

of the clavicle; simple bandages passed over the shoulder and under the elbow; immovable plaster or other dressings; pads, straps, etc., in varying combinations; the ordinary Petit's tourniquet (well padded) placed over the end of the clavicle with the strap passing under the elbow; and Mayor's apparatus. All these have been tried, each one giving good results in some cases and failing in others. Sayre's dressing for fractured clavicle is about the simplest and most reliable. Many surgeons, however, advocate warmly Stimson's method of treating this dislocation. This is accomplished by means of a long strip of adhesive plaster, three inches wide, the middle point of which is placed over the front of the flexed elbow, and the ends carried up in front of and behind the arm, crossing over the distal end of the clavicle and then being fixed to the front and back of the chest, while the bone is held in place by pressure over the elbow and clavicle. The forearm is supported by a sling and the arm is bound to the chest. The readiness with which an inspection can be made from time to time, so that a recurrence of the dislocation may be quickly detected, is a good feature of this method. On the other hand, the possibility of sloughing at any time at the point of the elbow must be watched for and prevented. Gross first suggested wiring with strong silver wire, and this was tried by Cooper, of San Francisco, and by Dr. Hodgen, of St. Louis, in two cases. Although in these two cases the procedure proved successful, Hodgen said that he would not repeat the operation except in cases of *very great* displacement.* Mayor's apparatus consists of a sling or casing for the forearm, with straps and buckles attached to the covering over the point of the elbow posteriorly; one of the straps passing over a compress placed over the distal end of the clavicle and attached to the casing in front of the elbow, the other passing over the sound shoulder and attached to the casing midway between the elbow and wrist.

Dislocation of the acromial end downward is exceedingly rare, only five cases having been cited by Hamilton; while Stimson† gives a total of twelve. So far as known, this dislocation is produced by direct violence, forcing the end of the clavicle downward. At the same time the lower angle of the scapula moves slightly outward, and the coracoid process is depressed,—thus saving it from being snapped off. The acromio-clavicular, coraco-clavicular, and coraco-acromial ligaments are ruptured, and the head of the clavicle rests on the capsule of the shoulder joint and beneath the acromion. The alterations and symptoms produced are the following: There is a marked depression at the point of dislocation; the acromion is usually prominent, and a groove or gutter may be felt along its inner border; the displaced clavicle can be detected beneath the acromion; while the arm may be moved by the surgeon pretty freely backward or forward, the patient is unable to lift the arm voluntarily; and, finally, there is more or less sharp

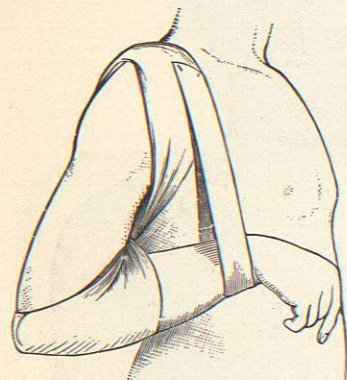


FIG. 1610.—Figure-of-8 Bandage from the Elbow. Side View.

pain, increased on movement of the limb.

The reduction is readily accomplished by drawing the shoulders outward and backward; the position being

* *Op. cit.*, p. 681.
† *Treatise on Dislocations*, by L. A. Stimson, M.D., LL.D., p. 191; Lea Brothers, publishers, 1888.

maintained by securing the base and lower angle of the scapula snugly and firmly to the body by a broad bandage and compress, while a sling is employed for supporting the arm in the desired position. These dressings are

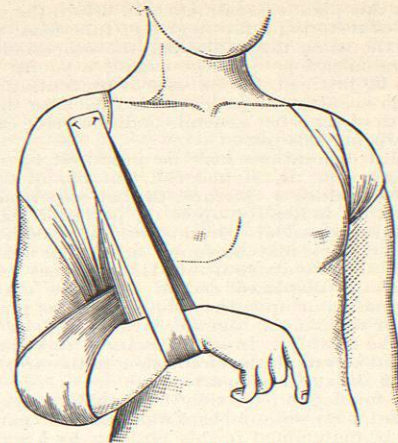


FIG. 1611.—Figure-of-8 Bandage from the Elbow. Front View.

to be worn for six or seven weeks. The coracoid process prevents the bone from slipping out of its place as long as the scapula is maintained in the position suggested.

