

brachial plexus, either above or below the clavicle, burrow backward between the latissimus dorsi, the trapezius, the rhomboideus, and the serratus magnus; some spread in all three of these directions. When they point into the mediastinum or penetrate the pleura a fatal outcome is the rule. The fasciæ are considered as boundaries between superficial and deep axillary abscesses; the diagnosis of the two conditions is, therefore, made just as elsewhere in the body. Severe constitutional symptoms, œdema in the neighbourhood, late appearance of fluctuation, in spite of great swelling and tension of the parts, may be regarded as the marks of a deep suppurative process. Symptoms distinctive of this region also appear; these have already been indicated. If tension, and later fluctuation, can be demonstrated beneath the clavipectoral fascia, in the subclavian triangle, or in the supraspinous fossa, the abscess is surely deep-seated. Burrowing along the muscles of the arm occurs, but is rare.

Finally, I may refer to the so-called *scapular crepitus*. At times a loud, rough crepitus, accompanied by pain, will be heard at the lower border of the scapula on movement, although the shoulder-joint is intact. It is caused by contact of the scapula with the ribs, due to a chronic inflammation which has resulted in destruction of the interposing muscles and roughening of the bony surfaces.

CHAPTER XVI

DISLOCATIONS AND FRACTURES AT THE ELBOW

SUBCUTANEOUS injuries to the elbow-joint and the bones that aid in forming the articulation are both very numerous and of diagnostic interest. The following dislocations are found: both bones of the forearm may be dislocated, backward, outward, inward, or forward, either together or in opposite directions (as, radius forward, ulna backward—divergent dislocations). Both may be dislocated forward, but complicated by torsion, so that the concavity of the coronoid process of the ulna faces backward in moderate extension of the forearm (reversed dislocation—*Umkehrungsluxation*). To these may be added incomplete dislocation of both bones inward and outward, which swells the total to eight varieties. The radius may be dislocated in three directions—outward, backward, and forward. The ulna alone may be displaced backward. These increase the possible number of dislocations to twelve. The commonest of all is a backward dislocation of both bones; the luxations of the radius alone are also not infrequent, and incomplete lateral dislocations occur with greater frequency in children than is generally supposed. The other forms are rare.

Various fractures require consideration from the standpoint of differential diagnosis. Fracture of the

lower end of the humerus is common, and resembles backward dislocation of the bones of the forearm. Other fractures are fracture of the condyles of the humerus, of the coronoid process of the ulna, of the upper end of the radius, and, lastly, in children, epiphyseal separation of the lower end of the humerus.

Incidentally fractures of the olecranon may be mentioned. They rarely give rise to difficulty in diagnosis.

Let us consider the more common varieties referred to above. A patient presents himself, suffering from an injury to the elbow-joint sustained by a fall from a wagon. The whole region is occupied by a considerable swelling, which obscures the contour and extends up the arm and down the forearm. After the patient has stripped to the waist, we measure the length of the limb. This is shortened about two centimetres, if roughly gauged by sight. The joint is slightly flexed, about one fourth of the possible degree of flexion. I can not sufficiently reprove the fault common to beginners, of at once grasping, handling, and pressing an injured part without rhyme or reason. I will show how a purposeful inspection reduces this handling to a minimum. Inspect as long as further information can be gained by the eye. Of great importance is recognition of the relative position of the axis of the forearm to that of the arm. In our patient we notice that the axis of the forearm has been moved backward, though still parallel to its former course. Draw an obtuse angle (\sphericalangle) in which the vertical line represents the axis of the arm, the lower, almost horizontal line, the axis of the forearm. If, now, the vertical line is left as before, but the lower line is moved backward, parallel to its former position (\sphericalangle), the ex-

isting condition is diagrammatically reproduced. Moreover, the axis of the arm and of the forearm no longer intersect at the joint, but at a point situated on the forearm. This is due to

the fact that the forearm slips upward at the time of dislocation. For the same reason, the forearm appears shortened, especially if examined from in front, but the upper arm must also appear shortened along its extensor or posterior surface. All these findings confirm the same fact, merely regarded from different standpoints. The upward displacement of



FIG. 8.

the forearm accounts for the actual shortening, which does not exceed one or two centimetres. Inspection

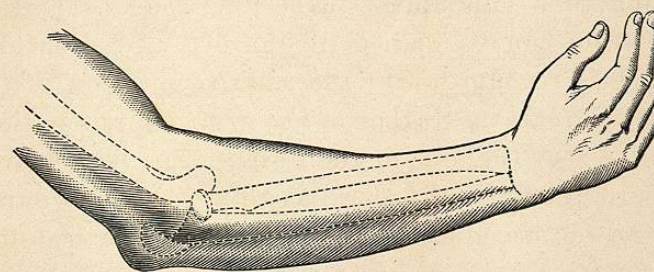


FIG. 9.

