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

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LECTURE VI.

PATHOLOGY OF DISLOCATIONS OF THE SHOULDER.

It is only of late years that surgeons have endeavoured, by dissection, to throw any light upon this very important branch of our subject. We search the writings of the older surgeons, but we search in vain for any account of the state of parts produced by this accident, the true character of which was naturally involved in mystery sufficient to account for the erroneous opinions entertained by our forefathers as to the real nature and character of the mischief incurred. The first published account of a dissection of a dislocation of the humerus downwards, is that by Mr. Henry Thompson, one of the surgeons of the London Hospital, in the year 1761, related in the second volume of the "Medical Observations and Enquiries," and since this period but comparatively few dissections of recent cases have been recorded; indeed, to the shame or misfortune of surgeons, Mr. Thompson maintained the honour for more than fifty years of being the only individual who had published a case of this description. Within the last thirty years, however, more has been written on the subject. Sir Astley Cooper, Dr. Hunter, and Mr. Crampton, have each given us the benefit of their experience, and related cases and dissections of great value, as tending to remove the uncertainty in which we must otherwise have remained. It will be necessary that I should detain you for a short time while I relate some of the most important of the cases recorded, whence you will be able to judge how useless it is to endeavour to make out a general rule from one, or even a few cases. Much has been said and written of the causes of obstacles to reduction in this form of dislocation, one surgeon considering it one thing, another something else, and each following or recommending a line of practice based on his particular theory; but this is wrong, the best surgeon being he who, unshackled by any one theory, is enabled to call to mind what has been met with in cases similar to his own, and is hence prepared to meet with, and meeting with, may be enabled to obviate and surmount any difficulties which may arise. You will find I am borne out in this observation after we have studied these cases. The same symptoms and signs may be present, the same difficulty of reduction may occur,

but the violence and mischief done to the joint may be very different.

CASE I.

William Robinson, aged 50, was admitted into the London Hospital, under the care of Mr. Thompson, on the 6th of December, 1760, having been injured by the sudden recoil of a wheel he was working in twisting a rope. On examination, his shoulder was found to be dislocated, and attempts were made to reduce it, but without success. He caught cold, with fever, and died on the 24th of the same month, having been eighteen days in the hospital. The shoulder was examined, and presented the following appearances:—The deltoid muscle was very much stretched, the coraco-brachialis but slightly so, whilst the short head of the biceps, with which you know this latter is connected at its origin, was relaxed. The long head of the biceps, instead of retaining its natural position, made a large curvature, and thus being violently stretched and distorted, occasioned an insurmountable flexion of the forearm. The deltoid, pectoralis, coraco-brachialis, short head of the biceps, latissimus dorsi, and teres major muscles, having been removed from their attachments at the humerus and scapula, afforded a view of the tendinous expansion of the supra and infra-spinatus muscles, spread upon the anterior part of the capsular ligament, which seemed to be in a state of great tension, but that of the teres minor was relaxed, whilst the arm hung down by the side. Under this aponeurosis several fragments of bone were observed blended with a fleshy mass, which united at its lower part with an exostosis that had shot out from the body of the humerus. The head of the humerus was broken, and found lodged on the inside of the neck of the scapula, at the root of the coracoid process, between the subscapularis and serratus magnus muscles. The blood-vessels and nerves lay on the inner and fore-part of the head of the humerus, but were in nowise compressed by it. The capsular ligament had been completely torn from the whole circumference of the neck of the humerus, no remains being left but a few fringes, denoting its place of attachment. Its scapular attachment was uninjured. On examining the bone a loss of substance was discovered, extending in length about two inches downwards, and in breadth taking in the portion of the bone that lies between the insertion of the subscapularis and teres minor muscles, so that the bony attachments of the supra and infra-spinatus muscles were destroyed. The tendons of the teres minor and subscapularis were torn from the greater and lesser tubercles, but a few fibres remained attached to the periosteum, and thus embraced the neck of the

bone in an oblique direction. The torn capsular ligament was laid in folds on the outer and anterior part of the neck of the humerus, whilst posteriorly the head of that bone projected through a kind of slit in the capsule, which embraced the neck of the humerus, and was supported on each side by the tendons of the subscapularis and teres minor muscles.

