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FRACTURE
OF THE
CORACOID PROCESS.

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Charlotte, North Carolina.

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CORACOID FRACTURES.

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A careful investigation of Surgical literature and experience would, in all probability, demonstrate uncomplicated fracture of the coracoid process of the scapula to be one of the rarest of all accidents to which the bony parts are liable: Indeed, prior to a few years since, the peculiar immunity from simple fracture, that this process was thought to be invested with, can almost be denominated its principal claim of distinction. The average writer in dealing with its injuries dismissed them with the briefest and most cursory description. A small minority with an inclination towards extremes, have strenuously maintained that a fracture of this process was quite impossible, others with a provisional liberality, have granted its occurrence as marvelously infrequent, if not the veritable *rari nantes* of fractures. This diffidence and divergence of opinion might not appear surprising, but from the fact a score and a half of well authenticated examples have been from time to time recorded, the majority of which have been corroborated by dissections years ago.

To assume the rôle of an apologist for venturing to solicit especial attention to this *one time* obscure and dubious class of injuries, I now scarcely believe is demanded or justifiable. I shall endeavor to present in this account an additional illustration from my experience, and to supplement in connection citations from all other recorded cases bearing upon the subject, thereby enabling one to view *seriatim* all cases that have been heretofore described. The entire literature of the subject is as yet, so far as I have been able to explore, but meagre.

This little process of bone that has been the means of some scepticism from very reputable sources, is described as a short thick process, situated at the anterior part of the upper margin of the scapula. Its name, coracoid, from the fancied resemblance that it bears to the beak of a crow, was given by Galen. It is also known, though not so well, as the processus cornicularis. It gives rise to the coraco-humeral, coraco-clavicular, and coraco-acromial ligaments, and serves also as an attachment for the short head of the biceps, and the tendons of the pectoralis minor and coraco-brachialis muscles. It is well protected and surrounded by bony framework, above by the clavicle, outwards by the head of the humerus, the ribs shielding within and below. Important blood vessels and nerves are in this vicinity, the whole being arranged in, and covered with connective tissue.

The traditional security that has protected this bone is obviously attributable to an imperfect consideration of its anatomical features, it was described as exempt from injury and so the report stood. It had been, so to speak, relegated dictatorially to a place of safety and the average experience had failed to correct the error.

Granting that an ordinary examination into the cause and mechanism of fracture of the coracoid, is calculated to impress

the belief that the position normally is well nigh invulnerable, at least so to any such force as is capable of breaking structures of similar constitution, still such analogy is not supported entirely when we rehearse the history connected with it. The conclusions may be plausible in appearance, but really are at variance with experience and phenomena. I deem it proper just here to reproduce the opinion of the worthy Scotchman Lizars, (as quoted by Hamilton,) with his characteristic emphasis to sustain these *a priori* opinions, he writes: "The coracoid process is said to be broken off, but this I question very much; it must be along with the glenoid cavity, or there must be a fracture of the neck of the scapula. The revelations made by the scalpels of Boyer, Duverney, Malgaigne, Neill, and Bennett, are absolutely efficient in the rebuttal of this dictum, disclosing as they do beyond any doubt, that it does really take place without any marked complications whatsoever.

Holmes' System of Surgery, says in treating of these cases, "It is only produced by direct violence, usually accompanied by other injuries, as dislocation of the humerus, —in the case of South and Holmes—or fracture of other parts of the scapula." Erichsen is of the opinion, "It can only be produced by very direct violence, usually of a severe kind." Bryant writes, "It is most commonly associated with dislocation of the humerus." Hamilton says "It is often accompanied with serious complications, and such as have sometimes proved fatal." The two cases which he "has had to deal with—both were complicated with an upward dislocation of the outer end of the clavicle."

The following case taken from the London *Lancet* for 1840-'41—University College Hospital Reports—illustrates very lucidly an uncomplicated fracture:—A milk-woman, aged thirty, fell from a cart upon her right

side into the street, arm motions were not impaired, she could raise her hand to her head without any difficulty. The clavicle, humerus, and acromion were entire, there was neither deformity nor flattening, but on attempting to grasp the coracoid process while the arm was freely moved up and down, a looseness and crepitus could be distinctly felt, and a grating was also perceptible in the axilla. The arm was secured to the side by means of a sling and bandage, fomentations applied, very little swelling, pain increased by motion.

Doctor Huse, of Illinois, has reported a case in the Chicago Medical Journal. The patient, a young medical man, who, while rising from his bed at night fell against the edge of a door standing slightly ajar. There were present all the usual symptoms, including crepitus, local pain, tumescence, and inability to use the muscles corresponding to the process. His diagnosis was confirmed by the Rockford, Ill., Medical Association.

