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CLINICAL LECTURES ON DISLOCATIONS, DELIVERED AT THE CHARING - CROSS HOSPITAL.

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LECTURE XVI.

Gentlemen,—Mr. Pott was in error in considering that the extending power is lost in the elbow joint, when applied at the wrist. Loss of power is due to the elasticity of the extending medium. The question, therefore, is, do the muscles and ligaments about the elbow-joint yield to the forces so applied?

When we consider the character of lateral ligaments generally; when we recollect how the muscles about the joint, (by the wrist and hand becoming the fixed point,) antagonize each other, and each set in contracting tends to knit the bones of the elbow more closely together; how the biceps, triceps, brachialis-antichus, pronator radii teres, supinator radii brevis, and anconæus, draw the radius and ulna to the humerus, whilst, on the contrary, the muscles running to the wrist and hand from the condyles and ridges of the humerus, keep the lower end of the latter approximated to the ulna and radius, we can scarcely question that the power is transmitted through the elbow to the shoulder, without incurring sufficient loss from yielding to support Mr. Pott's views.

The same argument applies to the extension from the ankle.

Whether in pursuing this method any injury is done to the intermediate joint has not as yet been ascertained; at all events, although of late years universally adopted in France, we do not find any cases recorded of mischief incurred in these situations.

The application of extension to the wrist or ankle certainly affords the surgeon a longer lever, but the advantage said to be derived from the non-compression of the biceps and triceps muscles is very problematical. If any benefit does accrue from this circumstance, it is more than counterbalanced by the inability of relaxing the former. It has not been by any means satisfactorily proved that the application of the extending power above the elbow does produce such violent spasmodic contraction;

moreover, if the pathological facts related are to be relied upon, it would appear that these muscles present but little resistance, particularly as in some instances the long tendon of the biceps is ruptured.

But there is one reason against the application of extension to the wrist, which has not as yet, I believe, been noticed; but which, in my opinion, ought to render us very careful how we employ it. I allude to the superficial situation of the nerves in this part, and the probability of producing paralysis. In one or two cases related by Haubert, where extension was employed from the patient's wrist, the hand and arm became paralysed, and there can be but little doubt that this resulted from the injury to the nerves. In one case the patient was a woman, aged 60; the dislocation had existed seven weeks. Hemiplegia, and partial closure of one eye, followed; the limb, which had before been free from pain, and enjoyed considerable motion, was rendered nearly useless; the hand was powerless, and remained with the fingers permanently half bent.

In the other, reduction was attempted, on a gentleman, aged 50, fourteen days after the accident. Extension was applied, causing great pain and numbness in the hand and wrist. Great pain ensued in the whole limb and neck, subsequently shrinking of the member, and paralysis.

These cases certainly do not support the assertion of Crampton, that this method is attended with less pain than when the force is applied above the elbow, whilst they demonstrate the risks incurred of injuring the nerves, which, from their situation, and the nature of the parts by which they are surrounded, can scarcely escape injurious pressure.

The next question at issue is, whether the extension is best made by assistants or by instruments.

Latta is very decided upon this point, and asserts that extension should always be made by assistants, which, for the most part, will answer much better than any machinery yet invented. No surgeon ought even to think of a machine until his own strength, as well as that of his assistants, have totally failed. Desault, Heister, Douglas, Richer and

with many other surgeons, ancient as well as modern, prefer assistants, but it appears to me that they can never fulfil the indications required in extension, however desirous they may be of performing their duties efficiently.

Of course I do not advise you to employ machinery in every case indiscriminately, as in many instances neither extension nor counter-extension is necessary; but I would confine my remarks to those in which extension is required to be forcible or prolonged, or where the more simple measures have failed.

Ludwig recommends, "*extensio, autem blanda æqualis et successiva sit*;" it is in these requisites that assistants are deficient, their exertions are sudden, violent, and often ill-directed; their efforts are jerking and uncombined; and, as Sir Astley Cooper observes, more likely to produce laceration of parts than to restore the bone to its situation; besides, when the extension is required for any length of time their muscles become fatigued, and it is then impossible for them to keep up that steady force so requisite.

