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CLINICAL LECTURES ON DISLOCATIONS,
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LECTURE IV.

I shall commence the present lecture by describing to you the appearances which the shoulder presents in its natural state, and also the points or processes necessary to be observed in relation to dislocations of the joint. The shoulder is somewhat conical in shape, the base being at the axillary border, whilst the apex is directed upwards and forwards. It presents four aspects—an anterior, posterior, superior, and external. On the anterior aspect, commencing at the border of the axilla, is a deep groove leading up to the anterior margin of the clavicle, at about an inch and a half from its acromial extremity, at the angle between its concave and convex portions. Place your finger upon this spot, and carry it outwards and then backwards around the shoulder, and you will be able to trace the end of the clavicle, the acromion process, and, lastly, the spine of the scapula, very well marked, and easily discerned, especially in thin muscular individuals. Next retrace your finger and place it in the groove immediately below the clavicle. This spot corresponds to the division between the anterior edge of the deltoid and upper edge of the pectoralis major muscles. Carry your finger outwards and you will then feel the dense ligament or rather fascia extending from the coracoid process to the clavicle and ribs, the coracoid process, the anterior edge of the deltoid muscle, and the prominence of the head of the humerus. On the posterior aspect you may observe the supra-spinal fossa, beneath which is the spine of the scapula; pass your finger along this process from within, outwards, or from the vertebræ towards the humerus, and you will be able to feel the well defined posterior margin of the acromial process, beneath which, if you exercise a little pressure upon the posterior portion of the deltoid muscle, you will observe, when the arm is at rest by the side, a depression, the acromion overlapping the head of the humerus in this direction; when, however, the

arm is carried across the chest, this depression is not so evident, as the head of the humerus is then thrown more backward.

Extending down from the head to the shoulder, on the posterior part of the neck, is a prominent but obtuse border. This is the external edge of the trapezius muscle. Carry your finger from above, downwards, and from within, outwards, along the cap of the shoulder, and you will distinguish the following objects. At the termination of this border or margin you will feel a ledge or ridge much more distinct in some individuals than in others, this is the acromial extremity of the clavicle articulating with the acromial process upon which your finger next rests; pass your finger for rather more than an inch outwards, and it will slip over the edge of this process directly upon the projecting head of the humerus, covered by the deltoid muscle. You must bear in mind the different degrees of projection presented by the clavicle. In some individuals it is so much elevated and enlarged that a considerable projection results, liable to be mistaken for luxation or disease of the bone.

M. Huguier has observed that this projection is very common among convicts sentenced to penal labour, and he attributes it to the incessant pressure exercised by the clavicle and acromion, one against the other. You will frequently meet with this excess of formation among the hard-working poor, and you must be careful not to mistake it either for accident or disease. In most instances, however, you will be guided by examining both shoulders of the patient, when you will usually find a similar projection on both. Indeed, I should strongly recommend you in every case of injury to joints, for which you are consulted, to examine the corresponding joint, for if you omit to do this, you will constantly be liable to fall into some error or other. On the external aspect the points to be remarked are the outer edge of the acromion process, below which is the rounded eminence of the head of the humerus and deltoid muscles projecting considerably in this direction. We will now proceed to the consideration of the motions of the shoulder joint, and the mechanism by which those

motions are executed. The shoulder joint enjoys greater extent and latitude of motion than any joint in the human frame. Its motions are those of flexion, extension, abduction, adduction, rotation, and circumduction, or a combination of these motions.

When the humerus is carried backwards, the shoulder joint is in a state of extension. The muscles by which this motion is effected are the deltoid, by its scapular portion, the teres minor, teres major, long head of the triceps, and the latissimus dorsi.

When, on the contrary, the humerus is carried forwards, the shoulder joint is in the position of flexion produced by the action of the acromial and clavicular portions of the deltoid, the supra-spinatus, biceps, coraco-brachialis, and clavicular portion of the pectoralis major muscles; and when the humerus is elevated in a plane parallel to that of the scapula, these muscles are to a small degree assisted by the infra-spinatus and subscapularis. Abduction is where the humerus is carried from within outwards, away from the side, being directed neither forwards nor backwards. This motion is effected by the combined action of the deltoid, the supra-spinatus and infra-spinatus muscles, assisted by the biceps and coraco-brachialis.

