Original Articles.

THREE CASES ILLUSTRATING SOME POINTS
IN THE PATHOLOGY OF CERTAIN INJURIES
OF THE SHOULDER-JOINT.¹

BY C. B. NANCREDE, M. D.,

Surgeon to the Episcopal Hospital, and to St. Christopher's Hospital for
Children.

A FEW preliminary anatomical points must be passed in review for the ready comprehension of my later remarks. The shoulder-joint differs in many important points from any other articulation of the body. A moment's reflection upon the almost unlimited range of movement which it enjoys will at once suggest that the ligaments of this articulation cannot be the means by which the joint surfaces are held in apposition; otherwise anything like freedom of movement would be impossible in a ball and socket joint where the socket is so shallow as in this articulation. What then does hold, firmly apposed, the articular surfaces? It must be something always tightly stretched, yet always capable of lengthening or rather always practically loose. Nothing but muscle could fulfill any such purpose. In truth, the muscles surrounding the joint are the most important ligaments the articulation possesses. When these are paralyzed, or in the cadaver, the head of the humerus readily falls away from the glenoid fossa. Bearing this fact in mind, you will clearly apprehend that the joint surfaces are kept pressed together solely by muscular tension. Again, the glenoid fossa, unlike the socket of any other important joint, *has no epiphysis*, which explains to a degree the fact that even in the young the head of the humerus may be so affected as to demand excision, while the glenoid process is either entirely or nearly healthy. Closely related with the scapulo-humeral joint, we find a number of bursæ, some of which commonly communicate with the joint, while others do not. To the former alone I shall devote my remarks. There is a large one between the acromial process and the coraco-acromial ligament upon the one hand, and the shoulder capsule upon the other. Two bursæ — the exact sites are unimportant for our present purposes — are situated between the subscapularis muscle and the capsule. An occasional one is placed between the infraspinatus muscle and the capsule, into which it often opens, as do the others just mentioned. Let an inflammation be set up in these sacs, and it certainly spreads to the joint itself, should communications exist, or nearly as surely by mere contiguity of tissue, if no opening between joint and bursæ is present. The articulation is securely covered in by the voluminous deltoid, so that any direct injury to the fibrous or synovial tissues of the joint is almost impossible from direct force, as a blow, although a twist *may* injure it, notwithstanding the latter is more apt to tear the bursal walls. The upper epiphyses of the humerus — of which there are three — coalesce at five years, but they leave a layer of epiphyseal cartilage between head and tuberosities and shaft, which in places either coincides with the capsular attachment or is actually within it. From these anatomical facts it must be clear that direct force, as a blow, can rarely injure the joint itself, but must either set up trouble in the surrounding bursæ or in the epiphyseal cartilage, or in both. Once again

the interior of the joint, the muscles moving the joint, and the skin over their attachment are all supplied by the same nerve or nerves; so that let a joint injury start where it may, the articulating surfaces of the shoulder-joint are subjected to such an injurious degree of pressure from direct or reflex muscular contraction as is possible for no other articulation. The bearing of these anatomical facts upon prognosis and treatment need hardly be pointed out.

The first specimen I proposed showing was presented to the Society some years back, and my reason for again showing it is the sharply contrasted result presented by the second specimen which I shall exhibit.

On November 27, 1878, the Society had an opportunity of examining the first patient and the admirable results of the case. To those who were not present, or who have forgotten the details, I will briefly recapitulate the history of the case, with the treatment pursued: —

COMPOUND FRACTURE AT THE ANATOMICAL NECK
OF THE HUMERUS.