CASE II.

A sailor fell from the yard-arm on a ship's deck, injured his skull, and dislocated his arm into the axilla. He was taken to St. Thomas's Hospital, where he died whilst he was being put to bed. On the following day Sir Astley Cooper examined the shoulder, and found the following appearances:—A large quantity of extravasated blood beneath the integuments, extending as far as the cervix humeri, below the insertion of the subscapularis muscle; the axillary artery and plexus of nerves before, displaced by the dislocated head of the bone; the deltoid muscle was sunk with the head of the bone; the supra and infra-spinati were stretched over the glenoid cavity; the inferior costa of the scapula, the teres minor and major, were but little changed in position, but the latter was nearly surrounded by effused blood; the coraco-brachialis was uninjured; the dislocated head of the bone was found between the axillary plexus and coraco-brachialis, the capsular ligament being torn on the whole length of its inner side, and capable of admitting a much larger body than the head of the humerus through the opening; the tendon of the subscapularis muscle was also extensively torn; the opening in the capsular ligament for the tendon of the long head of the biceps was also lacerated, but the tendon itself remained sound; the head of the humerus was thrown on the inferior costa of the scapula, between it and the ribs, and it was about an inch and a half below its natural situation.

CASE III.

The dislocation had existed for five months; violent attempts had been made to reduce the bone, but without success. The patient was a woman, aged fifty, and appeared to have died from the violence used in extension. Sir Astley Cooper examined the joint, and observed as follows:—The pectoralis major slightly lacerated, blood being effused amongst its torn fibres; the latissimus dorsi and teres major uninjured; the supra-spinatus lacerated in several places; the infra-spinatus and teres minor torn, but not to the same extent as the former muscle; some of the fibres of the deltoid and a few fibres of the coraco-brachialis torn; the biceps uninjured. The capsular ligament had given way in the axilla between the teres minor and subscapularis muscles; the tendon of the subscapularis was torn through at its insertion, and the head of the bone rested on the axillary plexus of the nerves and artery.

CASE IV.

Dr. Hunter, in the Transactions of the Edinburgh Medico-Chirurgical Society, for 1824, gives the following description of the appearances he discovered in a case of this accident:—Large lacerated wound of the belly of the deltoid muscle, under which was a considerable quantity of coagulated blood; the tendon of the supra-spinatus muscle was ruptured, and had torn away with it a considerable quantity of the capsular

ligament; the coracoid process was fractured in two places, one piece remaining attached to the tendon of the pectoralis minor, the other to the coraco-brachialis and short head of the biceps; the long head of the biceps remained entire, but the humerus was broken in several pieces above its middle.

CASE V.

Is related by Mr. Crampton, in the third volume of the *Dublin Journal*. In the year 1808, a labouring man was brought to the county of Dublin Infirmary in a dying state, having been buried beneath the partition wall of a house, under the foundation of which he had been digging. The man did not survive more than two hours, and the body was examined eighteen hours after death, and the following appearances observed:—The cellular membrane, extensively ecchymosed, formed a kind of cap, closely embracing the head of the humerus, which, when the axilla was cleared, was seen lodging on the inferior costa of the scapula, or rather its neck. The head of the bone in escaping from its socket had pushed the teres minor downwards, and burst through the lower part of the subscapularis muscle, some of the fibres of which closely embraced the neck of the bone, while the bulk of the muscle was pushed upwards and detached from the inner surface of the scapula. The neck of the humerus, therefore, was in some degree embraced by the divided fibres of the subscapularis, while a portion of its head rested on the neck and part of the venter of the scapula, without the intervention of any muscular substance; the short head of the biceps and coraco-brachialis were forced to describe a curve outwards over the neck of the humerus on the external side, while the long head of the triceps crossed the neck of the bone obliquely on the dorsal side. The capsular ligament was torn off from the lower part of the neck of the humerus, to the extent of more than half its circumference, the torn edge appearing like a crest over the head of the bone; the great nerves and blood vessels of the arm were forced to describe a curve backwards, by the pressure of the head of the bone; but the greatest injury had been sustained by those capsular muscles which lie at the back of the scapula. The tendons of the supra-spinatus, infra-spinatus, and teres minor, were completely torn off from the humerus, carrying with them a scale of bone, or rather the surface of the greater tubercle.

