

Lectures ON CLINICAL SURGERY,

DELIVERED DURING

THE WINTER SESSION OF 1854-5.

By JAMES SYME, Esq.,

PROFESSOR OF CLINICAL SURGERY IN THE UNIVERSITY OF EDINBURGH.

LECTURE VII.

FRACTURE OF THE THIGH.

THE next case to which I shall call your attention is one of fracture of the thigh; and as we have not hitherto spoken of fractures, I will enter in a general way into the principles of their treatment, and without at present going into the subject of the mode in which the union of broken bones is accomplished, will consider at once the object and means of treatment. The object in treating fractures is to maintain the fragments in their proper place, and to keep them free from motion till reunited. The causes that induce displacement are, in the first place, the weight of the limb, which tends to cause motion of the broken surfaces, producing, for instance, in the inferior extremity, a tendency to eversion of the foot, to obviate which the toes of a dead body are tied together. The great cause, however, is the action of the muscles, which constantly tend to draw their attachments nearer to each other, and are also liable to the additional contraction produced through volition and spasm.

The importance of considering muscular action in treating fractures was first particularly insisted upon by Percival Pott, whose writings on this and other subjects of practical surgery, I cannot too strongly recommend to your attention. Before his time, pieces of wood or iron, or some other unyielding material, were applied, to squeeze down the rising or riding end of the bone, as it was called, but which as Pott showed only appeared to project in consequence of the other end being drawn away from it. Pott himself happened to meet with fracture of the leg in his own person, and found great comfort in having the leg bent, on the journey from the scene of the accident to his own house. He saw that the relief which he experienced was due to the relaxation of the great muscles of the calf, which are not counterbalanced by any muscles of corresponding size on the front of the limb, so that their relaxation when the leg is bent, is not accompanied by any proportionate tension of the anterior muscles. Hence he was led to conclude that the great object in treatment should be to withdraw the obstacles produced by muscular contraction. Some who have imbibed his opinions at secondhand, have supposed splints altogether unnecessary, but Pott was fully aware of the necessity of splints,—not the short ones previously used to squeeze down the riding end, but long enough to extend beyond the ends of the broken bone. Keeping these principles in mind, let us proceed to the particular case of fracture of the thigh-bone.

Can anything be done by position of the limb, as in the case of the leg? Abduction of the limb would stretch the adductors, and is therefore obviously improper, and the only position to be considered is that of the thigh and knee bent. On the front of the thigh are the extensors of the leg, which arise from the pelvis, and are inserted below the knee into the tibia; and on the posterior aspect are the flexors of the leg, which also arise from the pelvis, and are inserted into the bones of the leg below the knee. Now, if the thigh and knee be bent, the posterior muscles are stretched as regards their pelvic attachment, whilst they are relaxed with respect to their insertion into the leg, and the opposite holds good of the anterior muscles, which are relaxed toward the pelvis while they are stretched inferiorly over the bent knee; yet from overlooking this most obvious fact, persons have fancied they have been doing their duty to their patients by bending the knee in case of fracture of the thigh, the result of which has been that the upper fragment has taken the direction of the trunk, while the toes have been everted from the weight of the limb, and the patient on his convalescence has discovered, to his great concern, that he has been left with a very unsightly and useless leg. All surgeons who have treated fracture of the thigh have experienced this

difficulty, that there is no position that will relax the muscles, and accordingly various means have been resorted to for the purpose of counteracting them by extension. Hildanus employed what has been called his “jackstone,” which was suspended by a cord that passed over a pulley at the bottom of the bed, and was attached by its other end to the leg; others have tied the patient to the two ends of the bed; and others, again, have produced extension by means of the double inclined plane, of which you see an example, commonly known as M^cIntyre’s splint, from having been invented by a surgeon of that name in Newcastle; or sometimes Liston’s splint, in consequence of a slight modification made by him. In using this apparatus, the leg is laid over it in the bent position; the foot is fixed to the foot-board, and the weight of the body keeps up extension behind, just as the jackstone of Hildanus made extension in front. The most effectual means of producing extension of the thigh is the long splint of Desault, which is a piece of wood, about as broad as the limb is thick, extending from the false ribs to below the foot, which is attached to its lower end, while a band passing round the perinæum has its ends carried through two holes in the upper extremity of the splint, and tied with any degree of tightness, so as to produce extension of the limb. But I have no hesitation in saying that, however heavy be the jackstone of Hildanus, or however firmly the patient be tied to the ends of the bed, however carefully the M^cIntyre be applied, or however tightly the perinæal band be tied to the long splint, none of these means can prevent muscular contraction if the tendency to it continue, and if you obstinately persevere in combating muscular contraction with the long splint, you will incur the risk of ulceration of the skin of the perinæum, or mortification of the foot. Is the treatment of fracture of the thigh therefore hopeless? Is it true, as we have lately read in print, that a shortening of two or three inches is no discredit to the surgeon? I am happy to say that the case is very different, and that the result of our practice here shows thighs which have been broken, scarcely to be distinguished from the sound ones; only do not trust to overcoming muscular contraction by extension, but seek to prevent it by careful adjustment of the broken bone, and equable support of the limb in the proper position. If you succeed in these respects in the first instance, you will be surprised how easy the treatment will be afterwards; and instead of waging war against muscular contraction, you will have nothing to do but admire the tranquillity of the patient, and the completeness of the cure.

