

A case of dislocation of the ulna forwards at the elbow, without fracture of the olecranon process : with observations / by Edwin Canton.

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With Canton's Case

A CASE
OF
DISLOCATION OF THE ULNA FORWARDS AT THE ELBOW,
WITHOUT FRACTURE OF THE OLECRANON PROCESS;
WITH OBSERVATIONS.

BY
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"There is no joint in the body which, under accident, requires more anatomical and physiological knowledge than the elbow,—particularly in dislocation,—where the force required to separate the bones must necessarily be so violent as to produce extensive tumefaction of the soft parts, and conceal the relative position of the natural eminences of the joint which can alone lead to a correct judgment of the injury. Swelling, pain, and loss of motion, are not the signs by which the true nature of the accident can be comprehended; but the fixedness of the joint, and the change of the position of the condyles of the humerus with the olecranon process of the ulna, are the best indications of the displacement of the articulatory surfaces of the elbow-joint."—B. Cooper, *Lectures on the Principles and Practice of Surgery*, p. 343. London: 1851.

So rare is dislocation of the ulna forwards at the elbow-joint without a simultaneous fracture of the olecranon process, that many authors have denied the possibility of its occurrence:—e. g. Petit^a, Boyer^b, Monteggia^c, Sanson^d, Bérard^e, Savary^f, S. Cooper^g, B. Phillips^h, Cheliusⁱ. The following writers tacitly agree with the above, by making no mention of this form of injury:—Vidal (de Cassis)^j, Dupuytren^k, Sir A.

^a *Maladies des Os*, tom. i., p. 236. Paris: 1772.

^b *Traité des Malad. Chirurg.*, tom. ii., p. 379. Paris: 1818-26.

^c *Institut. Chirurg.*, vol. v., p. 71. Napoli: 1825.

^d *Nouv. Elém. de Pathol. Med. Chir.*, tom. iv., p. 623. Paris: 1828.

^e *Dict. de Méd. Art.* "Coude."

^f *Dict. de Scien. Med. Art.* "Coude."

^g *First Lines of Surgery*, p. 700. London: 1840.

^h *Lectures on Surgery*, *Medical Gazette*, July 10, p. 615. London: 1840.

ⁱ *System of Surgery*, vol. i. p. 788. Translated by South, London: 1847.

^j *Traité de Pathol. ext.* Paris: 1839.

^k *Surgical Works*.

Cooper^a, Adams^b, Liston^c, Miller^d, B. Cooper^e, and Pirrie^f. The surgeons who have conceived the possibility of this accident taking place, and those who have seen examples of it, will be referred to in the progress of these observations.

The configuration of the articulatory surfaces of the elbow-joint and the arrangements of its ligaments to constitute the most perfect angular ginglymus in the body; the small coronoid projection in front and disproportionately large olecranon behind, with the lesser and greater pits to receive them, in flexion and extension, respectively; together with the wider range of motion enjoyed in the former than in the latter direction, fully explain why dislocation of the ulna backwards without fracture is of extreme frequency compared to the anterior displacement of the ulna with its olecranon process continuing intact. All circumstances connected with the former accident are well understood; but, with respect to the mode of production of the latter, the latest writer on dislocations observes:—“It is only as the result of very violent and extraordinary accidents, by which the forearm is forcibly flexed, or *greatly extended*, or twisted, or some other unusual or indirect way, the olecranon is placed in front of the humerus”^g. Nélaton^h believes that it is through a fall on the elbow whilst the forearm is *forcibly flexed*, that this luxation is produced, and he quotes a confirmatory opinion of Malgaigneⁱ. Debruyne^j has convinced himself, by experiments made on the dead body, that this displacement can only occur, according to the mechanism first pointed out by Colson^k:—“1°. Par une flexion forcée de l'avant-bras sur le bras. 2°. Par un mouvement imprimé à l'avant-bras, de façon à lui faire décrire un arc de cercle autour de l'arc de l'humerus. 3°. Par une extension forcée de l'avant-

^a Surgical Works.

^b Cyclopædia of Anatomy and Physiology. Art. “Elbow-Joint.”

^c Elements of Surgery. London: 1840.

^d Practice of Surgery. Edin.: 1856. ^e *Loc. cit.* London: 1851.

^f Principles and Practice of Surgery. London: 1852.

^g Hamilton, F. A Practical Treatise on Fractures and Dislocations, p. 594. Philadelphia: 1860.