CASE VI.

There is a preparation in the museum of the Royal College of Surgeons taken from a patient of the late Sir W. Blizard. The patient had suffered dislocation into the axilla, which was unreduced. The head of the bone lies between the scapula and the subscapularis muscle; the infra-spinatus and teres minor muscles are entire, but the tendon of the supra-spinatus appears partially separated from the greater tubercle; the glenoid cavity is absorbed on its inner side, and is quite denuded of cartilage; the capsular ligament is extensively lacerated, and its torn edges are covered with a kind of fibrinous fringe.

Mr. Gregory Smith, in the thirteenth volume of the *London Medical Gazette*, has recorded the dissection of five cases of this form of dislocation, which had remained unreduced, and two of dislocation forwards, taken from subjects in his anatomical room. In some the mischief was so extensive as to account for the

non-reduction, or, rather, for the inability of preserving the limb *in situ*, even if replaced. In the first case the bursa beneath the deltoid muscle, communicated with the articulation by a large lacerated opening; the tendons of the subscapularis, supra-spinatus, infra-spinatus, and *teres minor*, were all torn away from their attachments, as was also the long head of the biceps, which was entirely withdrawn from the joint, and remained firmly attached to the anterior margin of the bicipital groove; the capsule was much thickened; long and numerous bands of organized lymph extended in various directions; the anterior portion of the glenoid cavity was broken off, and the head of the bone, under surface of the acromion and glenoid cavity, covered with a kind of porcelain enamel.

In the second case, the bursa communicated with the articulation, as in the former instance. The tendon of the subscapularis was partially torn from its insertion; the long head of the biceps had been ruptured about half an inch from its attachment to the glenoid cavity; the supra and infra-spinati, with the *teres minor*, remained entire; the capsule was much thickened and torn, and fibrous bands extended in various directions, but the articulatory surfaces were not covered by enamel.

In the third case the bone appeared larger than usual; the tendons of the supra and infra-spinati, *teres minor* and long head of the biceps were completely separated from their insertions, the tendon of the subscapularis was partially so, the capsule was thickened and torn, and the articulating surfaces covered by enamel.

In the fourth and fifth cases, the patient had been a hard-working washerwoman to the time of her death; both shoulders had been dislocated. In the right shoulder the bursa beneath the deltoid, communicated with the articulating tendons of the subscapularis and supra-spinatus muscles, torn from their insertions, both having become united with the common capsule; the long tendon of the biceps was torn and attached to the margin of the bicipital groove; there were numerous points of exostosis and enamel on the nether surface of the acromion process, which had been fractured obliquely and united by ligament; that portion of the belly of the biceps connected with the long head was very short and thin, whilst that attached to the short head presented a corresponding increase of development from having double duty to perform. In the left shoulder the bursa was lacerated as in the right; the tendons of the supra-spinatus, subscapularis, and long head of the biceps, were torn through or detached, the synovial membrane lined by villi of lymph, and the head of the bone, glenoid cavity and acromion process covered with enamel. I shall reserve the remaining two cases until we come to the subject of dislocation forwards.

The next points for our consideration are the obstacles to reduction. The older surgeons, from not having availed themselves of their opportunities of dissecting these cases, were apt to theorise upon the subject, and we consequently find some of the highest authorities in surgery, among which we may enumerate the names of Petit, Duverney, Heister, Boyer, Desault, and White, imagining that the difficulties arise from the neck of the bone being tightly embraced by the ruptured capsular ligament.