The patient lately admitted is a boy, ten years old, and the fracture is the upper third of the thigh. In children, fracture is usually in the upper third or the middle; in adults, commonly in the lower third; in old persons, generally in the upper part, through the trochanter or neck of the bone; but at all ages the treatment is extremely simple and uniform. A hair mattress is much preferable to a feather bed, which is so unequal and yielding, that I would rather treat a patient with a fractured thigh upon straw. Draw out the limb to its full length, which you ascertain by comparing the distance between the knee and spine of the ilium with that on the sound side; feel that the fragments are, so far as you can judge, in proper position; then apply at each side of the thigh a splint of wood, pasteboard, or leather, extending on the outer side from the knee to the great trochanter, and on the inner side from the pubis to the inner condyle. It is of little consequence which materials be used; wooden splints such as these (Gooch’s) are very convenient for private practice, as they can be easily cut down with a penknife, and at once adapted to a limb of any size, from a thigh to a finger; pasteboard and leather, however, are more accommodating, and can be fitted with greater accuracy to the limb. The splints are retained in position by bandages, which should not be rolled continuously round the limb, but applied at intervals, in the following way: a piece, rather longer than twice the circumference of the limb, is doubled, and passed round; one of the ends is put through the loop, and tied in a bow to the other end. Three or four such “looped bandages” are applied along the thigh,—three being sufficient, if the splints be of wood, while an additional one is desirable with leather or pasteboard, on account of their softness at the time of application. The advantage of this method of bandaging is, that the state of the limb can be observed for the most part without disturbing the bandage; and if it becomes necessary to make a fuller examination, all that is requisite is to untie the bows, when the splints can be separated from the thigh without its being raised from the bed. The spasmodic action of the muscles is continued, in consequence of their being pricked by the sharp ends of the broken bones. Now, when these lateral splints have been applied, although the muscles

are compressed, and the risk of displacement diminished, yet whenever the patient moves a joint of the affected limb he moves the broken bone, and it is therefore necessary to restrain the motions of the whole limb; hence the great advantage of Desault's splint, which, though powerless as a means of overcoming muscular contraction, is of inestimable value in maintaining the quiet of the limb; the patient cannot move his toes without moving the ankle also, nor the ankle without the knee, nor the knee without the hip-joint, so that if he moves his great toe there is a tendency to displacement of the fragments of the femur. It is curious that Desault has given a wrong representation of his own splint, and while describing it correctly, as extending from the false ribs to a little below the foot, has figured it as reaching up only to the great trochanter. Unless it extend to the false ribs, it has no power in restraining the motion of the hip-joint. In ordinary practice, the long splint is generally not made sufficiently broad; it ought to be equal in breadth to the diameter of the limb, or about four inches and a half for an adult; otherwise there is great difficulty in preventing eversion of the foot. The best means of fixing the limb to the splint is a sheet wrapped round the splint till a part equal in breadth to the circumference of the thigh remains enrolled; this is passed under the leg, and wrapped round it; after which its free margin is secured by strong pins to the part rolled round the splint, which serves also as a pad to the limb; it is also well to use a perineal band, not to produce extension so much as to act as an additional means of insuring the perfect rest of the limb; the foot being fixed to the lower end of the splint by a handkerchief passed round the ankle just above the heel, and crossed over the dorsum of the foot, the ends being passed through the holes or notches in the splint, and tied upon its outer surface; a broad bandage carried round the chest and upper part of the splint completes the apparatus. The sheet is far simpler and more effectual than rollers applied from the foot to the groin; two or three bandages, six yards in length, are required for that purpose, and though they look very neat when first applied, they soon require re-application; the state of the limb can never be ascertained without either raising the thigh to take off the bandage, or cutting it up, and in the latter case the thigh must be raised in order to re-apply the bandage; whereas, when the sheet is used, on taking out the pins, and throwing the sheet aside, the limb is exposed undisturbed for examination. This apparatus has also the great advantage that it can be obtained extemporaneously; there are few patients, rich or poor, whose houses do not contain a piece of wood that would answer for a long splint, and a sheet or tablecloth to wrap round it.