Subcoracoid dislocation is yet more rare than any of the other varieties; the single case reported by Pinjon, and the five cases by Godemer of Mayenne, being all that so far have been cited. Hamilton is sceptical as to the existence of this form of dislocation. I quote the following from Wharton and Curtis:* "It is said to result from the shoulder being forced upward, outward, and backward, while at the same time the acromial end of the clavicle is driven downward. The most marked symptoms are: unusual prominence of the acromion and coracoid processes, pain and restricted motion of the arm, and an increase of the distance between the sternum and the summit of the shoulder. Treatment: To reduce this displacement the arm should be flexed and brought to the side and carried forcibly upward, inward, and backward, to relax the clavicular portion of the pectoralis major muscle. The clavicle should be grasped and disengaged from its position below the coracoid process and pressed back into its proper position. After reduction a Velpeau's bandage should be applied and the dressing retained for six or eight weeks."

Dislocation of the inferior angle of the scapula, though somewhat rare, may occur. The latissimus dorsi, or a portion of it, may slip beneath the lower end of the bone,—an accident which generally occurs in children as a result of lifting them by one arm. The effects produced are: Pain and difficulty in moving the arm, and a marked projection of the lower end of the bone, which is increased if the arm is drawn forward. Reduction, under these conditions, may be impossible.

Dr. E. M. Moore, in his article in the former edition of this work, places great confidence in his method of dressing a dislocated clavicle, and bases this confidence on the results obtained in sixteen cases which occurred partly in his own practice and partly in that of his friends, two of these cases being luxations at the sternal end. I quote from his article as follows: "The simple bandage which is here illustrated subserves the purpose with great assurance of success. This, as will be shown by the cuts, consists of the application of a shawl, or, what is better, a piece of common cotton cloth, about two and one-fourth yards in length, and a yard or so in width, folded like a cravat

* *Op. cit.*, p. 564.

until it is about eight inches in breadth at the centre. The application of this bandage is conducted in the following manner: Place the bandage, thus prepared, upon the palm of the outstretched hand, with the finger and thumb in the line of its length and at its centre. This enables the surgeon, while placing it under the elbow of the patient on the affected side, to grasp it firmly, and so to adjust it that the border reaches about two inches up on the humerus, and about six inches down on the forearm. The grasp of the surgeon's hand retains the bandage in position during the succeeding manipulations. The first movement is to place the inner tail up over the shoulder, smoothing it out over its rounded surface, and then committing it to an assistant. The outer tail is now carried over the forearm, up behind the back to the top of the opposite shoulder. Traction is now made upon this tail so as to draw the elbow backward and toward the thorax, after which its end is brought over the shoulder and under the axilla of the unaffected side. The other tail is now seized, and when made tense it draws the shoulder backward. This is carried under the armpit, and over the point of the unaffected shoulder. The two ends are now secured by pins at the points where they overlap the bandage. This, as will be observed, produces the peculiar form upon the unaffected side known as the figure-of-8 bandage. The special twist around the elbow of the affected side is similar in form, although one end runs up over the shoulder. For these reasons the writer has called the bandage "the figure-of-8 from the elbow." The bandage, however, is not complete without a sling to hold the forearm slightly above the horizontal position while the patient is erect. If the forearm droops, the bandage becomes disengaged from the elbow, and the arm has a tendency to swing forward. But if it be placed in the position already indicated, its weight has a tendency to carry it backward. This sling is best constructed by placing a strip of cotton cloth, three or four inches wide, around the wrist, and pinning the two ends together upon the larger bandage as it passes over the shoulder. It is desirable, also, to fold the end that projects behind the elbow and secure it with a pin, so as to make a sort of cup which will hold the elbow in its place. This bandage is usually worn with great comfort to the patient, the points most complained of being the axillary border of the unaffected side and the extremities of the olecranon and condyles of the elbow held by the bandage.

Protection against this pressure can be afforded by little compresses, placed alongside the suffering points,

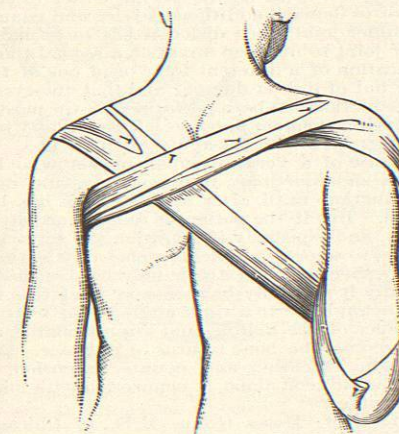


FIG. 1612.—Figure-of-8 Bandage from the Elbow. View from behind.

