not the universal, opinion still is, that both it and erysipelas do prevail epidemically at certain times. To show this, I quote a paragraph from a recent speech by Dr Priestley, the distinguished President of the Obstetrical Society of London. "A warm discussion (says he<sup>1</sup>) has taken place as to whether puerperal fever is ever really epidemic; that is, dependent on general atmospheric or other influences which pervade a community, as distinctive from the miasms of unhealthy hospitals, or the propagation of the disease from one patient to another by inoculation. Dr Matthews Duncan is inclined to doubt the evidence of its epidemic character altogether, and to regard it as essentially endemic. There is no doubt, as he suggests, that the word 'epidemic,' as applied to an outbreak of puerperal fever, has been at times used by authors carelessly, and that 'endemic' would have been the more appropriate term; but the annals of medicine still afford undoubted evidence of the epidemic character

<sup>1</sup> British Medical Journal, 8th January 1876. P. 36.