Prof. William Gibson, of Philadelphia, gives in his work on surgery, an account of a couple of cases occurring in his own experience. The first in the person of the famous Charles Carroll, of Carrollton, who, while riding in the carriage of the British Minister Bagot, was upset and by a violent fall upon the shoulder, this process was broken off. He states that the subject being a remarkably thin one, he "was able to detect and move the fragments one upon the other." Of his second example he makes no further mention than to say it occurred in the person of a sailor.

I have examined all the specimens of this fracture contained in the Army Medical Museum, at Washington, and find each to be the result of gun-shot wounds complicated with other severe lesions, possibly with one exception, that one being a secondary fracture said to have taken place spontaneously

three weeks after a destructive wound of the joint. As illustrations these examples therefore I do not regard as having any special value.

It is worth while to remember that this process is epiphyseal up to about the twenty-fifth year, and previous to that age its separation would be no difficult matter. Heretofore all such separations have been regarded as true fractures and I can see no good cause for disrespecting the arrangement, providing the subject is of a reasonable development.

During the summer of 1883 I was summonsd to attend a Mr. B., aged thirty-three, a slightly built man weighing about one hundred and thirty pounds, scanty adipose tissue, bony landmarks quite prominent. A few weeks previous to this time, owing to a laceration of the forearm and wrist, the result of a planing machine, he had undergone an amputation a few inches below the elbow of the left arm. The stump was somewhat inflamed and still tender. Upon my arrival some twenty minutes after the accident to which I had now been called, I found my patient supporting his wounded arm with the opposite or right hand. He was pale and anxious, evidently suffering much pain. I was informed that while endeavoring to avoid the moving wheels of a vehicle in the street, he had lost his footing and fallen backwards towards the gutter-curbing, and in doing so, to use his own words, he "had knocked his shoulder out of joint." Further questioning as to the exact manner in which the accident occurred, elicited the fact that while falling he had attempted to recover his lost equilibrium and in consequence landed rather awkwardly. The arm, it appears, had been raised above the head and thrown outwards—possibly instinctively to protect the sensitive stump—in this position the bulk of the blow from the fall was sustained by the space corresponding to a point near the

deltoid insertion of the humerus and outer aspect of the shoulder joint.

Upon exposing the shoulder and making an examination, I found it probably slightly lower than its fellow. The arm was held away from the body and a little forward. I passed my hand carefully over and along the clavicle, the scapular ridge, acromion, and head of the humerus, then across and felt into the space corresponding to the coracoid: The head of the humerus was found subluxated forward, I made slight extension and it receded to the normal position, the shoulder presenting its ordinary *contour*. Whereupon I assured my patient that everything was in its place and nothing broken.

Notwithstanding he continued to complain of severe pain, and in order to satisfy his anxiety, I began to manipulate the limb rather briskly—as if nothing were the matter—while carrying it outwards and rotating, I at once heard distinct crepitus, he noticed it and immediately said, “I felt it grate, something must be broken.”

A more careful repetition of these movements, with the fingers of one hand pressed gently into the coracoid space revealed the anomaly there. Any increased pressure from my fingers, while the arm was being moved in the above manner, always augmented the pain, so much so the patient objected to its repetition, and flinched each time, as I touched the point.

I now directed him to shrug the shoulder, this he was unable to do—and even now can do so imperfectly. So far as I am aware, this shrugging movement, as a feature of diagnosis in these cases, has not before been alluded to, I regard it however, as quite invaluable in the aid it furnishes. It appears to be peculiar to an intact condition of the tendons of the pectoralis minor and coraco-brachialis muscles: The former by its attachment to the coracoid, draws the scapula

forward and downward, and makes it at the same time execute a rotatory motion, by virtue of which the inferior angle is carried backwards and the anterior depressed; when the arms are fixed the coraco-brachialis assists these movements. Next day in company with a colleague I was again able to detect crepitus, impaired function, local pain, and now in addition, local tumescence which had in the meantime taken place.

It will be recalled that the arm was elevated and abducted, the force in such a direction as would most likely drive the head of the humerus against the process, that the blow was violent—striking edge of the curbing stone,—and the humerus found in the subluxation. I have no doubt that the head caused the rupture of the coraco-acromial ligament and produced a fracture *a contre-coup*. Rotation of the arm outwards appeared to restore the fragments, or least always produced crepitus. Hamilton saw a case belonging to Dr. Little in which outward rotation seemed to effect a reduction, but how and upon what principle he was unable to say, unless it did so by drawing upon the short head of the biceps and coraco-brachialis. I am of the opinion that the coraco-humeral ligament is the main factor in these restorations, admitting however, that these muscles play some part, though not the chief. In my case after swelling had subsided, if the arm were flexed and the process felt for it could be detected following the movements of the head of the humerus during rotation. I was in this manner enabled upon several occasions to displace the fragment at will. After the lapse of several months I found it thus still movable.