In adduction the arm is returned to the side by the pectoralis and latissimus dorsi muscles.

The motion of rotation is of two kinds, for instance, where the thumb is turned outwards and sideways, where the palm of the hand is directed forwards, the limb is said to be in a state of supination, or rotated outwards, or radiad; where on the contrary the back of the hand is directed forwards with the thumb turned inwards towards the mesial line, it is pronated or rotated inwards or ulnad. These rotations may be performed when the arm is in a state of extension, flexion, abduction, or adduction, as indeed may be abduction or adduction when the limb is flexed or extended, and *vice versa*. The muscles which rotate the humerus outwards are the supra-spinatus, infra-spinatus, teres minor, scapular portion of the deltoid, and when the humerus has been rolled inwards, the coraco-brachialis to a small extent. The rotators inwards are the subscapularis, the clavicular portion of the deltoid, and when the humerus has already been rotated outwards, the latissimus dorsi, teres major, and, at the commencement of rotation, the pectoralis major.

Circumduction is a compound movement comprising the whole of the preceding motions; in this the humerus is made to describe the circumference of a cone, the base of which is towards the elbow, the apex being at the shoulder joint. This movement is produced by the flexors, abductors, extensors, and adductors, acting to the same degree, and also in the same order of succession as that in

which they are inserted around the humerus. Thus it is commenced by the pectoralis major which raises the arm forwards, inwards, and upwards, until it comes within the sphere of action of the flexors and abductors, which continue the movement upwards, outwards, and backwards, until the arm is placed under the influence of the extensor muscles, which carry it backwards, inwards, and downwards, thus completing the motion of circumduction. But you must bear in mind that the movements of the shoulder joint are not confined to the mere revolution or gliding of the humerus upon the scapula, but that a great latitude is added to these movements by the scapula not being a fixed bone, but, on the contrary, retained in its situation and influenced by the action of muscles which enable it to yield to and follow the several motions of the humerus, thus bestowing greater freedom and sphere of action upon the upper extremity. Indeed, were we to confine our examination to the muscles usually described as effecting the movements of the shoulder joint, we should omit several very important agents. It is true that they do not act directly upon the humerus, but by adapting the scapula to the necessities of that bone, they enable the joint to perform the functions for which it was designed in a perfect and efficient manner. How comparatively limited would be the sphere of action, were it not for this beautiful arrangement I am now endeavouring to explain to you, and how constantly would jars and concussions be referred to the shoulder joint. The value of these muscles is particularly illustrated by those artisans who have to wield heavy sledge hammers; take the blacksmith for instance, and observe with what power he is enabled to strike the heated metal. He does not derive this power from what have usually been described as the muscles of the shoulder joint alone, but is mainly indebted for the great strength and ease with which he performs these evolutions to the accessory power the joint thus derives from the arrangement of the scapula, and the influence exerted upon that bone by the trapezius, levator anguli scapulæ and rhomboid muscles, and by which arrangement he escapes those shocks and concussions which his shoulder joint would otherwise inevitably encounter.

Dislocations of the shoulder are either complete, incomplete, congenital, simple compound, or complicated. But as the object of these lectures is rather to point out to you the phenomena of dislocation resulting from violence or accident, we will commence, if you please, with the consideration of simple complete dislocations of this joint. From the review of the anatomy of the part through which we have passed in this and the preceding lectures, you will doubtless have observed that there are situations in which dislocation cannot occur unless complicated with other mischief.

The motion of abduction being limited by the elbow striking against the thorax, the head of the humerus can scarcely be dislocated directly outwards through the deltoid muscle, or from beneath the acromion process of the scapula; neither can it be displaced directly upwards, as it there meets with the insurmountable obstacle presented by the coraco-acromial arch. Luxation backwards, or into the infra-spinatus fossa, though very rare, is by no means impossible. Sir A. Cooper mentions having seen two instances in a practice of thirty-eight years, but there are several cases recorded of this accident. The supra-spinatus and deltoid tend to prevent the head of the bone slipping directly forwards. Nothing, on the contrary, prevents dislocation downwards, and when the arm is raised from the side the deltoid may assist it in a very decided manner. The capsule, internally much thinner than in other situations, is only sustained by the tendon of the sub-scapularis muscle, which tends to push the head of the bone with great force towards the glenoid cavity when dislocation is likely to occur. When the arm is elevated to a right angle with the trunk, the axis of the humerus is very near the inferior border of the glenoid cavity. The deltoid, pectoralis major, latissimus dorsi, and teres major muscles, then become auxiliaries to the power of displacement, which, in point of fact, meets with no other opposition than that experienced from the capsule. Luxation downwards and inwards, therefore, may easily occur, and is consequently a very common accident.