and can be left entirely to the management of the patient. It is wise, however, to watch him daily for the period of a week, loosening the tails of the bandage and then tight-

ening them a little. At the end of this time the capacity of stretching will have ceased." Dr. Moore further states that the dressing will have to be kept on for about two

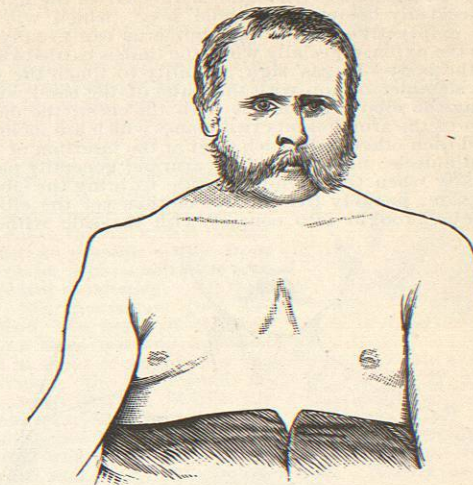


FIG. 1613.—Subglenoid Dislocation. (Traced from a photograph taken twenty-three hours after the injury had been received.)

weeks, and he claims for it "better results than by any other method, as meeting more definitely and more practically the exigencies of this condition."

Dislocations of the Shoulder Joint comprise fully one-half of all dislocations; some observers even placing the proportion a little beyond this. On this account alone they constitute the most important class. Quite a number of varieties have been described, but the following table gives all that it is necessary to consider; others being but modifications of these, or secondarily assuming one of these forms, either accidentally or by manipulation.

Varieties of Dislocations of the Shoulder Joint.

- | | |
|-------------------------|--|
| 1. Downward | { Subglenoid (common).
Erecta (very rare). |
| 2. Forward | { Subcoracoid (common).
Subclavicular (rare). |
| 3. Backward | { Subspinous (rare).
Subacromial (rare). |
| 4. Upward.—Supraglenoid | (rare). |

In the subglenoid dislocation we find the capsular ligament extensively torn on its under surface, permitting the head of the humerus to leave the glenoid cavity and take a position on the anterior edge of the scapula immediately below the glenoid cavity. The tendon of the long head of the biceps may be ruptured or completely detached from its insertion; the supraspinatus is stretched or lacerated; the infraspinatus, coraco-brachialis, and subscapularis are put upon the stretch, the latter sometimes torn from its attachment to the head of the humerus; the deltoid is placed in a condition of extreme tension, and paralysis of this muscle may be among the unpleasant sequelæ. The artery and vein may be injured, and the circumflex and other nerves may be seriously impaired.

Among the more frequent causes the following may be cited, in the order of their frequency: (a) a force applied to the upper end and outer surface of the humerus; (b) a fall upon the extended hand; (c) a fall upon the elbow. Sudden contraction of the muscles while the arm is strongly abducted may produce this luxation. It is perhaps one of the most frequent dislocations produced spontaneously, abduction of the arm favoring its production.

Among the most prominent conditions and symptoms that result from this dislocation may be mentioned the following: the presence of a depression under the end of

the acromion; the elbow is carried out from the body a distance of three or four inches and a little backward; it cannot be made to touch the lateral surface of the body; the line of the axis of the limb is directed to the axilla, and decidedly below the glenoid fossa, which will be found empty; the head of the humerus can usually be felt in the axilla, especially when the limb is carried away from the body—Dugas' sign; inability to touch the opposite shoulder on top with the palm of the hand while keeping the elbow in contact with the chest; the outer surface of the arm presents two planes which are inclined toward each other and which meet at the insertion of the deltoid muscle; numbness of the arm and generally pain, especially when the attempt is made to bring the elbow to the side; possibly free passive motion, yet the elbow cannot be brought into contact with the side without