^h Elem. de Pathol. Chirurg., tom. ii., p. 387. Paris: 1847-48.

ⁱ “Quant à la luxation en avant, si l'on suppose une chute sur le coude lorsque l'avant-bras est fortement fléchi, il est aisé de voir que les saillies osseuses ne font nul obstacle au déplacement, et qu'il suffirait dans cette position, d'une chute sur l'olécrâne.”—Malgaigne, Traité des Fractures, et des Luxations, tom. ii., p. 626. Paris: 1855.

^j Mem. sur les Luxations de Coude. Annal. de Chirurg., tom. ix., p. 46. Paris: 1843.

^k Archiv. de Méd. Journal complém. Thèse de 1835, tom. ii., p. 377.

bras, ce qu'il appelle 'flexion en arrière.'” In no case did it appear to Debruyne that flexion alone was adequate to the production of this peculiar luxation. He conceives, however, that it could occur where external force operated on the olecranon from behind forwards, whilst the forearm was held in a state of forcible flexion. In a case of this dislocation which came under the care of Monin, and occurring to a child between six and seven years of age, the patient fell, with violence, upon the elbow, whilst the forearm was forcibly flexed on the arm^a.

The first case of this accident, I believe, distinctly recorded, was one that came under the charge of Colson^b, and occurred to a lad aged 15, who fell on the right elbow while skating, at the same time that the forearm was semi-flexed, so that the weight of the body, increased by the suddenness of the fall, bore on the olecranon process, and, driving it forwards, caused it to abandon, completely, the humeral trochlea.

Having now considered the mode of production of this injury, I pass to a review of the symptoms by which it is to be distinguished:—Increased length of forearm; absence of the olecranon at the posterior part of the joint; slight flexion of the elbow (in a case, however, recorded by Guyot^c, the forearm was in a straight line with the arm); tension of the integuments; projection of the tendon of the biceps, and a bony eminence to be felt internal to it; the lateral parts of the joint flattened and depressed, presenting on either side a longitudinal fossa; and posteriorly two eminences separated by a depression, or rather a gutter which extends from the posterior surface of the arm, beneath the inferior extremity of the humerus, in place of the eminence which should exist here; movements of the articulation limited and very painful; in the cases, however, of Colson and Guyot^d, the joint permitted of great mobility.

It would appear from the accounts of those authors who have treated this form of accident, that reduction was accomplished with comparative facility. Debruyne remarks:—“ Il suffit, après avoir par l'extension, descendu les extrémités articulaires des os de l'avant-bras au niveau de celle de l'humerus de fléchir brusquement le membre, pour voir les os reprendre leur position naturelle”^e.

^a Journal de Chirurg., tom. ii., p. 119. Paris: 1844. Quoted from the Journal de Méd. de Lyons.

^b *Loc. cit.*

^c Revue Méd.-Chir., tom. ii., p. 106. Paris: 1847.

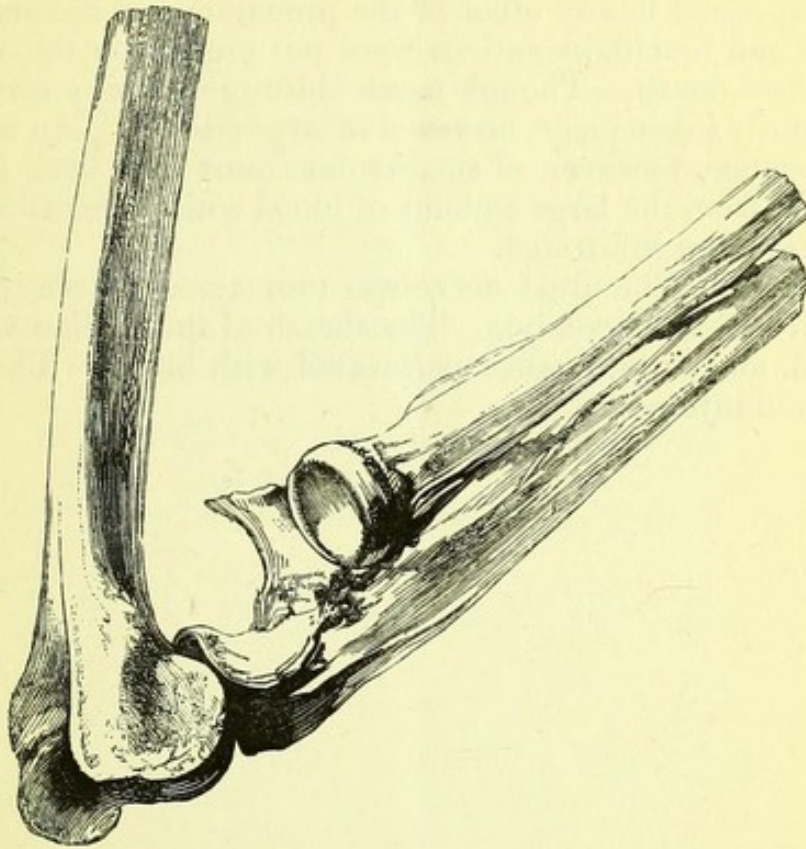
^d *Loc. cit.*, p. 48.