Boyer and Desault believe that the capsular ligament is so constructed that frequently the opening in it becomes closed, and thus impedes the return of the head of the bone, but the cases which I have above related to you, prove the fallacy of this doctrine, inasmuch as in all these instances the ligament had been lacerated to too great an extent to offer any obstacle, and, moreover, these tissues, as I have pointed out in a former lecture, although capable of being stretched to a certain extent, are not endowed with the power of contractility, and, consequently, if the torn edges should fall round the neck of the bone, they do so passively, not actively, and are totally unable to present any active resistance, as they must do if Boyer and Desault were correct in their opinion. But it is universally admitted in the present day that the muscles are the great opponents to reduction. They, as Mr. Pott has observed, are the moving power by which these parts are thrown into action. When, therefore, their course of direction becomes suddenly and violently changed, when they are put unnaturally upon the stretch, they are thrown into a state of powerful antagonization, and the stimulus afforded from the irritation keeps up this contraction. Hence arise the difficulties; and it would appear that the muscles perform their various offices connected with dislocations—first, in producing the dislocation; secondly, in opposing reduction; and thirdly, in effecting reduction when the head of the bone is placed in a favourable position by the efforts of the surgeon. The next question, however, which suggests itself is, what are the muscles which offer the greatest resistance, and which consequently are the great obstacles? It was to this point I referred when I alluded to the inutility of endeavouring to lay down a general rule from isolated cases. There can be no doubt that the effects of dislocations differ with the different causes producing them, and that a true knowledge of these effects can only be attained by experience, either from the examination of several cases by dissection, or by comparing the results of the various cases recorded. Mr. Thompson, in his observations in his own case, has alluded to this, and he moreover inquires, “whether the difficulty in reducing a dislocated shoulder, when the head of the bone is lodged in the axilla, does not proceed from the neck of the humerus being tightly embraced by the tendons of the subscapularis and *teres minor* muscles passing obliquely over it, and by the pendulous flap of the capsular ligament: the first making a considerable resistance, and the latter, by closing the opening between the tendons, in attempting to reduce the head of the bone from without inwards, becoming tense and stretched in proportion to the extension of these tendons and impulse of the head of the bone behind it, and thereby preventing the reduction, especially when the attempt is made in an horizontal line, or carried downwards?”

With regard to Sir Astley Cooper's second case, that gentleman, after describing the appearances, proceeds—“Having determined these points by dissection, I next endeavoured to reduce the bone, but finding the resistance too great to be overcome by my own efforts, I became very anxious to ascertain its origin; I therefore divided one muscle after another, cutting through the coraco-brachialis, *teres major* and *minor*, and infra-spinatus muscles. Yet still the opposition to my efforts remained, and with but little apparent

change. I then conceived that the deltoid must be the chief cause of my failure, and by elevating the arm I relaxed this muscle, but still could not reduce the dislocation. I next divided the deltoid muscle, and then found the supra-spinatus muscle my great opponent, until I drew the arm directly upwards, when the head of the bone glided into the glenoid cavity. *The deltoid and supra-spinatus muscles are those which most powerfully resist reduction in this accident.*"

Let us now refer to Mr. Crampton. He says—"In order to ascertain the nature of the obstacles which oppose the reduction of the dislocated humerus, the scapula was fixed by the arm being raised to nearly a right angle with the body; extension was slowly applied to the arm by pulling at the wrist; it then appeared that so long as the hand was held supine, the head of the bone remained immovable, the chief resistance appearing to be caused by the *closing of the biceps and triceps behind the head of the bone*. The muscles on the back of the scapula being detached from the greater tubercle, could of course afford no resistance, but on turning the position, and giving motion of rotation inwards to the whole limb, the extension being still maintained, the head of the bone glided easily into the socket."