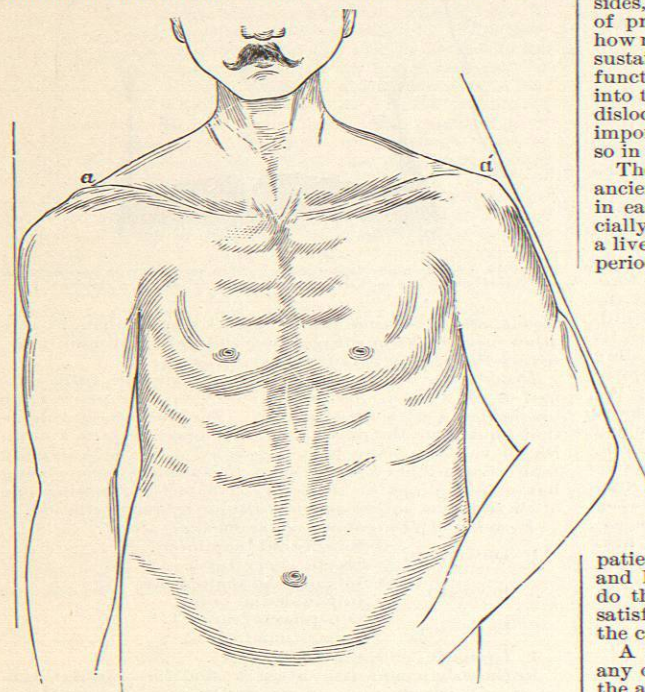


FIG. 1614.—Subglenoid Dislocation of the Humerus, Showing Flatness Beneath the Acromion. *a, a'*, Tips of acromion processes. The ruled lines indicate the test for dislocation by means of a straight-edge line on the arm.

great pain, which is doubtless due to pressure of the humerus on the axillary plexus. The existence of these symptoms, or of a majority of them, immediately after luxation, or after inflammation has subsided, should make it possible to arrive at a correct diagnosis; yet this may be rendered a difficult matter by the presence of a slight degree of crepitus—due to conditions which were mentioned in the earlier part of this article,—by the existence, during the intermediary period, of a large amount of inflammatory exudation, and finally by the presence, in fleshy persons, of a good deal of adipose tissue in the region of the shoulder. And here let me add that a failure to make a diagnosis is not due, in all cases, to want of a reasonable degree of skill, nor to a lack of painstaking efforts to ascertain the true condition of the parts.

Ordinarily, if the force producing the luxation has not been extreme, and reduction has been accomplished at a reasonably early period without a resort to excessive force or violence, which should ever be guarded against,

complete recovery may confidently be expected in a comparatively short period of time. Yet the character of the injury producing the dislocation, and the absence of swelling, or the presence of only a slight degree of swelling, are not always indicative of the amount of damage sustained by important tissues in the immediate vicinity of this joint. The extensiveness of the swelling may be the result of grave injury to important blood-vessels, or, on the other hand, it may be due to the fact that the individual is predisposed to serous, fibrinous, or hemorrhagic effusion. In the case of a slight injury to the main trunk of the nerves or to some terminal branch, the pain may not only be great but it may appear at an early stage, and we may have in addition temporary loss of muscle functions. On the other hand, more serious nerve lesions may manifest themselves at quite a late stage, and, besides, they may be slow in attaining any marked degree of prominence. It is extremely difficult to say exactly how much injury muscles, nerves, tendons, or vessels have sustained, or to predict to what extent restoration of function may take place. I have gone somewhat fully into these points as affecting this particular variety of dislocation of the shoulder, yet they play a more or less important part in all forms of dislocation, and especially so in all the forms of dislocation of this important joint.

The time at which dislocations of the shoulder become ancient, or even irreducible, will vary to a great extent in each particular case. In a young person, and especially in one who is dependent on the use of the limb for a livelihood, six months might not be at all too long a period in which efforts more or less strenuous, though guarded and cautious in the extreme, could be justly essayed for reduction. On the other hand, in an elderly individual, or one whose circumstances did not imperatively demand thorough use of the limb, so great a degree of risk would not be justifiable. The time when these dislocations, or in fact any dislocations, become ancient, or even irreducible, is not to be measured in days, weeks, or months; each particular case, and each and every phase and characteristic bearing thereon, must be carefully weighed and thoroughly considered under a rigid observance of the rules of good common sense and judgment.

Although it is most important to inspire the patient with the greatest possible degree of confidence and hope, yet it is best to promise nothing more than to do the best you possibly can; and if this is not entirely satisfactory, it will as a rule be far better to surrender the case or to demand additional advice and counsel.

A shoulder-joint once dislocated is more liable than any other joint to undergo luxation a second time under the application of a different force or of one of the same character but of lighter degree; and that too even if the original reduction had been performed in the most perfect and satisfactory manner possible. This liability to a fresh luxation increases with the age of the patient.