That the patient's sufferings are greater than when subjected to the pullies there can be but little doubt; indeed, Mr. Colles, of Dublin, who unfortunately dislocated his astragalus, complained that the pain he experienced from the abortive manual extension, far exceeded all the rest. I should, therefore, most certainly recommend you in all cases of difficulty, or where you find one assistant is insufficient, at once to have recourse to pullies instead of multiplying manual force.

But whether you employ pullies or not, you should always guard the patient's limb as effectually as possible against the effects of friction. Should you neglect this, bruising, inflammation, abrasion of the skin, and ulceration, will commonly ensue, adding very unnecessarily to your patient's sufferings, as such mischief can only proceed from carelessness and inattention on your parts.

In France they frequently employ lint, covered with cerate, and bandaged upon the arm, but in this country we usually prefer a wet bandage, properly and evenly applied. It is less liable to slip, and answers the purpose very well.

If you please, you may use a flannel roller. It is soft and elastic, but I prefer the wet calico; it sticks closer, and, upon the whole, answers better than anything else. However, you can use whichever you prefer, or is most readily obtained; but never, on any account, apply your apparatus until you have properly guarded the limb, when you may proceed according to the principles which we will next consider.

The object of extension is, not to overcome the resistance by excessive force, but rather to attain our ends by gradual elongation, and fatigue of the

opposing muscles. Nothing can be more injurious or injudicious than to suppose you can take these parts by storm. If you attempt to do so, you will show that you are totally ignorant of those principles by which you ought to be guided. All the best surgeons are unanimous in deprecating the substitution of force for fatigue.

"I know," says Mr. Pott, "that the *vis percussio*, as it is called, has been recommended as having been successful in some difficult luxations, but I have seen such bad consequences from it, that I cannot help bearing my testimony against it." And, in like manner, Hey observes, "Let it be constantly kept in remembrance that precipitancy, in extension, is one of the principal causes of failure, if extension is made in a proper direction, for in all cases, the more slowly extension is made, the more the resistance of the muscles will be eluded, and the probability of success increased."

In all instances, therefore, let your force at first be moderate, and steadily maintained; endeavour by degrees to fatigue and tire out the muscles, and then increase your extending power gradually.

If you put out all your force at once and suddenly, you may succeed, it is true; more probably you will not; whilst you are much more likely to lacerate the muscular fibres, and do mischief to the nerves, as in the cases related by Haubert, to which I shall refer hereafter.

Some surgeons prefer repeated extension to the constitutional remedies already described.

Allan says, "In powerful men, when the muscles have been difficult to overcome, it has been recommended to reduce the strength by warm baths, &c., or intoxication. I believe the preferable method is, by slow and repeated extension, to exhaust their strength.

"When the patient is strong and the luxation not recent, gradual extension should be applied, and continued, at intervals, for half an hour, repeating it morning and evening for several days in succession, not with a view to effect the reduction, but to destroy the adhesion, and elongate and fatigue the muscles. After this practice has been persisted in for a few days, it is wonderful with what ease the bone is sometimes reduced. In this way I have often reduced dislocations of three months standing, without much difficulty."

Mr. Allan is not the only surgeon who advocates this repeated extension. Leveillé adverts to the same methods in some of the cases he has related, where he says that his patients became so fatigued that he had them returned to their beds, with the promise to repeat the operation after they had recovered; from which, it would appear, that M. Leveillé usually desisted at the very time that his endeavours were most likely to be successful, for it

is considered that fatigue, and consequent inability to resist, is the condition most favourable to the object in view.

In his method a vast quantity of power was evidently thrown away, the intervals of rest enabled the muscles to acquire fresh energy, and the stiffness which would ensue about the joint would add no little to the patient's sufferings.

There can be no doubt of the benefit derived from gentle and long continued extension. It is not the power exerted, so much as the length of time it is employed, which, as Mr. Hey has already remarked, is so beneficial.