This injury nearly always results in ligamentous union, osseous reparation but rarely, if ever taking place; the usefulness of the limb is not to any great degree thereby impaired.

The treatment adopted heretofore has been to place the

arm in one of two positions, either carried slightly backwards and supported vertically—to get, as it is claimed, the head of the humerus to retain the fragment in position—or to flex the arm across the breast, to relax the muscles attached to the process. Consulting the patient's comfort more than any particular surgical or anatomical feature, I choose the latter position and employed an ordinary four-tailed bandage to meet the indications. Rest of the parts enjoined, considerable discoloration reaching as far as the elbow took place during the first week, but gradually yielded to cold applications and stimulating lotions, leaving at the end of eight weeks from the first reception of the injury, only a little soreness over the immediate seat of fracture. One year afterwards the patient expresses very slight discomfort, yet cannot use the joint naturally, owing, I conjecture, to the lengthening of the process, following ligamentous union.

Prof. Edward H. Bennett, of Dublin, has kindly furnished me notes of five cases dissected by himself and colleagues, all of which have been placed in the Museum of Trinity College. One of the above examples presents features the most remarkable of any yet described, being a green stick or incomplete fracture of the base, showing the break plainly on the under surface, the superior being intact. It comes from a subject who was crushed to death by a lot of masonry falling upon him.

Flower thinks he has met with two cases, both the result of a fall forward from a slight height with the arm stretched forward; there was in each instance mobility of the tip of the process, with crepitus and pain, but no displacement of the fragment could be detected.

Bryant gives one case from his practice in the person of a girl aged fifteen. It was the result of a blow; both crepitus and local pain were present, the fragment was drawn downwards and the base projecting. I find objections to this in consequence

of the youth of the subject; it should be classed merely as an epiphyseal separation and nothing more.

Agnew has seen one case also, the result of a severe injury to the shoulder. It occurred in the person of a railroad official. The violence, he writes me, was applied to the chest below the clavicle. In his work on Surgery, where he again mentions this same case he says—somewhat in conflict with my letter: "As the humerus had been dislocated in this instance, I have no doubt the fracture was caused by the head of the bone." A year afterwards he was able to verify his diagnosis, the process being quite prominent from the length of the connecting band. He fails to mention whether crepitus or mobility was present; the account, in this respect, is faulty.

Hamilton, debaring the case of Little, has observed two instances, the first, in a gentleman who 'was struck by a board which fell edgewise upon his shoulder.' It appears from the fragment remaining quite movable for considerable time, that very imperfect union followed in this case, although the usefulness of the arm was not curtailed. His second case, a girl, who had fallen upon her shoulder; in this one he had both mobility and crepitus.

Doctor Mussey, of Cincinnati, possessed an example showing the head of the humerus dislocated forward and the coracoid process broken off below.

Bransby Cooper had an instance that showed a fracture of the base, the union by ligament.

Prof. Chas. Gibson, of Richmond, is said also to have had a specimen in which the fragment is united by fibrous tissue a line or two in length; it comes from an adult.

In the Neill specimen, of Philadelphia, the break is at the base at least an inch from the point. But this case is open to the same criticism as that of Bryant, being from a young

subject; were it not so this would be one of the best illustrations known.

In a recent letter to me Doctor John H. Packard writes concerning a case of his own, as follows :—"An elderly woman who slipped down in a narrow alley-way and struck her elbow, driving the head of the humerus upward and forward. The symptoms were loss of function of the coraco-brachialis and pectoralis minor muscles, tenderness and crepitus on pressure over the coracoid. I do not remember the result of the case, but an account of it was published by me in the *Charleston Medical Journal and Review* about 1859."

Specimens are to be found also in the Mass. Medical College Museum; University College Museum, London; the Dupuytreu Museum, Paris; besides those in possession of several individuals in this country. To class these injuries according to the manner of causation, it will be found that nearly half of them result from falls upon the shoulder, the others resulting from direct blows. The instances of Gibson of Philadelphia, South, The Lancet, Agnew, Packard's, one of Hamilton's and my own, were associated with changes in the position of the head of the humerus, and were most likely caused by it, while those of Little, Huse, Bryant, and the other of Hamilton's were the result of a direct blow.

This fracture has features for further study. That it is frequently overlooked in connection with lesions more severe in this vicinity, I am convinced. Nothing but careful examination and discrimination will reveal its presence. In obscure injuries in this region we should be upon guard.



