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**LUXATIONS**

OF

**HIP AND SHOULDER:**

BY

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PROFESSOR OF SURGERY IN THE UNIVERSITY OF MICHIGAN.

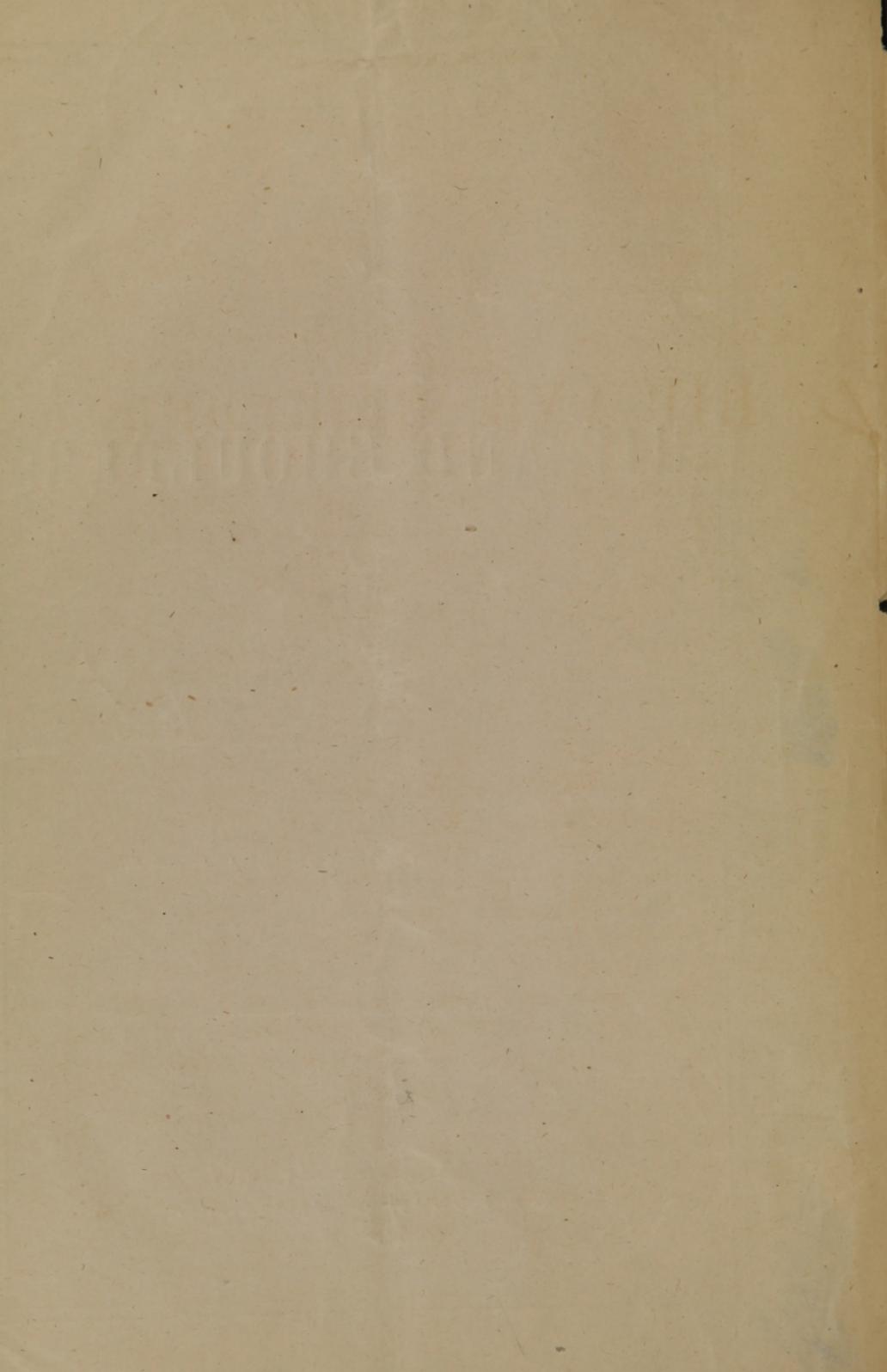


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1855.