Luxation in front occurs under two forms. First, the head of the humerus, arrested by the tip of the coracoid process and the capsular ligament, may remain with the groove or anatomical neck placed on the edge of the glenoid cavity. This accident has been described as an incomplete or sub-luxation of the humerus, by Sir A. Cooper, Messrs. Physic, Velpeau, Malle, Howship, Fisher, and other writers on this subject. In the other form, the head of the bone may be forced upwards and inwards, either above the tendon of the subscapularis muscle, or by that muscle being ruptured, and be fixed beneath the clavicle, although Petit has observed that the head of the bone can never be dislocated upwards and inwards, because the head of the bone is arrested by the coraco-brachialis, two heads of the biceps, and the coracoid process. Nevertheless, these accidents do occur, and occur frequently, although less so than in the direction of the axilla. M. Petit indeed placed too much reliance upon the power of muscles in preventing dislocations, whilst he appears to have overlooked how much the strength of a joint and its immunity from these accidents depends upon shape and the arrangement of the bony articular surfaces; for he observes, with reference to this subject, that these articulations which are surrounded by the

largest number of muscles are those which are luxated with the greatest difficulty; a theory completely overset by the greater frequency of this accident to the shoulder than to any other joint of the body. Most of the older authors have fallen into the same error; from not having had opportunities of examining the parts and judging from actual dissection, they were obliged to guess, indeed, as recently as the year 1810. Mr. Hey, of Leeds, than whom a better surgeon never existed, in his observations on surgery, lamented that the opportunities of dissecting the shoulder joint in a state of dislocation were so exceedingly rare. So rare were these opportunities, that Mr. Crampton, who has assisted materially in removing our ignorance upon this subject, states, in the third volume of the *Medico-Chirurgical Transactions*, that at the time Mr. Hey wrote his work on surgery, there was, he believes, but one case on record in which the actual state of the joint, in a recent dislocation of the shoulder, was described and delineated, and you will find that case recorded in the medical observations and enquiries for the year 1761, entitled: *observations on a dislocated shoulder*, by Henry Thompson. We know from experience, that the muscles afford but little protection when taken by surprise. Mr. John Hunter justly observed, that when muscles were so taken by surprise, their force or power was then eluded, and he asserts, that before a muscle can put forth its full force, it must be in a state of preparation for action, and that this state of preparation must be produced either by the stimulus of the will conveyed by the nerves, or by mechanical or chemical stimulus applied or acting directly on the muscle itself. Hence we can easily understand how these joints, which, under certain circumstances are so easily dislocated, are capable of performing and sustaining the powerful actions which they constantly exert.

But dissection has proved that so far from preventing displacement, the muscles themselves are lacerated, thus rendering the accident more severe than was formerly supposed, but at the same time accounting for the unfortunate symptoms which sometimes result, and for which, were it not for these pathological researches, we should be at a loss to account. A great deal still remains to be done in this particular. Our knowledge upon this point still falls very far short of perfection, and I would seriously impress upon you the great benefit which you would confer upon the profession, and upon mankind in general, by availing yourselves of every opportunity which presents itself, of carefully examining the injured parts, and by imparting the results of these examinations to your professional brethren. It is not by isolated cases that we can any of us judge of disease or accident, let it be what it may; but it is only by collecting cases, and carefully studying numerous

facts, that we can arrive at anything like a just or satisfactory conclusion. In these lectures I have dwelt upon the anatomy of the parts perhaps more than you may consider necessary, but I have done so because it is absolutely impossible for you to understand anything whatever of these or other dislocations unless you are acquainted with this part of the subject, especially the action and arrangement of the muscles and the direction in which they exert their influence. You will then, I think, agree with me when I explain to you the various methods employed for the treatment of these accidents, that patients were exposed to unnecessary violence which might frequently have been avoided had our forefathers paid more attention to these points.

