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CLINICAL LECTURES ON DISLOCATIONS, DELIVERED AT THE CHARING CROSS HOSPITAL. SUMMER SESSION, 1844.

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LECTURE II.

The bones are joined together by a structure intermediate in organisation between periosteum and tendon, called "Ligament;" this assumes different forms, according to the character of the joint, and the kind and extent of motion which it enjoys. For the most part all the articular ligaments may be arranged under two heads, capsular and fascicular. The capsular ligaments are proper to enarthrodial joints, and consequently to the shoulder and hip joints; they are shaped like a barrel, one end surrounding the socket or articular cavity, the other encircling the ball or head, or rather the neck of the corresponding bone so as to envelope the whole joint. These ligaments are lined on their inner surface by synovial membrane, whilst externally they are covered and protected by the muscles of the joint; they are not of uniform consistence throughout, as they are considerably thicker in some situations than in others, being strengthened by additional ligamentous fibres, extending from some neighbouring point of bone, and blending with them, and likewise by the tendons of the various capsular muscles with which they are in some places incorporated. At their extremities their fibres interlace with the periosteum covering the bones.

They do not invest the joint closely, but are very loose, their size being proportioned to the degree of motion of which the joint is susceptible; and they are sometimes perforated by the tendons which go to attach themselves to the bones. They are pliable, and bear stretching to a certain extent, but if violence is applied suddenly, even in a minor degree, we find them unable to resist it; they tear, and the head of the bone slipping through the opening, becomes dislocated. It is of importance that you should not confound this pliability with contractility, as by not making this distinction, some of the best surgeons of ancient days, and even those whom we now quote as authorities upon the subject of dislocations, were led into error, and a very improper and painful method of proceeding. Desault, Petit, White, and others, considered that the difficulty of reduction in some cases of dislocation arose from the small size of the opening in the capsular ligament, which contracted round the protruded bone, preventing its return to its natural situation; and acting upon this opinion, they endeavoured to overcome the difficulty by lacerating the ligament

in a still greater degree, which they effected by moving the bones about freely in all directions, especially that in which it was dislocated, and also by pushing the head of the bone with violence against the already lacerated membrane. I need scarcely point out to you the impropriety of this method; independent of the unnecessary pain given to the patient, the mischief and bruising inflicted on the surrounding soft parts must have been very great, and moreover dissection has proved that the capsular ligament can never create the difficulty, inasmuch as it is always lacerated to too great an extent in the first instance. But few individuals in the present day would fall into this error unless they were totally ignorant of the physical and mechanical properties of capsular ligaments. They are strong and they are pliant, but they possess very little elasticity; the influence which they exercise in the reduction of dislocations can be but passive, for they neither retract when they are cut, nor contract when irritated. Although not organised so highly as the periosteum, they are well supplied with blood vessels, arranged in a reticular manner, and when accidentally divided, they unite by means of condensed cellular tissue. Although, hitherto, nerves have not been clearly traced into them and when healthy they possess little or no sensibility, when inflamed or violently stretched they are excessively painful. When exposed to long continued inflammation they become thickened, in consequence of the effusion of coagulable lymph into the areolæ of the cellular tissue which enters so largely into their composition, whilst in abscess of the joints we find them giving way to ulceration, and thus evacuating their contents.

The fascicular ligaments assume the form of round or flattened cords or bands; occasionally, but rarely, they are triangular in shape, as the coraco-acromial ligament. These bands not only unite bones together, but in some instances they stretch across from one process to another on the same bone, and occasionally convert a notch into a foramen, as in the notch on the superior costa of the scapula. The bones and intermediate cartilages of the spine and also the bones of the carpus are united together by these fasciculi, which are here called anterior and posterior ligaments, and the same name is applied to those ligamentous bands which assist in fastening the sacrum to the ilium, and also in retaining the pubes together at their symphysis. In the joints of the tarsus, and in the acromio-clavicular articulation, they are designated, from their situation, superior and inferior ligaments, but in most of these instances their fibres are more separated, and