The patient, J. M., aged fourteen years, fell, upon the afternoon of September 23, 1878, from a tree, about twenty-five feet, landing on the ground, but striking in his fall against the branches of the tree, and sustained the following injuries: The shaft of the humerus was separated from the head and greater and lesser tuberosities. The line of fracture closely followed the epiphyseal cartilage, although in several places the diaphysis was fractured. The shaft, slightly split, was driven through the integuments over the lower part of the deltoid muscle on its anterior aspect, tearing in its course the following parts: the insertion of the deltoid was completely stripped off with the subjacent periosteum; the coraco-brachial, teres major, and latissimus dorsi were in like manner torn off, the latter carrying with them the posterior lip of the bicipital groove. The tendon of the pectoralis major was torn off about half an inch from its insertion, and one if not both heads of the biceps was ruptured. In consequence the head and neck of the bone, deprived of periosteum, merely hung suspended by the capsular ligament and the rotator muscles. The shell of bone connected with the head and tuberosities was fissured at various portions of its circumference, as if by the impacting action of the wedge-shaped extremity of the shaft. I enlarged the wound and removed the fragments you see, namely, four and one fourth inches of the humerus, including its head. Seven weeks after the operation he could remove his coat, vest, and shirt without assistance. Ten weeks after the injury considerable reproduction of bone, even up to the margin of the glenoid cavity, was observed, with new attachments for the pectoral and latissimus dorsi muscles, as determined by Dr. C. T. Hunter. The actual shortening consequently amounted to only one and a half inches. He had perfect use of the fore-arm, could put his hand to his mouth, behind his back, and to his ear. Of course he had lost all over-hand movements.

The course of treatment pursued, and my reasons for deciding upon it, seem worthy of detail, since such injuries are but seldom seen, and, as far as I can discover, no clear rules have been laid down for their treatment. To the members of this Society who devote themselves especially to surgery, I need hardly say that no question of amputation arose in my mind;

¹ Read before the Philadelphia County Medical Society, March 20, 1884.

but to those in pure medical practice I would say that when the main vessels and nerves of a limb remain intact, the injury to the soft parts having been produced by the bone itself, not the fracturing force, almost any degree of shattering of the bones may be recovered from, in the young, without amputation. Two lines of treatment then offered for consideration, namely, the simple return of the bone, closure of the skin-wound, drainage, and trusting the case to nature; or the resection of the injured bone. Theoretically the first would have seemed the better course, promising no shortening of the limb, and the retention, in a measure, of the power of the deltoid. In reality, however, the chances of union were not one in a thousand; and if not union, then necrosis with its consequent shortening; necrosis, too, meaning months or years of inflammation and suppuration, matting the muscles together so that when recovery occurred — almost necessarily by an operation — the usefulness of the limb would be but slight. Resection, on the other hand, offered the complete removal of all injured portions of bone, and with them the most important factors of trouble after such an injury, thus permitting rapid healing, and the smallest possible amount of inflammatory adhesions between muscles, tendons, etc. If the bone had been simply returned, the risk to life would have been greater, owing to the prolonged suppuration incident upon the separation of the necrosed bone and the deep-seated abscesses so common after compound fractures. Against it was the absolute shortening of the arm, with the prospective cessation of growth due to removal of the upper humeral epiphyses.

The actual result, I think, bears me out in the course of treatment pursued, for I hardly think that in seven weeks he would have been in so good a condition, with the wound soundly healed, if I had followed what is often but falsely called the "conservative" plan of treatment. I believe that true conservatism indicated exactly what I did. The amount of shortening would not have been much less had the case been left to nature and necrosis. Had this occurred union of the severed head could not have taken place, and then the same shortening would have obtained as surely as if the epiphysis had been removed. Army experience has shown that when a portion of the upper end of the humerus is removed for injury nothing is gained by leaving the uninjured head, since it necroses.

Although not cognizant of this fact of experience at the time of operation, anatomical knowledge, general surgical principles, and experience induced me to arrive at a conclusion by *a priori* reasoning, which I have since found that extended experience had already proved.

I believe, therefore, that, theoretically and from experience, resection ought to be performed for such injuries. It is hardly necessary to say anything about the operation itself, since each case must be a rule for itself, the only point being to remove the bones with as little additional damage to the soft parts as practicable. The wound was dressed antiseptically, and when I transferred the wards to my colleague, Dr. Packard, no suppuration had occurred, and there was not the slightest inflammatory blush about the wound. He did uninterruptedly well, and the wound was soundly healed in less than seven weeks, the greater part at a much earlier date.