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OF

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PLP AND SHOOTING

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OFFICE OF THE SECRETARY OF THE INTERIOR

ANN ARBOR:

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## LUXATIONS OF HIP AND SHOULDER.

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The object of the present paper is to elucidate more fully certain views relative to luxations of the hip and shoulder joints, which were contained in a short article originally read before the Detroit Medical Society, and subsequently published in the *Peninsular Journal of Medicine*. An article on dislocations of the hip, by Dr. Markoe, of New York, Published in the January number of the *New York Journal of Medicine*, induced me to re-peruse the article by Dr. Reid, of Rochester, published in the *Transactions of the State Medical Society of New York*, and I was pleased to see how illustrative of the views contained in my former article, were two experiments, one made by each of these gentlemen. This, together with further experiment on my own part, led to the preparation of the present paper; in the construction of which, I shall here introduce my former article, published in September, 1853 :

“The views here advanced I have taught for the past two years to the gentlemen composing the Medical Class in the University; and I shall offer no apology for calling the attention of the Society for a few moments this evening to the subject of Dislocations of the Hip and Shoulder, and more particularly to that form of the accident, which, from the anatomical peculiarities of the joint, is one exceedingly difficult to reduce; and for the reduction of which Dr. Reid has recently proposed a novel and efficient mode.

“It is not my intention to discuss the question of priority which has been raised in reference to this subject, for there can be no doubt that Dr. Reid arrived at his conclusions by a course of reasoning and experiment; and that those conclusions were most essentially novel to a large majority of the profession. I propose

rather, briefly to consider the prominent peculiarities of the joint, and the relation of the parts in a state of dislocation ; the structures which oppose the return of the head of the femur to the acetabulum ; the manner in which Dr. Reid's manipulations overcome this opposition ; and lastly, the application of the principle involved, to the reduction of some other dislocations.

“ The encircling ridge which gives depth to the cotyloid cavity, presents upon its outer slope a plane, the inclination of which varies in different parts. At its posterior portion this inclination is very great, and it would seem in dislocation in this direction, impossible to return the head of the bone to the cavity without lifting it completely over the ridge ; upwards and backwards it is more gradual, and would seem to afford a much more easily surmountable obstacle ; yet when we examine the relation of the parts in a dislocation in this direction, we find that applied to this surface, we have the anterior and inferior surface of the head and neck of the femur, the rotundity of the head corresponding with the curvature of the slope, while the edge of the acetabulum corresponds with the curvature described by the anterior and inferior surface of the neck. Although thus seemingly locked together, comparatively slight extension in the line of dislocation would cause the head to ride over the edge of the cavity, were it not bound down in this position by the surrounding tissues. Which particular tissue constitutes these bonds is an important question to him who seeks to relax them. Dr. Reid, in common with the profession generally, considers the muscles the agents which thus oppose our efforts at reduction, and his manipulations are conducted with a view to relax them, while the femur, acting as a lever, raises the head of the bone clear of the edge of the cavity. With this same view we have the directions of the books and public teachers to apply extension and counter-extension *slowly* and *uniformly*, in order to *tire out* the rebellious muscles. Blood-letting, antimony, and the hot bath are also called in to aid in this laudable crusade against these wicked organs.

“ In this view, I would respectfully differ with Dr. Reid, the teachers, books and profession, and state my honest belief that the muscles oppose our efforts very little more than they do the progress of our earth in its orbit. This belief I have repeatedly verified by experiments upon the dead subject, and the members of the medical class of 1851-2 in the University will remember those conducted