Because you keep up extension for four hours, or longer if required, it is by no means necessary that you should increase your power in the same ratio; indeed it would be wrong in you to do so, for it is not the time expended that endangers the patient's life, that tears the nerves and lacerates the muscles, but the violent and improper manner in which the force is exerted.

Mr. Mash, the house-surgeon to the Northampton General Infirmary, has recently published a case in the *Lancet*, in which the extension was continued gradually and perseveringly from ten in the morning until six in the evening. The dislocation had existed for nearly two months, but was reduced by this method, combined with bleeding, warm bath, and tartarised antimony.

There was slight abrasion from the friction of the apparatus, but no other inconvenience resulted from the lengthened extension.

In his remarks on this case, Mr. Mash observes, "Were any similar case to present itself, I should continue gradual and persevering extension during a whole day if necessary, keeping the patient during this period in a warm bath, and after depletion giving him the potassio-tartrate of antimony, so as to induce syncope. That the latter auxiliary means have their use cannot be doubted, but I should mainly depend for reduction on long continued and unrelaxing extension."

That you should more completely understand the subject, I have endeavoured to describe to you what is meant by extension and counter-extension, and the laws which govern their application.

We are commonly told that there are three things necessary for the reduction of a bone, viz.:—Extension, counter-extension, and coaptation, or the subsequent application of such force as is necessary to replace the bone.

But, in reality, where the two former are employed, the last indication is rarely required; for if a sufficient degree of extension is applied to draw the head of the bone on a line with the cavity, the reduction is in almost every instance completed by the action of the muscles.

You will know that you have succeeded by the disappearance of the symptoms.

Usually, as the head of the bone returns, (particularly that of the femur,) it enters its cavity with a very audible snap. Sometimes this is wanting, mostly in those cases where the dislocation has existed for any length of time; therefore, although this noise is a corroborative sign, it is not an indispensable one.

The limb will resume its natural length and the joint its normal shape; the patient will immediately experience a cessation of the pain, and recover the power of moving the joint, of which he had previously been deprived. When you have reduced the bone the principal part of your duty is performed. It has been well remarked, that dislocation differs from fracture in the fact, that when, in the former, you have returned the bone to its natural position your treatment is nearly ended, whilst, on the contrary, in the latter, it has only begun.

It is comparatively a rare occurrence for much inflammation to succeed reduction performed under ordinary circumstances. Generally all that is necessary is, to prevent the head of the bone again slipping out, and to keep the limb entirely at rest, that the injury to the muscles and capsule may be repaired. Fortunately the position most favourable to effect these objects is that which agrees best with the patient's comfort. It is evident, unless fracture has occurred, that the head of the humerus cannot be displaced so long as the arm remains by the side; neither can the head of the femur slip from the acetabulum unless the leg is separated from its companion. Therefore, in dislocations of the shoulder, you should bind the arm to the side, and carry the forearm across the front of the body, fix it in that position, and support the elbow so as to prevent any dropping of the shoulder. There is no occasion to confine your patient to his bed or even to the house, unless more inflammation comes on than is usual in these cases. At the end of a fortnight you may move the joint a little every morning, but the limb should not be left entirely free for three weeks or a month. If it be employed too soon, it is weakened and predisposed to a recurrence of the mischief. This should be avoided as much as possible. Should you find at the expiration of this period, that the muscles remain weak and the joints stiff, you will do well to order friction, the application of stimulating embrocations, cold douche, blisters, &c. Where numbness exists in the hand and arm, I have found electricity in the course of the nerves very beneficial.

Should inflammation run high, you must treat the case as I have before recommended; but you will not then attempt to move the arm so soon, nor indeed at all, until you have subdued the symptoms. When you have done this, you may proceed in the usual manner. In cases of disloca-

tion of the hip, so long as the legs are kept together, if there be no fracture, the bone can scarcely slip out of its cavity. You should therefore apply a bandage loosely round the patient's ankles and knees, which will usually be sufficient; but should you not consider it so, you can carry another round the pelvis. But this is scarcely necessary.