are less connected and compact than in the examples I have now to describe. In the ginglymoid joints, as in the jaw, elbow, wrist, knee, and ankle, we find a distinct strong band of condensed ligament, placed ~~one~~ on the inner, the other on the outer side of the joint. These are called internal and external lateral ligaments. In most instances the internal lateral ligament is flatter, more expanded, and is attached to a larger surface of the bone below, than the external, which however is rounder, thicker, shaped more like cord, and in some cases is divided into two or even three strong bundles of fasciculi, as in the external lateral ligaments of the knee and ankle. In some situations this form of ligaments is found within the joints themselves, and cannot be exposed until the joints are laid open; the only examples are the round ligament of the hip, and the crucial, (so named from their crossing each other,) and transverse ligaments of the knee joint. They have been denominated "internal ligaments." The last form of ligament to which I have to advert is the "circular or coronary." These take a circular course, and form more or less of the circumference of a circle, the remainder of the circle being completed by bone. Examples are met with in the joint between the processus dentatus of the second with the first bone of the vertebræ, and between the upper extremity of the radius and ulna. I have not here mentioned the fanciful names given to particular ligaments of particular joints; they all belong to the above class, and will be described to you, when we treat of the joints with which they are connected.

Healthy ligament is a whitish, glistening, silvery-looking substance; but when its vitality is destroyed, it loses this glistening appearance, becomes of a yellowish straw colour, flabby, and easily torn. The fascicular ligaments are intimately connected by their extremities to the periosteum covering the bones; they are endowed with vast strength, and so much so that the bones will commonly break before these fibres yield. A man falls from a height and alights on his feet, giving his foot a twist at the same time, or he trips over some obstacle, and gives his foot a violent wrench. He feels something snap, and finding that he cannot walk, he sends to you for your opinion. You might imagine, were you unacquainted with the fact, that one of the ligaments of the ankle joint had been ruptured, and you might treat your patient accordingly: but this very rarely happens; the sensation of snapping was not occasioned by the rupture of any ligament; these usually resist the violence, but the fibula is most commonly fractured a few inches above the outer malleolus. Under these circumstances, I should strongly urge upon you, in all cases of accident to the ankle joint, never to confine your examination to the part itself, but always to press your finger in the course of the fibula, and feel whether it yields at any one point. Even should dislocation of the ankle be present, you should not abstain from such an examination, as cases of dislocation of the ankle are very frequently complicated with fracture of the fibula.

A case illustrating the strength of these ligaments, and the resistance they present to violence, fell under my notice some years past, when I was residing at the Westminster Hospital as house surgeon. A young woman, about twenty five years of age, the wife of a baker, was brought into that institution with severe

compound fracture and displacement of the bones of the ankle. It appeared that the poor creature had been confined about a week previously, and that the child had died; she had been attacked with puerperal mania, and her nurse having imprudently left the room for a short time, she had seized that opportunity of getting out of bed, and throwing herself out of the window, which was on the third floor of the house, the ankle was injured in the manner I have been describing, one of her arms was fractured, and she received severe injury on the head. She lived for three days, at times in a state of profound melancholy, at others extremely violent, when at length she sank worn out and exhausted. I obtained permission to examine the body, and found the fibula broken, and the astragalus fractured transversely through, and that the only ligament ruptured was the middle external lateral ligament of the ankle joint.