Some of the continental surgeons differ as to the directions in which the head of the bone can be luxated. M. Velpeau denies the possibility of a dislocation directly downwards into the axilla, and in our own country Sir A. Cooper limits his description to dislocations downwards and inwards. M. Malle, Professor of the Faculty of Medicine at Strasbourg, however, describes luxations directly downwards, which, according to him, may be either complete or incomplete. M. Sedillot also relates a case of luxation of the shoulder downwards directly beneath the glenoid cavity, in front of the scapula, but behind the *teres major* and *latissimus dorsi* muscles. The head of the bone in this case was thrown between the *teres minor* and *major* muscles, resting in front of the scapula and long head of the *triceps*. Desault, Velpeau, Boyer, and others, admit only of two forms of primitive luxation of the shoulder, namely, into the axilla, and on the *infra-spinal fossa*. According to these gentlemen, the other varieties are consecutive. M. Malgaigne, however, describes five principal dislocations of this joint. He says the most frequent is where the head of the bone lies beneath the *coracoid process*; he calls this the "sub-coracoid;" next, luxations inwards; luxations completely downwards, of which he had only met with the account of three cases; incompletely luxation below the *coracoid process*; luxation backwards, into the *infra-spinal fossa*, or what he denominates "sub-acromial." He completely rejects the idea of consecutive luxation from muscular contraction. Dupuytren also considers primitive luxations forwards as very rare, but he admits that they may occur. This disputed point, however, has been set at rest by Mr. Crampton, of Dublin, who has published a case of this variety of dislocation, which I will relate to you when we treat of these accidents.

CASES OF EPIDEMIC CHOLERA, TREATED BY TRANSFUSION.

By DAVID TORRANCE, Esq., Rugby.

[Read at the Anniversary Meeting of the Provincial Medical and Surgical Association Aug. 8th, 1844.]

It is known to many present, although perhaps not to all, that in the year 1832, when the Asiatic cholera was making its ravages in this country, the village of Newbold-upon-Avon, about seven miles from Rugby, was visited by that dreadful scourge. It continued its ravages in the village for about five weeks; the population at that time, including the strangers that were at work on the new cut of the Oxford canal, was 530, and out of that number 235 were attacked by the disease. It is with feelings of satisfaction that I am able to inform this meeting that the deaths only amounted to 21; my object at the present time, however, is to bring before the meeting the great benefit I experienced from transfusion. It was at the wish of my friend Dr. John Conolly, that I was induced to try its effects. During the time the epidemic was raging in the village, I was visited by most of the medical gentlemen in the neighbourhood, and amongst others, I was favoured with a visit from Dr. Conolly. On that day I had a great many cases under treatment, but only one that was not doing well—in fact, he was rapidly getting into the state of collapse. Dr. Conolly, on seeing him, said "I do not think you can save that man, but I wish you would try Dr. Latta's suggestion of transfusion, and the following is, from what I can recollect, the proportions of the mixture to be employed:—

Muriate of soda 2 drachms.

Carbonate of soda 2 scruples.

Two quarts of water at the temperature of 96°."

That was the mixture used in the first case. The following day I had a letter from Dr. Conolly informing me that the mixture ought to contain seven grains of chloride of potassium which was used in the other six cases.

CASE I.

Richard Bates, aged 40, married, an agricultural labourer, of sober habits, rather weakly in constitution, was seized about noon, with violent vomiting and purging of gruelly-looking matter, accompanied with severe cramps in the lower extremities; he had been ill about two hours when I was called to him. I did not use the lancet in this case, which I generally did when called in on the first appearance of the disease; but his pulse was so very weak that I did not deem it prudent to bleed although the spasms were most violent. I immediately gave him ten grains of calomel and two of opium, with some aromatic confection, and half an hour after, on ounce of the following mixture:—

Carbonate of soda 2 drachms.

Aromatic confection 2 drachms.

Aromatic spirits of ammonia 2 drachms.

Compound tincture of lavender 2 drachms.

Tincture of opium 1 drachm.

Peppermint water 7 ounces.

In three hours Bates had taken twenty grains of calomel, twelve grains of blue pill, five grains of opium, and four doses of mixture, and he also had several small quantities of brandy and water and beef tea. I had two or three people constantly employed in using frictions