Sometimes you will meet with cases where the upper portion of the acetabulum is broken off. This is a very perplexing complication, for after you have reduced the bone, the muscles inserted into the digital fossa assist the glutæi in reproducing the displacement.

A case of this kind fell under my notice some years ago at the Westminster Hospital. A young woman, about 20 years of age, had fallen down and dislocated her right hip; she was taken to the hospital, where the bone was reduced without much difficulty by the house-surgeon and two or three of the dressers; her legs were tied together and the patient placed in bed. Upon visiting her the next morning, her limb was found to be again dislocated, and was again reduced, without, however, any permanent benefit. Mr. Guthrie, whose patient she was, saw her, and ascertained that she had incurred a fracture of the upper part of the acetabulum, in addition to the luxation of the head of the bone on the dorsum ilii, so that when the bone was reduced there was nothing to prevent the muscles again drawing it out. The patient was placed in a double-inclined bed, and the foot of the injured side firmly secured, to prevent retraction, and she ultimately left the hospital with a very useful limb.

After you have reduced dislocations of elbow, wrist, knee, or ankle, or of the fingers or toes, you had always better use splints: they keep the parts quiet, and are of great comfort to the patient; but we will consider the treatment to be pursued in these cases more at length when we treat of the accidents.

Again, as to the position in which you should place the arm in dislocations of the shoulder. I have told you that I would recommend the extension to be made from above the elbow; that you should flex the forearm to relax the biceps muscles. Mr. Burn observes, "If the supra-spinatus be not lacerated, it pulls the head of the bone against the glenoid margin, and fixes it there. If we roll the humerus inwards, we may stretch a little the teres minor, and must stretch the spinati muscles, particularly the supra-spinatus, also the coracobrachialis, and coraco-humeral ligament. Rolling the bone outwards stretches the subscapularis and teres major. In pronation we tighten the biceps. From these premises it follows, that we ought neither to roll the arm much outward nor inward, though the latter may, after suitable extension,

tend to return the head of the bone over the glenoid margin into the cavity, and that it ought to be raised, and the arm semi-bent, or if extended, it ought not to be decidedly prone."

This is different to the opinion of Crampton, who found he could not reduce the bone until he had produced pronation, and turned the whole arm inwards. You will, consequently, perceive that there is no general law to guide you in this particular; you must depend upon your own tact, and the circumstances of the case. You cannot tell with any certainty what injury the soft parts have sustained, or what muscles are lacerated, although, from what I have already said, you are aware what may occur. You, therefore, had better, in the first instance, relax the muscles about the joint as much as possible, and be guided as to the positions of pronation and supination by what you meet with. In some few instances the bone will be reduced by mere muscular contraction, without any assistance on our part.

In the year 1843, I was called to Mr. G., in the Strand, who had fallen down and injured his shoulder. I found him sitting in his shop, with the head of his right humerus dislocated downwards and inwards. He presented the usual symptoms. Having had him removed upstairs, I directed his coat to be taken off, that I might at once proceed with reduction. However, as the coat did not come off as quickly as the patient wished, he became irritable, and said, "Oh! leave it to me, I will do it;" and at the same time gave himself a twist to throw it off his shoulder. He immediately exclaimed, "Oh! it is in," and in it was, sure enough; all pain subsided, the natural appearance was restored, with ability to move the limb, which was confined to his side, and he recovered without any further trouble.

A somewhat similar case is related by the late Mr. Hey. He was, in May 1774, called to an elderly man, who had dislocated his shoulder by a fall. He appeared to suffer greatly, and was very uneasy whilst the preparations were making for reduction; he walked about the room, putting his arm in various positions to procure a little ease, and with this view placed his hand upon the back of a low chair, moving his body in different directions. He suddenly called out, and sat down, after which he said he was easy. Upon examination the bone was found to be reduced.

In the fifth volume of the "*Nouveau Journal de Médecine*," is a case published by M. Segalas. The patient, a female, whilst turning in bed, dislocated her shoulder downwards. In the course of half an hour afterwards it was reduced spontaneously by the action of the deltoid and supra-spinatus muscles.