Between the arches of the vertebræ on either side of the spinous processes, occupying the interlaminar spaces of the vertebræ, from that which exists between the second and third, to that which separates the last from the sacrum, is a tissue of great peculiarity, called "elastic or yellow elastic tissue," or ligamenta subflava. I have already pointed out to you the very small degree of elasticity possessed by the ligaments, but here we have a structure possessed of extreme elasticity always in a state of antagonism to the action of gravity and muscular contraction. In the spine it serves to maintain that column erect, and to relieve muscular action. It is best seen in the lower animals, and enters into the structure of the lungs and trachea, connects the several parts of the larynx together, and forms the chordæ vocales. It forms the covering of various organs capable of distension, such as the spleen, but more particularly the arteries. It is very remarkable in the lower animals, especially in the claws of the cat, &c. In those animals possessed of large heads, there is a piece of vast strength connecting the vertebræ, and called ligamentum nuchæ. In the oyster, again, while living, the shell is closed by the muscular action of the fish itself; but when dead, it is this tissue which, forming the hinge of the shells, prevents their closing. It was long confounded with fibrous tissue, and was first distinguished by the late John Hunter, who fully appreciated its importance in the animal economy. He divided it into two classes, first, as antagonising muscles, and secondly, as assisting them. In the former, he placed the ligament of the oyster, in the latter the ligamentum nuchæ of ruminant animals, and the ligamenta subflava.

Upon laying open a moveable joint, you will observe that it is lined throughout by a shining tissue, remarkable for its thinness, transparency, and smoothness. This is the articular synovial membrane. The articular synovial membranes bear the greatest resemblance to serous membranes, assuming the form of shut sacs; the internal surface is free and contiguous to itself; it is smooth and polished, continually lubricated by an albuminous fluid, and is sometimes thrown into folds with fringe-like margins, which project into the cavity of the sac.

These folds appear to consist of cellular tissue containing fat; they receive blood-vessels, from which circumstance they are sometimes of a reddish colour. Anatomists have compared them to the appendices

epiploicæ of the large intestine. Clepton Havers considered these fringes as the excretory ducts of what he called his glands, to which I shall subsequently refer; but they have been ascertained to consist of the tissue described above. Their external surface, like that of the peritoneum, is cellular and attached to all the surrounding organs. In the knee joint the synovial membrane is arranged in large folds, to which older anatomists applied the name of *ala* and *adipose ligaments*. This is evidently incorrect; they are merely membranes, folds of greater magnitude, and do not possess any ligamentous structure. The synovial membranes occur invariably in all moveable joints; in some of the joints containing an interarticular fibro-cartilage, there are two of these shut sacs, which, like the peritoneum, while they invest all the parts of the joint, do not in reality contain any of them. They pass from point to point, adhering by their outer cellular surface, but their internal surfaces are, as I have before remarked, entirely free, and we never find any substance or structure within their cavities, unless it be the result of accidental or abnormal formation. The best way of studying the manner in which the synovial membrane is related to the surrounding articular structures, is to take a knee joint and saw it through in a vertical direction from before backwards, dividing the patella, femur, and tibia, into two lateral halves. You will then perceive the membrane stretching across from the patella to the condyle of the femur, and you will be able to trace it in different directions, completely investing the joint, and adhering to all its structures; and you will be materially assisted in your studies by referring to a good diagram in the paper on articulations by Dr. Todd, contained in his *Cyclopædia of Anatomy and Physiology*.

Anatomists by no means agree as to the fact of the synovial membrane being spread over the articular cartilages. This difference of opinion has arisen, partly from the difficulty experienced in separating the one from the other, and partly from the impossibility, even in the most successful injections, whilst the parts are in a normal condition, of injecting the membrane in these situations; and in relation to this point M. Velpeau adduces the fact of the membrane of the articular cartilages retaining its clearness and transparency while the rest of the joint is in a state of inflammation.

With respect to the former of these objections, the separation of the membrane from the cartilage may be difficult, but it has been done. Mr. Mayo states that he has a preparation in which he raised a uniform membrane from the cartilage, covering the head of the humerus; and as to the latter, although it is true in very many instances, that the articular extremities of the bones do retain their pearly glistening whiteness for a long period after the surrounding synovial membrane has become degenerated by disease, still there are exceptions, as we find in Sir B. Brodie's work on the diseases of joints; and in a knee which I removed from a boy a short time since, although the bones were to a certain degree denuded, yet the thickened pulpy synovial membrane could be distinctly traced to some extent over the articular cartilage that remained. Those who assert that the articular cartilages are not covered by synovial membrane, and among whom we number Gendrin, Blandin, Magendie, Velpeau,