Sharply contrasted with this case and its results is that of the patient from whom the next specimen was

removed, where the head of the humerus, luxated and partially fractured, and protruding through the skin of the axilla, was *reduced* instead of being resected. Here the tension of irritated lacerated muscles, conjoined with the necessarily imperfect drainage, kept the injured bone bathed in unhealthy pus. This with the original injury resulted in an osteomyelitis, which necessitated my amputating at the shoulder-joint. I believe had the head of the bone been removed a fairly useful limb would have been the result at the end of a few weeks' treatment, while instead, after three months of illness and risk to life, amputation was the best I could do for him.

COMPOUND LUXATION (WITH FRACTURE) OF THE SHOULDER-JOINT.

—, aged thirty years, man, three months ago had his right arm caught by the belting, and drawn over a large drum in a position of extreme abduction and probably of extension. The head of the bone was luxated, the greater tuberosity torn off, and the caput humeri thrust through the axillary integuments near the anterior axillary fold. When I first saw him at the Episcopal Hospital after the accident he was very pale, with a constant discharge of pus from an opening at the site of the old wound, that is, near the anterior axillary fold, while the orifice of another deep-seated sinus was seen over the middle of the triceps, on the outer side of the arm. A probe introduced into the anterior sinus readily touched the denuded carious head of the humerus. I attempted to excise the head of the bone, but when prepared to saw it, after its protrusion through the wound, I found such evidences of osteomyelitis as to render amputation at the shoulder-joint necessary. He did well, and recovered, but even some months later a sinus existed, doubtless the result of necrosis of some of the fragments of periosteal bone produced by that irritated structure. As before said, had the head of the injured bone been excised a useful arm would have probably resulted.

The third and last case is one where a comparatively trivial injury, owing to non-treatment at first, resulted in a condition which demanded resection of the shoulder-joint.

CHRONIC ARTHRITIS OF THE SHOULDER-JOINT: EPIPHYSEAL ABSCESS OF THE HUMERUS.

Anna M., aged seventeen years, was admitted to the female surgical ward of the Episcopal Hospital May 14, 1883. One year ago last May she fell down stairs and struck her shoulder. She was unconscious for a short time, but was soon able to walk home. The arm did not become inflamed, and seemed to the patient well. Nine months after the fall she noticed pain in the shoulder, and an elevated papule formed near the joint, which was opened at the dispensary. This relieved the pain, but left a fistulous tract discharging healthy pus. She attended the dispensary until the 14th of last May, when she was sent into the house, Dr. Seltzer, the assistant surgeon on duty, having touched dead bone with the probe. After admission she had pain from time to time, gradually increasing in intensity until shortly before operation. Other free openings for drainage were made by Drs. Simes and Kelley. The probe detected an apparent sequestrum within the humeral head. Diagnosis, epiphyseal abscess.

The operation showed complete destruction of the

joint, a carious and denuded humeral head, with an abscess about the epiphyseal site containing a sequestrum. The glenoid cavity was denuded of cartilage and roughened. The portions of head and shaft, such as you see, were removed, while all the glenoid cavity was cut away with the gouge-forceps except where the long head of the biceps was attached. Further details of the operation are unnecessary. The patient was practically well at the end of two weeks. Perfect quietude of the joint at the outset might have averted all subsequent trouble.

What was the condition here after the accident? Probably the bursæ and fibrous tissues surrounding the joint were involved, and the vascular epiphyseal cartilage was congested from the jar and injury of the fall. Congestion of all these parts, instead of being relieved by complete functional rest of the articulation, with the local application of ice, leeches, etc., as appeared indicated, was kept up by the girl following her usual occupation of housework. Although in no sense markedly strumous, yet the tendency was in that direction. As the congestion increased inflammation and suppuration were set up in the bursæ, the disease spread to the articulation, gelatinous arthritis with epiphyseal abscess supervened notwithstanding the skillful treatment of my colleagues who, *too late*, had the opportunity of treating the case.