before them. A subject was placed upon the table, the lower border of the gluteus maximus was raised, and a scalpel carried through the subjacent muscles, and an opening made in the posterior and superior portion of the capsular ligament. The round ligament was then divided, and the head of the femur luxated upon the dorsum of the ilium. The usual indications of this dislocation were present. The subject was placed in the proper position, a counter-extending band applied to the perinæum, and fixed; the strength of two men exerted now upon the extending band, while endeavor was made to raise the head of the bone clear of the acetabulum with a jack towel, was insufficient to reduce the luxation. Reid's method of manipulation readily replaced the bone. This experiment was repeated many times, and uniformly with the same result. As *muscular action* could not have opposed our efforts and prevented success in this case, the question naturally presents itself, what structure stood between effort and success?\* I answer, *the untorn portion of the capsular ligament*. In support of this view, let us consider for a moment the position of the limb at the instant of escape of the head from the socket during the process of dislocation. To do this we must bear in mind that force applied to the knee or foot while the limb is in a state of adduction, constitutes the most frequent cause of this dislocation. Force thus applied adducts the limb still more powerfully before dislocation takes place, and at the moment of the escape of the head of the bone from the socket, the limb is in a direction which crosses the thigh of the opposite side. Immediately that the head of the bone has cleared the edge of the acetabulum it settles into its position upon the dorsum of the ilium, and the limb assumes the position and direction indicative of the accident. During the dislodgement of the bone, the superior and posterior portion of the capsular ligament is ruptured, through which the head protrudes; while from the position of the limb at the instant of protrusion, the anterior and inferior portion is very much relaxed, thus allowing the head to rise easily over the acetabulum. As soon as the head settles into its position upon the dorsum of the ilium, the direction of the limb is changed, and the untorn portion of the ligament becomes more tense, and for this reason the head of the bone cannot be readily returned to its place, till the limb is again placed in a position to relax it. Dr. Reid's method does this

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\* Doct. Reid would answer, *passive muscular fibres*.

most effectually, and I conceive that any other plan which does not accomplish this, as for instance extension and counter-extension by the pully, or Jarvis' apparatus, in the usual direction, succeeds only by lacerating much more extensively, if not by actually tearing the ligament completely asunder, before the head of the bone will ride over the edge of the cavity.

"The principle, then, I would seek to establish, is this—that *in luxations of the hip and shoulder the untorn portion of the capsular ligament, by binding down the head of the dislocated bone, prevents its ready return over the edge of the cavity to its place in the socket; and that this return can be easily effected by putting the limb in such a position as will effectually approximate the two points of attachment of that portion of the ligament which remains untorn.*

"This principle can be successfully applied to the reduction of the backward luxation of the femur into the ischitic notch, and also to the several luxations of the shoulder. It has several times been my guide in the reduction of the downward dislocation of the humerus into the axilla. The patient is seated upon the floor, an assistant slowly raises the arm to an angle of forty-five degrees to the plane upon which the patient is sitting; and now while the assistant makes extension in this direction, the surgeon makes pressure with the hand upon the top of the shoulder, the bone readily returns to its place, and the arm is dropped to the side and secured in a sling.

"White's method of reducing this luxation, which is figured in Druitt, is essentially the same, the only difference being in the position of the patient. According to his plan the patient lies upon his back, the scapula is fixed by a counter-extending band applied to the top of the shoulder, or by the hand of an assistant, while 'the arm is raised from the side, and drawn straight up by the head, till the bone is thus elevated into the socket.' In either method it will be seen that the upper and untorn portion of the capsular ligament, by the elevation of the arm, is very much relaxed, thus giving a latitude of motion to the head which greatly facilitates its return, and which could not be obtained by any manipulation in which this relaxation was less perfect. Nine-tenths of the force spent in extension and counter extension may be spared, in the reduction of all those dislocations in which, by alteration of the position of the limb, such relaxation is effected; and in the several luxations above specified, this end is undoubtedly attainable."