Cruveilhier, and others, are of opinion that the latter is reflected from the capsular ligament as far as the edge of the cartilage, where it abruptly terminates—thus also, denying the fact of synovial membranes being shut sacs; but on the other hand, among those who mention the analogy between these and serous membranes, we include Dr. W. Hunter, Soëmmering, Bichat, Meckel, Cloquet, Mayo, and indeed most of the modern anatomists. Now, if the articular cartilages be uninvested by synovial membrane, and if they be, as Velpeau affirms, entirely unorganized structures, how can that ulceration take place which we so frequently find attacking their free surfaces?

The articular synovial membranes vary much in shape; in some instances representing mere simple round bags, as in the joints of the phalanges; others are, however, more complicated, passing in between several bones, and investing their articular surfaces; whilst others, as in the hip and shoulder, are traversed by ligaments or by a tendon, round which they are reflected, forming a sheath. Membranes of this description derive their name from the peculiar fluid which they secrete, and which lubricates the joint, and enables the bones to move with ease and freedom one on the other. This fluid is called "*synovia*."

It was formerly supposed to be produced by a mixture of the serum of the blood with the marrow of the bones, but from the analysis of M. Margneron it appears to be composed of the following ingredients, viz:—

Fibrous matter	11.86
Albumen	4.52
Muriate of Soda	1.75
Soda	0.71
Phosphate of Lime	0.70
Water	80.46

It is white, viscid, and transparent, and when allowed to rest, on being removed from a joint, it is converted into jelly.

I have already alluded to Haver's glands. These were originally observed by Rosenmüller, and named by Clepton Havers, "*Glandulæ Mucilaginosæ*," he considering that the synovia was secreted by them; and he was confirmed in this opinion by Heyliger, Portal, Winslow, and some others. The existence of these glands has been denied by Boyer, Beclard, Bichat, &c.; and, indeed, they do not appear to consist of anything but cellular tissue and fat, and no excretory duct can be traced in them. They are usually of a reddish colour, varying in shape and size, some being rhomboidal, others semilunar, &c. They are always found in the depressions or notches of the joints, in such situations as to be entirely protected from injury in the several motions of the bones, and there is usually one of very large size situated in the depression in the acetabulum.

The muscles and tendons surrounding the articulations are disposed in various ways. Some, as in the wrist and fingers, passing over their surfaces without adhering to them, protect these parts against violence, at the same time that they influence their motions. Others, on the contrary, as in the shoulder, completely surround the joint, forming as it were a "*capsule*," thence receiving the name of "*capsular muscles*," and being inserted directly into the head of the bone, these muscles not only protect the shoulder joint, but they actually

retain the head of the bone in situ. Cut away the whole of the muscles and tendons surrounding this joint, and you will find that the capsular ligament has no power to retain the head of the humerus in the glenoid cavity, but that, on the contrary, it is so long and loose as to allow the bone to drop, and thus to become dislocated. The same thing is observed in paralysis, where, from wasting of the muscles, the humerus drops away from the scapula, and becomes subluxated. In the ginglymoid joints, the muscles and tendons, passing in front and behind, confer great strength on the part, whilst the knee joint is entirely dependent for its anterior capsule on the expansion of the quadriceps extensor femoris muscles. We also observe a very wise provision in some of the joints, especially in the elbow and shoulder, where the muscles adhering to the capsular and posterior ligaments of the joints, at the time of this contraction, draw out the ligament, and thus prevent its being bruised or crushed between the moving bones.

I shall have to direct your attention to some of the phenomena of muscular contraction, when we come to the causes and treatment of dislocations.

CASE OF DEFORMED PELVIS—CÆSARIAN OPERATION—DEATH.

By FREDERICK COX, Esq., Welford.