REPORT OF A SUMMER COURSE IN OBSTETRICS.¹

BY C. M. GREEN, M. D.

THE cases included in this report were attended during the summer of 1883 by a class of six second-year students under my supervision and instruction. The report is based on the records of the students; but their observations were in many instances verified or corrected by my own.

	Cases.	Males.	Females.	Total.
Primiparæ....	9	4	5	9
Multiparæ....	34 ²	14	21	35
Total.....	43	18	26	44

The youngest primipara was nineteen years of age, the oldest twenty-three: the youngest multipara was twenty, the oldest thirty-eight.

There were two cases of ante-partum hæmorrhage: one case occurred three weeks before delivery, without apparent cause, due presumably to a slight placental detachment by painless uterine contractions. The other case, in which the hæmorrhage was considerable, occurred between the fifth and sixth months: the woman had been in a drunken *mêlée* and had been kicked and beaten. She was found with a temperature of 102° F. and very restless: the fetal movements were much exaggerated. She was kept in bed for several days, and the uterine irritability controlled with morphine, and she was delivered at full term of a living child. There was one case of sciatica in the

second month, and another of obstinate neuralgia in the face, head and back which lasted throughout pregnancy and ceased only several days after the termination of the labor.

POSITION AND PRESENTATION.

O. L. A.	O. R. A.	O. L. P.	O. R. P.	Foot: S. A.	Head: Position Uncertain.	Total.
29 ³	3	1	2	1	8	44

The eight cases in which the diagnosis of position was not made were not reached by the attendant until after the child was born, or until after rotation had occurred which brought the head into the conjugate diameter of the pelvic outlet.

AVERAGE DURATION OF THE STAGES OF LABOR.

	Cases.	1st Stage.	2d Stage.	3d Stage.
Primiparæ....	5	13 h. 44 m.	1 h. 23 m.	17.4 m.
Multiparæ....	27	8 h. 44 m.	45 m.	16.5 m.

In a recent work by Dieterlein of Paris on *The Natural Delivery of Primiparæ*, which is reviewed in the *Centralblatt für Gynäkologie*, No. 47, 1883, the average duration of first labors is placed at 15 hours: of the five cases in this report the average duration was 15 hours 24.4 minutes. The duration of the expulsive stage is placed by Dieterlein at 1 hour 15 minutes: in my five cases the average duration of this stage was 1 hour 23 minutes. Dieterlein bases his calculations upon cases below thirty years of age; for those above that age the labor is correspondingly longer, especially the second stage. My cases were between nineteen and twenty-three years old and therefore come within the limits of those on which Dieterlein based his calculations.

THE THIRD STAGE.

In all the cases but two the placenta was expelled by the uterus or expressed by the method of Credé: in two cases it was necessary to introduce the hand.

There were two cases of moderate post-partum hæmorrhage, which yielded readily to ergot, ice and compression of the uterus; and one case of severe hæmorrhage, which was finally checked with injections of iced-water and vinegar.

Of the placenta one was very large and had several cretified nodules and plates. In one case the cord had two small diverticula about six inches from the umbilicus: in another, the cord was forty-eight inches long and was twice wound about the child's neck. In the case of twin labor the placenta and membranes were distinct, and the fœtuses were male and female.

STATISTICS OF THE PERINÆUM.

Of the thirty-four multiparæ the perinæum was in no instance ruptured: of the nine primiparæ the perinæum escaped rupture in six cases. In one of the three cases in which rupture occurred the tear was slight and required no operation. In the second case, in which podalic version was performed, the perinæum was torn superficially for half an inch: the tear was

³ In two cases the head was extended and the brow presented.

¹ Read before the Boston Society for Medical Improvement, April 14, 1884.

² Including one case of twin pregnancy.