would lead us to conclude that the case is one of *dislocation*. In transverse fracture of the lower end of the hu-

merus, the forearm, and the lower fragment can assume the above position, so that all the previously mentioned symptoms—shortening, position, and axial deviation—are common to both. A single manipulation is sufficient to decide. Grasp the forearm and partially flex it. If the resistance encountered on attempting flexion is insurmountable, dislocation and not fracture has to be dealt with. Should a sceptical colleague refuse to be convinced, still further evidence may be advanced. Find the internal epicondyle, which is readily located no matter how extensive the swelling, and then the less prominent external epicondyle. With the elbow at a right angle, the two epicondyles and the tip of the olecranon should normally lie in the same straight line. In dislocation, the tip of the olecranon is as much above this line as the forearm is shortened—in adults, about two centimetres. If this symptom is to be clearly demonstrated, we stand in front of the patient and flex both elbow-joints to a right angle in order to compare the healthy and the injured side. The middle finger rests against the internal condyle, the thumb against the external, and the index-finger upon the tip of the olecranon. On the sound side the three fingers are in line; on the injured, they represent the corners of a triangle, of which the index-finger is at the apex. This, however, merely proves that the ulna has been dislocated. The radius must also be accounted for. Normally, the head of the radius is about a finger-breadth below the external epicondyle. In dislocation this space is empty, and the depression found on the head of the radius can be felt behind the condyle. Passive pronation and supination serves to identify the head, which is felt to accompany the shaft in these movements.

In *fracture*, the forearm can be flexed beyond a right angle, extended beyond a straight angle. The relation of the two epicondyles to the olecranon are unchanged; the head of the radius is in its proper place. If we

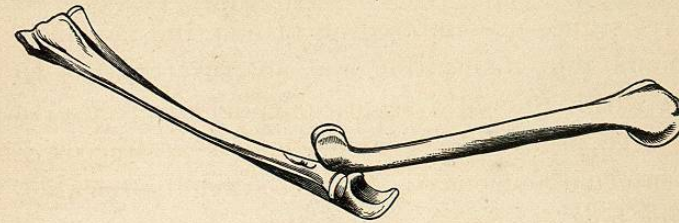


FIG. 10.

grasp the two condyles—i. e., the lower fragment—it can be moved to and fro, as the point of abnormal mobility is above the epicondyles. A T-shaped fracture should not be overlooked. The transverse fracture, which separates the lower end of the humerus from the shaft, is then complicated by a vertical fracture, which divides the lower fragment into two pieces. In this case the condyles will move on each other, or crepitus limited to the lower fragment may be elicited.

The picture of a recent dislocation without swelling, or of an old dislocation, is so striking that it can never be forgotten after one case has been examined. It can be produced on the cadaver by overextension, followed by flexion, combined with strong backward pressure exerted upon the forearm. The symptoms of this dislocation, described by all authors, are then plainly evident. The flexor surface of the forearm and the extensor surface of the upper arm seem shortened. The triceps tendon forms a marked curve with concavity directed backward, and the olecranon becomes unduly prominent with depressions on either side of it. The

head of the radius allows the posterior half of its articular surface to appear, while anteriorly the trochlea, especially the mesial edge, can be felt. The transverse diameter of the joint is unchanged, etc.

It might be objected that dislocation of both bones of the forearm, or fracture of the lower end of the humerus, are not the sole conditions to be dealt with. Therefore, while resistance to flexion beyond a right angle is a striking symptom, it may be of no value in the diagnosis of injuries to the joint.

Let us analyze the objection: *Lateral* dislocation of both radius and ulna can be recognised at the first glance. The forearm has left its normal site, and has moved either to the inner or outer side. The axis of the humerus and of the forearm run side by side; this relation is diagrammatically represented as follows: \perp . This variety requires no further discussion, as it can not be confused with the preceding forms. *Forward* dislocation of both bones is at once excluded by the position of the forearm. In this luxation the elbow is held rigidly at an acute angle of flexion. The so-called reversed dislocation attracts attention because of the marked pronation. The protuberance noticed at the front of the joint proves to be the subcutaneous surface of the olecranon, and the site normally occupied by the olecranon is empty.

Divergent dislocations are characterized by the considerable degree of shortening, combined with readily recognised separation of radius and ulna at their upper ends.

In dislocation of the *ulna alone* (Fig. 11), the forearm assumes a pathognomonic position. It is fixed in complete extension. The axes of the arm and forearm form

an obtuse angle, with its apex directed away from the median line, resembling somewhat the lower extremity in genu varum.

All these varieties differ widely from the first two conditions mentioned, and, as a matter of course,

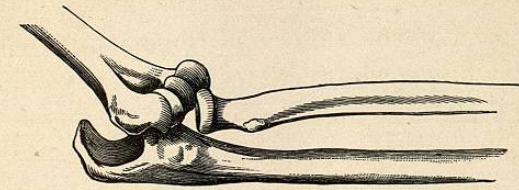


FIG. 11.

lead to different deductions. This leaves only dislocations of the radius and incomplete dislocations of the forearm to be considered. Dislocation of the radius causes a swelling, which is specially prominent at the radial side. *Posterior* dislocation of the radius limits flexion beyond a right angle, and is thus differentiated from fracture of the lower end of the humerus. It can not be confused with dislocation of both bones backward, because no shortening takes place. *Forward* and *outward* dislocation of the radius in some cases impedes movement and in others does not; but, as in backward displacements, if measurements are taken along the ulnar side of the forearm, shortening is absent.

Incomplete dislocations of the forearm still remain to be discussed. They offer considerable difficulty in their diagnosis, as is shown by the greater frequency with which they are recognised in recent days. Streubel's classical work on dislocations of the elbow, which appeared about thirty years ago, mentioned only a few scattered instances, while Pitha, in his treatise on sur-