Further thought and experiment upon this subject have convinced me that dislocations of the hip joint *cannot occur*, except in certain positions, and these, are positions of *very great distortion*. In support of this view I would call attention to the great security against this accident provided by nature in the anatomy of the joint. The great depth of the acetabulum, surrounding on all sides the head of the femur, renders its escape nearly, if not absolutely, a physical impossibility, so long as the legs are parallel to each other, and on a line with the body. Fracture of some of the bony structures of the joint, would be the result of great violence, in this position of the limbs, but dislocation without fracture, I apprehend, never. Before dislocation can take place, the limb must be so distorted that the walls of the acetabulum will afford no longer protection against the escape of the head of the femur, the dislocating force throwing the head, in this changed direction, against some portion of the capsule of the joint, which gives way before it, permitting the rupture of the round ligament, and the escape of the bone. It is evident that while the changed direction of the limb, throws the head wholly against some portion of the capsule, the opposite side of this capsule must be relaxed, and by its relaxation facilitate the riding of the head over the edge of the cotyloid cavity. Taking, for example, the upward and backward form of luxation, in my experiments, I have found it impossible, by my own strength, to produce luxation, even when the direction of the limb was changed to that which distinguishes this form of the accident *after* it has occurred, although the upper and posterior portion of the capsule, and the round ligament, were divided. In the course of my instruction during the last winter, I introduced the following experiment: A fresh, whole, and muscular subject was selected, and a circular incision was made around the middle of the thigh down to the bone; another, from the tuberosity of the ischium around the inner aspect of the thigh, and over the dorsum of the ilium to the point of commencement, and all the tissues cleanly removed from the bone and capsule of the joint. The upper and posterior half of the capsule was then cut away, leaving the anterior and inferior half, whole, and the round ligament was divided. In this state it will be seen that *all tissues* were entirely out of the way, (and could neither afford protection against dislocation, or impediment to reduction,) except the anterior and inferior half of the capsular ligament. I now

placed the limb in the position which characterizes the dislocation upon the dorsum, viz: the knee in advance of the other, and the foot inverted; and the pelvis being fixed, I attempted to produce dislocation, but failed to do so, and I believe that no force, however great, applied to the knee, would be sufficient to accomplish the escape of the head of the bone without fracture of the acetabular walls, so long as the limb remains in this direction; for in this position, the head presses *perpendicularly* against the superior and posterior portions of the acetabular walls. But on carrying the limb to a position in which the thigh crossed that of the opposite side, at a point just above its middle, slight pressure was sufficient to dislocate the bone, for the acetabular walls, in this position, presented to the head of the bone an inclined plane, while from the same reason of position, the undivided portion of the capsule was relaxed, thus permitting the head to slide easily up this inclined plane and ride over the acetabular edge. At the moment, however, during which the head rested upon the edge of the cavity, this undivided portion of the capsule became tense, relaxed again as the head settled down upon the outside of the cavity, and upon dropping the limb down to the position which characterizes this dislocation, it became again tense. Efforts at reduction by extension and counter-extension in this direction were now made, but were unsuccessful, for this tense, undivided portion of the capsule bound down the head so that it could not ride back over the edge of the acetabulum; but on carrying the limb across the other, to the position in which it was at the moment of escape, the reduction was easily accomplished.

Upon the limb of the opposite side the experiment detailed in my former article was repeated, and with the same result.

The following case illustrates also the practical bearing of the principle under consideration: In February of the present year I was called into the interior of the State to reduce a dislocation of the hip of four days standing, which had resisted the efforts of two very efficient professional gentlemen. They had extended with Jarvis' adjuster, and practiced Reid's manipulations, but without success. Reid's method, they informed me, only altered the form of luxation, carrying the head downward and forward upon the obturator ligament. The luxation had been primarily upon the dorsum, but upon examination I found the head of the bone in the

ischiatric notch. I placed the patient upon his back, and attempted reduction after Reid's plan, but with the same result that had attended the efforts of the gentlemen in attendance. By inverting the foot, I slipped the head back to its position in the notch, and repeated my efforts, but with like result. I thus four times essayed reduction, but succeeded only in making the head travel from one position to the other. I adopted this plan with confidence, from the fact that the luxation had originally been upon the dorsum, but failing to replace the bone, I applied Jarvis' adjuster, and made extension after the usual method, and carried it to the extent of bending the extending bar to the form of a very considerable curve, but was not able to reduce the luxation. Opposed, as I was before, to violence, I removed the instrument, and straightening the extending bar, resolved to adopt Blundell's obstetric motto, *arte non vi*. After some deliberation, I armed the adjuster with the shoulder fork, flexed the thigh at right angles with the body, and adducted it; and applying the shoulder fork to the pubis and ilium, and attaching the extending bar to the knee, a few turns of the instrument evolved the head into the socket.