In the case of a very muscular person who has dislocated his shoulder-joint, it is best, as a rule, not to attempt reduction until after an anæsthetic has been administered. But if the patient is seen immediately after the injury, and especially if sensation and muscular contraction are to some extent held in abeyance by the effects of primary shock, an anæsthetic may be dispensed with. Occasionally it will only be necessary to elevate the arm to an acute angle, or to a right angle to the body, when, the resistance of the deltoid and supraspinatus muscles being overcome, the bone returns to its place. At other times, slight extension and counter-extension, at the hands of the surgeon alone, in connection with manipulation, will suffice.

The late Prof. Moses Gunn, M.D., of Chicago, in a paper read before the American Surgical Association in 1884, regarded the upper and untorn portion of the capsule to be the chief obstacle in the way of reduction and he suggested the following: "The patient sitting on the floor, the arm is carried to an angle of 45°, and entrusted

to an assistant, the surgeon placing his hands on shoulder with the tips of the fingers resting on the head of the humerus in the axilla. The assistant making upward and

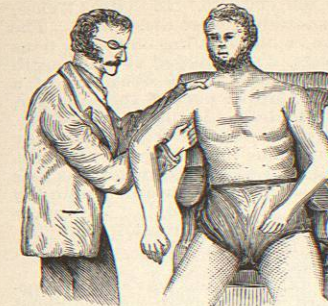


FIG. 1615.—Direct Reposition of Dislocated Humerus.

outward traction, the head glides into place guided and followed by the fingers of the surgeon; and the arm is lowered to the side, tension being kept up during this movement." Sir Astley Cooper's method of placing the heel (divested of boot or shoe) in the axilla, where it acts partly as a wedge, forcing the head of the bone from the edge of the scapula, and partly as a fulcrum as well

as a counter-extending force, will in many instances prove effective. In this procedure the forearm of the patient is to be flexed at a right angle with the arm, and both traction and a slight rotary movement are to be exerted upon the limb by the surgeon, who must be seated by the side of the recumbent patient. Sir Astley Cooper also in some cases substituted the knee for the heel in the axilla. With the patient seated in a low chair, the surgeon, having placed his foot in the chair beside the patient, brings the axilla over the knee; then, steadying the acromion and scapula with one hand, he presses the lower end of the humerus downward with the other.

In Prof. Nathan R. Smith's method counter-extension is made from the wrist of the opposite side; the patient being seated in a chair, while the surgeon, with his foot on the chair and knee in the patient's axilla, employs manipulation and extension by means of the injured arm, the extension being aided by traction on the wrist on this side (the affected side) by an assistant.

La Mothe's method consists in pulling the arm directly upward, while at the same time pressure is made downward over the shoulder-joint. According to Hamilton* Jobert succeeded, by means of this method, after twenty-three days, "when all the usual methods had failed."

Skey's method is by the application of a padded knob of iron in the axilla, with two strong, straight branches extending laterally, and terminating in a bulb or ring by means of which counter-extension may be maintained. Extension is effected by compound pulleys.

I regard Kocher's method as the best, not only for this dislocation, but also for the subcoracoid variety, which occurs next in frequency. He flexes the forearm upon the arm; carries the elbow against the side of the body; abducts

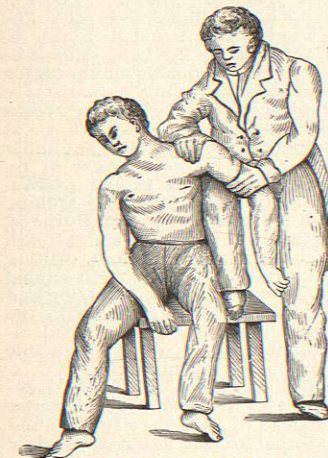


FIG. 1616.—Reduction of Dislocated Humerus, with Knee in Axilla. (Cooper's method.)

next in frequency. He flexes the forearm upon the arm; carries the elbow against the side of the body; abducts

* *Op. cit.*, p. 702.

the hand, in order to rotate the head of the humerus outward until resistance is experienced; then he carries the elbow forward, upward, and slightly inward, while the arm is still flexed at a right angle and the hand maintained in a position of forced abduction; and finally he rotates the arm inward and carries the hand up on to the sound shoulder. All of these movements are to be executed slowly and as gently as possible. According to this method, while the elbow is flexed at a right angle and pressed closely to the side of the chest, the forearm is turned as far as possible away from the chest, thus causing the arm to rotate externally. If, during the movement just described, the head of the humerus does not roll outward and in front of and below the acromion, the attempted reduction will fail. While external rotation is being accomplished the elbow should be carried well forward and upward, the arm next rotated inward, and finally the elbow lowered. During the latter part of these manipulations an assistant may render good service by pressing the head of the bone outward with his fingers or by pulling it outward by means of a hand introduced in the axilla.