I consider that it is a great error to teach surgery only adapted to hospitals. Complicated apparatus is, in my opinion, not so good as the simple; but even if the complicated means were the more effectual, the other ought also to be taught. But I would trust to the simple apparatus before you, rather than to the most complicated ever devised. Some surgeons who would go along with me thus far, make an exception in the case of fracture of the thigh in children, saying, that the fracture being in the upper part of the thigh, the upper fragment must be tilted upwards by the action of the psoas and iliacus, and that therefore the double inclined plane is preferable to the long splint for children. This, however, is a merely theoretical objection, and ample experience enables me to testify that the long splint is as applicable for children as for adults. I admit rare exceptional cases, however; for instance, I have found it necessary to use the double inclined plane when the knee has been ankylosed in the bent position, and again in one case where the leg had been amputated. Other cases also do occur, though very rarely. A man was once brought to this hospital with a simple comminuted fracture of the thigh, for which the long splint was applied; the patient, however, obtained no relief from it, but suffered such extreme agony, that it made him even get out of bed and drag the splint after it. I confess he met with but little sympathy, being supposed to be affected with delirium tremens. After a while swelling of the limb came on, followed by ulceration, and protrusion of the bone in the ham, and I was obliged to amputate the thigh. On examination of the parts, we found that the fragments, instead of forming as usual a convexity forwards, projected backwards, and one fragment as sharp as a needle had penetrated the popliteal nerve, and obliterated the vein so that the extreme pain, and the swelling of the limb were both accounted for. It happened that a patient came in soon after with fracture of the thigh, with the fragments in the same position. My late house-surgeon, Mr. Bickersteth, told me that he could not make the bones lie straight with the long splint. We therefore used the double inclined plane with a perfectly successful result.

FRACTURE OF THE PELVIS, WITH LACERATION OF THE URETHRA.

The next case to which I shall allude, is one of great interest, being very serious, and also of considerable rarity. The patient is A. M—, aged thirty-four, pointsman at the Cobbingshaw station of the Caledonian Railway. On Monday the 13th November, he was crossing the line, at 8 P.M., when an engine, coming upon him unawares, at a speed of about fourteen miles an hour, struck him upon the right side of the pelvis, and knocked him down. He was insensible at the moment, but soon came to himself, and was brought by train to Edinburgh, and admitted into the Infirmary about ten P.M. At this time there was some swelling of the right thigh and groin, and, on examination of the pubic arch, an abrupt deviation from its natural line was felt about the junction of the rami of the ischium and pubes on the right side, and on pressure with the finger on this spot, very distinct crepitus was perceived, a small portion of bone being apparently detached, and freely moveable. As a measure of precaution, an attempt was made to introduce a catheter, but no urine could be drawn off, although the instrument passed pretty freely backwards, and was supposed to have entered the bladder. He was therefore put to bed, a flannel bandage being passed round the pelvis. Next morning, however, the patient complained of inability to pass urine, and a tumour began to appear in the hypogastrium. Another attempt was now made to introduce the catheter, but without success, its point having a constant tendency to slip out of the membranous part of the urethra. I was then asked to see the patient, and passed a full-sized instrument, which was tied in and remained for two days. About midnight of the day of its removal, I was again called to the case, in consequence of retention, with distressing symptoms. I again passed the catheter, which was now retained three days and a half, the patient not complaining of any inconvenience from its presence. But, within a few hours after it had been removed the second time, it became again necessary to introduce it, the patient being unable to pass a drop of urine. The instrument has been since retained, having been now, for the second time, three days in the bladder, in addition to the first two days. It now becomes a question, What is to be done? A man cannot always wear a catheter in his bladder: a metallic instrument is liable to cause injury by producing ulceration, and I believe it would be impossible to pass a flexible one. It would appear that the injury inflicted on the urethra has been such as to produce a valvular condition at the lacerated part; certainly no extravasation of urine has occurred, otherwise death must speedily have resulted from its escape from the part of the canal injured.