Here then we have the description of three cases, with the opinions of three eminent surgeons, derived from the appearances which each case presented on dissection. The direction and character of the dislocation were the same in all three, but the effects and the obstacles to reduction were very different according to the statements of these gentlemen. Mr. Thompson considered the teres minor and subscapularis muscles the great opponents; Sir A. Cooper, the deltoid and supra-spinatus; whilst Mr. Crampton, whose case bears great analogy to that of Mr. Thompson, affirms that the difficulty of reduction arose from the contraction of the biceps and triceps behind the neck of the bone.

These three cases, as well as the others which I have related to you, establish the fact, that in dislocations apparently similar, there are many kinds as well as degrees of lesions, and consequently very different causes of opposition to reduction; they also point out to you the necessity of acquiring a complete and general knowledge of the subject, the direction and attachments of the muscles, what have been the difficulties encountered in these cases, what has been observed on dissection, and lastly, what has been done by others to obviate these difficulties; for if you content yourselves with merely adopting individual views, or being guided by individual experience, you will find yourselves very much at a loss when you arrive at the practice of your profession.

M. Malgaigne places the subscapular among the muscles stretched. He observes, "the deltoid is much elongated, the supra and subspinal, and teres minor, are stretched over the glenoid cavity. The subscapular passes above the head of the bone, interposed sometimes between it and the coracoid process; it is more stretched than any other and tends to draw the head of the bone into the subscapular fossa." M. Filugelli, of Parma, in a paper on reduction of recent dislocations, controverts this opinion of Malgaigne, and states, that "all the observations he has made upon the dead body tend to contradict the statement as to the subscapularis

muscle." But with regard to experiments made on dead bodies, we must always take into consideration, that the parts acted upon are in a very different state to what they are during life. The dead muscles being deprived of their vital contractility, have no longer the power of offering any active resistance, or of exerting any active influence over the bone, either in displacing it or in retaining it when so displaced, further than that which would be experienced from any other passive bands; the evidence, therefore, which these experiments afford, must be regarded as anything but conclusive. However, I am disposed to agree with M. Filugelli generally as to the subscapularis muscle, inasmuch as he is supported by the facts exposed in the cases I have related, for in eight out of the eleven, this muscle was either completely detached or extensively lacerated. M. Filugelli asserts that the resistance to reduction is not due to muscular contraction, but that other aid is necessary. "Thus, he says, it is the bony prominences which, projecting against the articular head on the one hand, and the stretched muscles on the other, incessantly pushing the latter against these prominences, which is the essential and complex cause of the obstacles under consideration." No one ever doubted this who attributed the cause to muscular contraction, for if the bones were perfectly smooth and presented merely plane surfaces, without any irregularity, the difficulties would be very much less; but it is not the bony eminences of irregularity which push against the head of the bone, but the head of the bone drawn and fixed against the bony eminences by the action of the muscles, that produces the opposition, and therefore, after all, we return to muscular contraction as the true cause.

CASE OF MALFORMATION OF THE GENITALS, IN WHICH A CHILD, TWO MONTHS OLD, CHRISTENED, AND ALWAYS CONSIDERED AS A FEMALE, PROVED TO BE A BOY.

By HENRY TERRY, Esq., F.R.C.S., Surgeon to the General Infirmary, Northampton.

Lois Brown, of Mears Ashby, Northamptonshire, aged two months, was brought to the Northampton General Infirmary on the 9th of March, 1843, on account of a malformation in the organs of generation. The mother and grandmother, who came with the child, said that the external opening was closed, and the water came the wrong way, and that she was born so. On my first examination, it appeared to be a common case of imperforate vagina. There was, however, a little fulness, and a slight degree of prominence at the lower part of the supposed closed orifice, and this was the only peculiar circumstance which I observed. On proceeding to separate the adhesion, which required no cutting, and very little force, my utmost surprise was excited by the appearances which were presented to view. There was something which looked like a penis, and I immediately fancied that my patient was a case of hermaphroditism. I separated the parts more extensively, and more minutely examined those which had been concealed; a glans penis and prepuce were now discernible, and the penis was complete, though a good