FIG. 1617.—Simple Apparatus for Keeping the Arm at Rest After Reduction of a Dislocation of the Humerus. (Helfferich.)

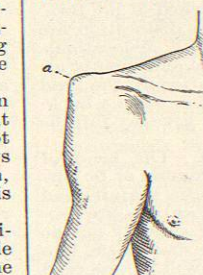


FIG. 1618.—Typical Subcoracoid Dislocation of the Humerus. (Helfferich.)

In this condition we have the arm held vertically with the hand on top of the head, in order to avoid the intense pain which arises when it is held in any other position. The mechanism of this dislocation seems to be this: while the arm is extended forcibly and is also elevated, a blow descending on or near the proximal end of the humerus drives the head of the bone downward. It is usually readily reduced by making firm traction upward, with manipulation on the head of the humerus, and then bringing the arm down to the side as the bone glides into position. This variety of dislocation occurred in a case which came under my observation. A boy, falling from a tree, with his right hand extended, caught hold of a lower branch and

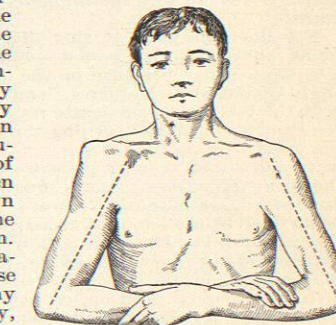


FIG. 1619.—Subcoracoid Dislocation of the Right Arm. The axis of the humerus is shown on both sides by the black lines. (Helfferich.)

thus to some extent broke the force of the fall; but by this act he threw the head of the bone down below the glenoid cavity.

In subcoracoid dislocation, which is mentioned in the recent work of Wharton and Curtis* as the most frequent variety, the capsular ligament is lacerated anteriorly and the head of the bone slips forward on the inner surface of the neck of the scapula. It is produced most frequently by direct violence acting on the posterior surface of the shoulder, although falling on the elbow or hand, with the arm extended and directed slightly backward, has occasionally been the cause of the dislocation. In some instances it has been attributed to muscular action alone.

Subclavicular dislocation is closely allied to the above variety. In it the head of the bone passes beyond the coracoid process and lodges just beneath the edge of the clavicle, being covered by the pectoralis major and minor muscles. If the force applied produces a fracture of the coracoid process this form of dislocation is most certain to occur. It produces more severe pressure on the axillary vessels and nerves than does the other variety. In either of the above dislocations the head of the bone can usually be readily made out in the abnormal position. In subclavicular dislocation there will be a marked depression under the outer edge of the acromion, extending beneath its posterior margin. The elbow hangs away from the body, a little backward, and the axis of the limb is directed toward some portion of the clavicle rather than toward the glenoid cavity. The supraspinatus and infraspinatus muscles and that portion of the deltoid which arises from the acromion are greatly stretched, if not torn. The measures required for reducing this dislocation are similar to those resorted to in subglenoid dislocations. Less extension, however, will be required and greater attention will have to be paid to manipulation of the head of the bone, which needs to be pushed more in a backward direction. Kocher's method will give by far the most uniformly gratifying results.

Backward dislocations are quite rare. The head of the bone may lodge just beneath the acromion or be carried farther back upon the dorsum of the scapula and beneath the spinous process. These dislocations are produced most generally by a force acting directly on the anterior surface of the shoulder. In the first of the two forms named above, the head of the bone will be observed beneath the acromion, and in both there will be a space more or less wide between the head of the bone and the coracoid process, into which space the fingers can be pushed more or less deeply. The axis of the bone is directed upward and backward, in a direction posterior to the glenoid cavity, and the arm comes across the front of the chest with the humerus rotated inward, unless the subscapularis is ruptured. The patient may hold the hand to the head, with the arm lying horizontally across the body, and it may be carried vertically. If the subscapularis is not torn the humerus cannot be rotated outward.