There seems to be something wrong in this case, which it is not in the power of nature to remedy. After careful consideration of the circumstances, I have concluded that the catheter must be now removed, and that if he should be still unable to pass urine, an incision must be made, so as to reduce the injury to the condition of a simple wound. There are two situations where this might be done: either laterally, as in lithotomy, or in the median line. It is not a matter of indifference which of the situations be chosen, that in the middle line being much the safer; for the artery of the bulb, which is a vessel of very considerable size, enters the bulb at its lateral aspect, just at the anterior part of the membranous portion of the urethra. Now, if a knife be entered into the membranous part of the canal at its lateral aspect and carried forwards into the bulb, then, (and engrave what I now say upon your memories till the last day of your existence as practitioners of surgery!) to an absolute certainty, must the artery of the bulb be wounded. Hence the common cause of wound of this vessel in lithotomy is division of the urethra too far forwards, and this is particularly liable to occur to those who use a straight staff. In the present case we shall have, very probably, to cut as far forwards as the bulb. The artery of the bulb is hardly within reach of ligature, and if pressure be applied to repress the hæmorrhage, extravasation of urine into the cellular tissue of the pelvis must of necessity occur when the patient makes an effort to pass urine. All this risk will be avoided by cutting in the middle line upon a staff grooved on the convexity, and then introducing a short tube through the wound into the bladder. The short tube is far preferable to a catheter in such a case, for here the incision, unlike that for stricture, involves the deep fascia of the perinæum, and if the beak of the catheter should slip for a short distance, the patient would be liable to fatal extravasation of urine. I speak from sad experience. A healthy young man once applied to me with a stone in the prostatic part of the urethra.

I extracted it easily, introduced a catheter, and tied it in. Next morning, however, I found him dying; the catheter had slipped, and urine had become extravasated into the pelvis.

[The patient continued unable to pass urine after the removal of the catheter, which was again introduced by Mr. Syme in the night. He found that the parts in the vicinity of the injury of the urethra were in a less satisfactory state than before; they were becoming softened, and a cavity containing urine had formed around the seat of laceration. Mr. Syme therefore resolved to proceed to the operation to which he had alluded in his lecture; and accordingly the next day, (Nov. 24th,) the patient being under the influence of chloroform, he introduced into the bladder a staff grooved on the convexity, made an incision in the middle line of the perinæum, and, having introduced the point of the knife into the staff, pushed it along so as to divide freely the membranous part of the urethra which he could distinctly feel to be lacerated; a short tube, such as is used after lithotomy, was then passed into the bladder through the wound, and tied in. Not more than an ounce of blood was lost in all, including subsequent oozing.

Mr. Syme in remarking on the operation said, that the only source of regret was that it had not been performed earlier. The prognosis was now rendered very unfavourable by the jaundice which had come on during the last twenty-four hours, and by a livid discoloration in the perinæum, which looked very like sloughing of that part. The patient felt at first much relieved after the operation; but, on the following day, he was seized with very severe pain in the hepatic region, and acute tenderness below the right costal margin. Leeches were applied, and calomel and opium administered; and, under this treatment, the pain and tenderness subsided, and in a few days the jaundice disappeared. Healthy lymph upon the surface of the wound showed also that the suspicion of sloughing of the perinæum was groundless; and the prognosis became, on the whole, much improved. The almost total loss of appetite, however, which he had before the operation, and during the hepatic attack produced great emaciation; and this, together with his lying always on his back, in consequence of the fracture of the pelvis, while the bed was more or less wet with urine, induced extensive bed sores, which have since been the chief difficulty to contend with in this case.

The tube was removed forty-eight hours after the operation. The urine then came freely away, and passed entirely by the wound for a fortnight. Mr. Syme then passed a full sized bougie, which went smoothly into the bladder; after which the patient passed a few drops of urine by the penis. During the following month the amount of urine passed by the natural passage increased, the bougie being introduced at intervals of about ten days. The use of the bougies has not been continued since; and a considerable proportion of the urine is still (February 6th) passed by the fistulous opening in the perinæum; hence the difficulty of healing the bed sores continues to be great, and he is prevented from making the progress which he doubtless would otherwise make. Still by the use of a large water pillow, and frequent change of bed-clothes, the back is now almost healed, and his general strength is on the increase, so that he is able to support himself in bed during the dressing of the back more than ever before.