Rebecca Brooks, aged 27, the subject of this paper, was a single woman, residing at Welford, pregnant for the first time. She was a very diminutive person, with large head, short neck, short crooked legs, very hollow back, and weak intellect. I was called to attend her on Thursday, the 8th instant, by an order from the relieving officer. I saw her at five o'clock, p.m. I found her in labour; she had been so throughout the day, and had experienced strong pains since twelve o'clock. The pains were now strong and regular, and occurring about every five minutes; the membranes were ruptured by a pain, and much liquor amnii had escaped. On examination I found the vagina well lubricated, soft, and easily distensible. Upon passing my fingers into the pelvis, I met with a large round substance, which I at first took for the child's head; but soon discovered to be the promontory of the sacrum, occupying the greater part of the pelvis. With a great deal of difficulty I succeeded in getting the fore-finger of my left hand over the pubes, and ascertained the child's head to be presenting. I was alarmed at finding I could but just pass two fingers between the sacrum and pubes, or, in other words, to find the antero-posterior diameter of the pelvis to be about an inch and a half. After waiting an hour, I sent for my friend Mr. Colston, of Bosworth, and we had a consultation, the result of which was, a determination to obtain a third opinion, as we coincided that craniotomy would be of little or no avail, there being insufficient space for the base of the skull, &c., to pass. After considerable delay we were so fortunate as to obtain the aid of Mr. Francis, of Harborough. The poor woman had continued to have pains regularly throughout the night, and at eleven o'clock on Friday morning we met in consultation, and, having well weighed the matter, we agreed that we would attempt craniotomy; in fact,

although it held out but small hope of success, we considered we were bound to try it patiently and perseveringly. The child's head remained exactly as it had been at five o'clock on the previous night; it could be readily felt on the outside of the abdomen resting on the upper edge of the pubes. The os uteri had been fairly dilated many hours. The operation was performed in the usual way, and after between two or three hours almost incessant labour, we painfully felt that our efforts had been useless, as, after crushing the head, we could not cause the advance of the rest in the smallest degree, and we discontinued longer employment of these means. The patient's pulse was now fluttering and feeble; she evinced symptoms of temporary exhaustion, and the labour pains were almost suspended.

We again consulted, and were unanimous that the Cæsar operation could alone deliver her, and having explained to the poor creature and her friends her exact situation, and the nature of her case, and proposed the only remaining remedy, we withdrew for half an hour. The patient and her mother were both willing that the operation should be performed, especially the former, who said that she would rather suffer any operation, than allow us to renew our attempts to extract the child.

At half-past two we proceeded to perform the Cæsar operation, having previously ascertained that the bladder was empty. The patient having been placed upon a board, with the head and shoulders a little elevated, an incision was made through the skin and cellular membrane, about seven inches in length, a little to the left of the linea alba, and commencing about two inches above the umbilicus; having carefully dissected through the parietes at the upper end of the incision, so as to admit two fingers, I used these as a director, and completed the external incision. The peritoneum was simultaneously divided; no hæmorrhage attended this step of the operation. The protruding intestines were carefully held aside by my friends, and an incision of four inches and a half in length was made into the uterus, commencing a little below the fundus; the walls of this organ were about three quarters of an inch in thickness. Considerable hæmorrhage now took place, the more so, as the placenta was placed rather anteriorly, and about a third of it was cut through. The child was easily and quickly removed, and the placenta with the same facility, the uterus contracting forcibly and well. The child was large and well made, and of more than average dimensions. The blood lost did not amount to more than fourteen or sixteen ounces. The edges of the abdominal wound were brought together, and five sutures employed, placed about an inch apart. Adhesive straps round the abdomen, and a bandage, completed the operation.

I ought to have stated that a quantity of serum was seen in the abdomen when the parietes were cut through.

Scarcely was the operation finished before symptoms of syncope were manifested, and the woman vomited a considerable quantity of a greenish coloured fluid—an early intimation of the sympathy existing between the stomach and the injured uterus. The patient was placed in bed, and thirty drops of laudanum administered. She soon recovered from the more alarming symptoms, and expressed herself easy and comfortable,