For the reduction of this dislocation the following plans have been suggested:—Slight forward traction (Duplay); direct pressure on the head of the bone, with slight extension (Mollière); traction at a right angle with the body, with moderate rotation (Desprès); raising the hand and arm and turning the hand backward behind the head (Sir Astley Cooper); moderate traction downward and outward, with pressure directly on the head of the bone (Hamilton); and, finally, traction outward, downward, and slightly forward (Parker), the shoulder being fixed by the hands of an assistant or by other means. The plan of Dr. Moses Gunn, of Chicago, was to have the shoulder properly fixed by an assistant, while the surgeon, taking the arm by the elbow and forearm, raises it to a horizontal position, carries it to the front, rotates it inwardly, and draws it into place.

Without fracture of the acromion or coracoid process, upward dislocation of the humerus seems wellnigh im-

possible, yet it has occurred in very rare instances. The symptoms consist in the absence of the humerus from the glenoid cavity and its being found in the interspace between the coracoid and acromion processes, in front of and above the level of the clavicle. In Albert's case, cited by Stimson,* both shoulders were dislocated. The patient, a full-grown man, while holding on to the reins of a pair of runaway horses, was dragged at full length on the ground. The deformity, which consisted of a prominence on the front and upper part of the shoulder, was more conspicuous on the left side than on the right. Stimson gives the following points in the symptomatology of this form of dislocation: "The limb hangs by the side, perhaps slightly abducted, and rotated outward; its axis is directed from below upward and forward, passing in front of the normal position of the head." "Voluntary movements," he says farther on, "are almost or quite impossible, and passive movements are greatly restricted, in old as well as recent cases."

The following methods of reduction have been suggested: Traction downward, under anaesthesia, combined with a tilting motion which brings the head of the bone back toward the glenoid cavity (Verneuil); carrying the arm away from the body until the head passes under the coracoid process, and then at the same time raising the elbow and rotating the humerus inward (Panas); abduction, extension backward, and rotation inward (Albert).

According to some observers there have been cases of partial dislocation of the shoulder in which, after rupture of the long head of the biceps, the contraction of the supraspinatus muscle has drawn the head of the bone almost, but not entirely, out of its normal position. Such a partial dislocation is marked by the presence of a depression on the posterior aspect of the joint, beneath the acromion, and by the existence of an unnatural rounded prominence formed by the head of the bone in contact with the coracoid process. Hamilton,† and Gerster,‡ however, entertain strong doubts in regard to the occurrence of such a partial dislocation.

Dislocation of the shoulder complicated with fracture is not unfrequently met with; the break usually occurring at the surgical neck. As preternatural mobility, crepitus, etc., accompany the signs occasioned by the presence of the head of the bone in its abnormal site, the diagnosis is not difficult. When the fracture occurs at the anatomical neck it is not always possible to make the diagnosis certain unless a very careful and thorough investigation is made. If the head of the bone cannot be restored to the glenoid cavity by reasonable manipulation of this fragment alone—the arm affording no assistance—it will probably be best to wait four or five weeks until union has taken place, and then to make efforts at reduction. It must be remembered, however, that under these circumstances there is very great danger of re-fracturing the bone, and consequently proper precautions, such as firmly but temporarily applying splints, bandages, etc., must not be neglected. McBurney§ effected reduction in one case by cutting down through the deltoid upon the lower end of the fragment, drilling a hole into it, and inserting into this hole a right-angled hook, by means of which he made forcible traction and rotation of the fragment. The propriety of removing the head of the bone will in some instances require consideration, and the operation may be necessitated in irreducible cases, if great suffering and inconvenience exist.

Dislocations of the Radius may occur forward, backward, or outward. In all cases the lateral and annular ligaments are torn and the head of the bone will be found in front of, behind, or external to, the external condyle of the humerus.

Forward dislocation is the most common variety and is generally produced by falling upon the hand while it is in a state of pronation, though direct force applied to

* *Op. cit.*, p. 249. † *Op. cit.*, p. 739.
‡ *N. Y. Med. Journ.*, May, 1878, p. 487.
§ *American Text-Book of Surgery*, 3d edition, 1899, p. 442. W. B. Saunders & Co., publishers, Philadelphia.

* *Op. cit.*, p. 565.

the side of the elbow may produce it. The symptoms and alterations are: The radial side of the forearm is shortened and inclined outward; a depression will be found below the external condyle of the humerus; dur-

sidered in a single paragraph a short distance farther along.