Although Doct. Reid attributes to the muscles the difficulties of reduction, he is explicit upon the fact that it is not muscular *activity* which opposes our efforts, and points triumphantly to the ease with which muscular contraction is overcome in fractures of the neck and shaft of the femur. He conceives that the muscular tissues immediately surrounding the joint, are the means of binding down the head of the bone in its new position, thus preventing reduction. He says, "the true condition of the muscles is this: the six, rotator, adductor, and abductor muscles, viz: the obturator externus anteriorly; the pyriformis, obturator internus, gemelli and quadratus, posteriorly, are all in a state of extreme tension, while the other eleven muscles, larger and smaller, are shortened, and in one sense, contracted, but in another, and in fact, they relaxed—that is, in a recent dislocation. Now it is evident on the slightest inspection, that the six muscles, that are put upon the stretch, being in antagonism to each other, that is, the short, strong obturator externus, anteriorly, being opposed by the other five posteriorly, and all acting at nearly right angles to the axis of the femur, must hug, with great power, the head of the bone, upon the dorsum, and by the same force, oppose its ascent over the brim of the acetabulum,

in any direct attempt to replace it by traction towards its socket. These six muscles, then, so violently stretched, constitute the real and only impediments to the reduction by the usual mode, and not the shortened and contracted triceps and glutei, as has always been believed and taught by all authors and professors of surgery."

So forcibly impressed is Dr. W. with the idea that "*these six muscles constitute the real and only impediment,*" that even in an experiment of his own, which he details in his paper, he fails to see the fact which he actually relates, that there is *another* structure which forms an impediment. His experiment was upon a subject considerably advanced in decomposition, and in the course of its relation he holds the following language :

"After carefully noting the relative position of bone and muscles, we made traction on the femur downward and inward over the sound limb, as we are directed by most authors; but the moment the attempt was made, the muscles already named as being in a state of tension became more tense, although all the muscles about the joint were separated from each other—were loose, without vitality, and almost in a state of decomposition, yet it was with great difficulty that we could bring down the head into its socket; and when we did so, we carried away a part of the capsular ligament."

It seems hardly probable that muscles "almost in a state of decomposition," could form the "real and *only* impediment," particularly, when in accomplishing reduction, he "*carried away a part of the capsular ligament.*" In this connection, I quote from my first article: "Extension and counter-extension by the pully, or Jarvis' apparatus, in the usual direction, succeeds, only by lacerating much more extensively, if not actually tearing the ligament completely asunder, before the head of the bone will ride over the edge of the cavity."

Dr. Markoe, who adopts Dr. Reid's views relative to the nature of the impediment, seems to have had a similar illustration, in one of his experiments, and like Dr. R., fails to see that the untorn portion of the capsular ligament forms an "impediment." His experiment is as follows :

"I removed all the muscles, leaving the capsular ligament only, and then endeavored to dislocate the head of the bone. I first tried adduction, and carried the limb so forcibly over the abdomen that the knee touched the anterior surface of the thorax, but without

producing luxation. In making more violent efforts in the same direction, the cervix fractured, or rather cracked across within the capsule, and soon after the ligament itself tore across at its superior and posterior part, just opposite the point of yielding of the cervix. The laceration was directly across the ligament, and occupied about one half of its circumference. As soon as this took place, the dislocation was easily effected. The neck of the femur and the trochanteric portion of it were now seen to be kept in their place by the untorn portion of the capsular ligament, which acted as a sort of fulcrum, upon which, by using the limb as the long arm, we could make the head, as the short arm, move about in any direction upon the surface of the dorsum of the ilium."

Does the untorn portion of the capsular ligament form an impediment? My own views are that it constitutes the *chief*, if not the *only* opposition to our efforts at reduction. If it is urged, that in this view, I am exclusive and ultra, I ask only that before such judgment is passed, the experiment of removing all the tissues about the joint, in the manner detailed above, may be made.

DETROIT, May 15, 1855.



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