^e *Loc. cit.*

The following case came under my care in the Charing Cross Hospital:—F. P., aged 40, a somewhat short, slim-built, but muscular man, while driving in a light cart at the rate of seven or eight miles an hour, was thrown out, and instinctively extended his right hand to prevent injury to his head. The weight of the body, however, caused sudden and forcible flexion of the elbow, and at the same time the forearm became twisted in under the chest. On rising, it was found that the elbow was considerably swollen, and the power of moving it entirely lost. When admitted into hospital, the forearm was forcibly flexed, and the hand supinated. The swelling, ecchymosis, and tension around the elbow were so great that it was with difficulty any of the more salient anatomical peculiarities of this part could be recognised,—everything appeared, in every way, so disarranged. The skin covering the inner condyle was stretched to the utmost, and here, over a space about the size of a sixpence, it was to such a degree injured, that a compound state seemed to be momentarily threatened. The antero-posterior and lateral diameters of the joint were increased in extent, and the general swelling was so great as to present a circumference far beyond the normal size of this region. Externally and somewhat anteriorly the cup-like cavity of the radius could be indistinctly distinguished; internally, the condyle was unduly prominent; anteriorly no particular point for diagnosis could be determined on, on account of the state of forcible flexion and great tumefaction there; posteriorly also the swelling was very considerable, but, below it, there existed a depression favouring the view that the ulna was broken immediately below its olecranon process. No median gutter, with lateral elevations to bound it, could be felt.

Attempts were made to rectify the mal-adjustment, but without success; the efforts, however, could not be longer continued, for, it was obvious that the injury already sustained by the soft parts was so extensive,—the obstacles to be overcome so resistant, and the great likelihood incurred of rendering the case one of the compound kind, forbade further trial, and it was agreed, in consultation, to place the limb at rest on a splint, and to keep the parts cool with an arnica lotion. Within the course, however, of forty-eight hours the tumefaction became still greater; a large slough was forming on the inner side of the joint, and high constitutional irritation having set in, I was obliged to amputate the limb at a sufficient distance above the articulation.

Dissection.—A very careful examination of the elbow was made, under my superintendence, by my pupil, Mr. Edgar Browne, with the following results:—



Bones.—The ulna was dislocated forwards, so that the upper surface of its olecranon process became placed in front of the capitellum humeri, and had thus assumed the position naturally occupied by the head of the radius during flexion of the forearm. The radius was supinated and maintained *in situ naturale*—as regards the ulna—by the coronary and interosseous ligaments being intact.

Ligaments.—Of the anterior ligament, the only part remaining at all perfect was a shreddy portion about the centre; all the rest of it had been torn through. The posterior, and both lateral ligaments were completely divided. The coronary and oblique ligaments were uninjured.

Muscles.—The triceps extensor was detached from all its points of insertion. The supinator radii longus was uninterfered with at its origin; but the two radial extensors of the carpus beneath it were torn away from the surfaces whence they spring. All the muscles which arise from the external condyle—with the exception of the supinator radii brevis, and

anconæus—were detached from this process. The only muscle that was torn through at its origin from the internal condyle was the flexor carpi ulnaris,—the olecranon and ulnar portions of it, however, continued intact. No mischief whatever had happened to any other of the pronators and flexors. The biceps and brachialis anticus were put greatly on the stretch.

Blood-vessels.—Though much shifting of their position had necessarily taken place, no vessel of large size had been injured; the sacrifice, however, of smaller ones must have been great—judging from the large amount of blood with which all the soft textures were infiltrated.

Nerves.—The ulnar nerve was torn across where it passes behind the inner condyle. The sheath of the median was distended, and its substance permeated with blood. The other nerves uninjured.