On the 22nd of January, Mr. Syme showed to the class the urethra and parts of the pelvis of a young man eight years of age, who had fallen from the roof of a lofty house, and died in the hospital a few hours after. On admission he was almost unconscious, and moving his limbs about in a wild manner, and these symptoms, together with a severe bruise on the right side of the head, led to the suspicion of laceration of the brain, which was found to exist on post-mortem examination. A few drops of blood from the penis led to a careful examination of the pelvis, when a comminuted fracture of the descending ramus of the right os pubis was detected, and a catheter was kept in the bladder till a little before his death. On examination of the body, it was found that the horizontal and descending rami of both pubic bones were broken; and there was a comminuted fracture of the right side of the sacrum, through the line of the foramina for the passage of the nerves. Very extensive ecchymosis existed about the fractures, and the membranous part of the urethra was completely separated from the surrounding parts by coagulated blood, while some of the fragments of the pubes lay very close to the canal. On laying open the urethra, however, on a full-sized bougie, it was found to be quite entire, some bruising of the membranous part, and of the spongy portion near the bulb, being the only injuries it had sustained. Mr. Syme, after pointing out these facts, spoke as follows:—]

You recollect a patient who is still in the hospital, to whose

case I directed your attention in a former lecture, who had suffered fracture of the pelvis, and laceration of the membranous part of the urethra, and in whom I found it necessary to make an opening into the perinæum, on account of protracted retention of urine. In that man's case, the injury sustained by the urethra was only a degree further than what you see here; there the urethra was lacerated at its membranous part, by the fragments of the pelvis; here it is only bruised. You see from the condition of the parts here present how necessary was the precaution of introducing a catheter in that case. You observe the membranous part of the urethra is lying insulated from surrounding parts in a cavity filled with effused blood, and had the urethra been torn in this situation, and no catheter introduced, extensive extravasation of urine must inevitably have occurred. After bruising or laceration of the urethra, it is very necessary to introduce bougies occasionally to guard against the occurrence of obstinate contraction of the canal at the seat of injury.

This has been well illustrated by another case still in the hospital. You remember my speaking to you in a former lecture of a miner from Bo'ness, who, having occasion to descend a shaft eighty-four feet deep, adopted the dangerous method of slipping down a rope. He had not gone far, however, when he found that the rope was wet and very slippery, but he still kept his hold, and shot down with great velocity, lighting on the perinæum, upon the edge of a wooden cage used for drawing up the mineral. He then suffered from retention of urine, which the medical men of the district were unable to relieve, and he was therefore sent to this hospital. His bladder was then greatly distended, and the perinæum was bruised near the scrotum. A full-sized catheter was, however, introduced without much difficulty, although the urethra was obviously injured, and a large quantity of clear urine was drawn off. After a time bougies were passed with the object of preventing contraction, but not until it had occurred to a small extent; but now, the use of the instruments having been discontinued for ten days, the stricture has increased so much that it will admit only No. 1 bougie. This same patient, on his admission, complained of severe pain in the back, extending round the waist, and into the legs; and, on examination of the spine, a marked unnatural convexity was found on the lower part of the dorsal region, which was very tender when touched, and surrounded by ecchymosis. There could be no doubt that, the patient having lighted on his seat, the back had been violently bent, and fracture of the vertebræ had occurred, the bodies being compressed, while the spines were separated from one another at the part. The patient, however, has had no paralysis of the lower limbs, and the pain of which he at first complained has now almost entirely subsided. The spinal canal is of much greater capacity than the cord; and this accounts for the fact, that fracture of the vertebræ may occur without any injury to the cord. I have seen repeated instances of this in the hospital; and the present case is a good example of it.

Clinical Lecture

OR

L I T H O T O M Y,

Delivered at St. Thomas's Hospital,

By SAMUEL SOLLY, Esq., F.R.S.,

SURGEON TO THE HOSPITAL.

GENTLEMEN,—There is no operation in surgery equal to lithotomy in the difficulty of its performance, or the uncertainty of its result, from adverse circumstances over which the operator has no control. I express this opinion as the result of thirty-two years' observation in this hospital, from the scattered facts which I have obtained of unsuccessful cases in other institutions, and from the scanty records of private practice.

The disease, for which this operation is the remedy, is attended with such fearful suffering, and the result so surely inevitable, if the surgeon does not step in and avert the fatal blow, that no conscientious man can refuse to do his best, though his services may be thought too late to accomplish his desire.