The symptoms of dislocations of both bones of the forearm backward at the elbow are: shortening of the anterior surface of the forearm; the presence of a marked prominence in front of the elbow (due to the projection of the lower end of the humerus); and the presence of a still greater prominence posteriorly (produced by the olecranon and the tendon of the triceps). The arm is slightly flexed, the elbow rigid, and all movements are difficult. The condition is likely to be confounded with

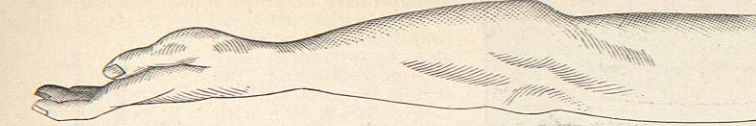


Fig. 1620.—Forward Dislocation of the Head of the Radius: Forearm Supinated and Extended.

ing movements of pronation and supination the head of the radius can be felt rotating in front of the elbow; and flexion as well as complete extension is prevented.

To effect a reduction, the surgeon must flex the patient's arm upon the forearm with one hand, and with the fingers of the other he must make pressure upon the head of the radius in a downward and outward direction, the hand of the injured arm being at the same time sharply pronated. A well-padded right-angled splint, with a compress over the head of the radius, should be worn for several weeks, and after the first week it should be taken off at intervals of two or three days and passive movements of the limb should be cautiously executed.

More rarely, the head of the radius passes through the posterior part of the capsular ligament, and rests behind the condyle of the humerus. This dislocation is caused by direct violence, or by falling upon the hand when it is in a state of extreme pronation. The head of the bone will be found behind the condyle of the humerus, with a depression below it, the forearm being slightly flexed and the hand pronated. Supination, under these conditions, is impossible, and flexion and extension are diminished.

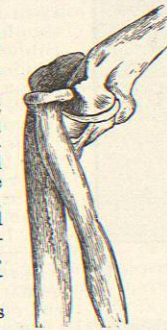


Fig. 1621.—Dislocation of the Ulna Backward, without the Radius.

With the aid of an assistant who is to make counter-extension, the surgeon should first extend and then supinate the flexed forearm, at the same time pressing the head of the bone forward. An obtuse-angled splint, well padded, should be worn on the forearm for several weeks. As was suggested in the paragraph relating to dislocations of the radius forward the splint should be removed from time to time and passive motion should be carried out.

Dislocation of the radius outward, in which the head of this bone rests on the epicondylar ridge, is still more rare. The conditions which indicate the existence of this variety of dislocation are: prominence of the radial head above and in front of the external condyle of the humerus; the arm flexed and held in a position midway between pronation and supination; and impairment of flexion and extension.

For the reduction of this dislocation it is necessary that, while counter-extension is being made, the arm, moderately flexed, should be extended, and that, at the same time, pressure should be made on the head of the radius in a downward and forward direction. A right-angled splint should be worn as in the first variety.

The ulna may be dislocated directly backward, the radius being left *in situ*, and the coronoid process dropping into the olecranon fossa or resting on the posterior inner surface of the inner condyle. There will be some shortening of the forearm but not as much as in dislocation backward of both radius and ulna. The latter variety is doubtless one of the most frequent dislocations at the elbow; and as practically the same treatment is required for both of these forms, the subject will be con-

condyloid or supracondyloid fracture of the humerus. The relations of the olecranon with the condyles, in a dislocation at the elbow, are altered; in a fracture they are unchanged. In dislocation the prominence posteriorly is increased by flexion and diminished by extension, while the opposite holds good in fracture. In fracture the deformity disappears on firm extension and counter-extension, but reappears when it is removed; in dislocation, if we can remove the deformity by this means it does not return.

When the parts are completely relaxed reduction is easily accomplished by two opposite movements: Fix the arm, flex the forearm, and make traction at the same time; or fix the arm, extend the forearm, and, while making traction, suddenly flex the forearm. An anterior angular splint, well padded, should be worn for two or three weeks, and there should be occasional passive movements and massage. Sir Astley Cooper, in reducing a dislocation at the elbow, caused the patient to sit in a chair, and placing his knee on the inner side of the elbow-joint, in the bend of the arm, he took hold of his wrist and bent the arm; at the same time he pressed on the radius and ulna with the knee, so as to separate them from the humerus, the coronoid process being thus lifted out of the humeral fossa; and while the pressure was being kept up by the knee, the arm was forcibly but slowly bent, until the ends of the bones resumed their natural relations.

Dislocation of the ulna and radius forward, both bones lying in front of the condyles, is rare. The broad surface of the humerus can be felt posteriorly, and the olecranon and head of the radius in front. If the dislocation is complete, the forearm is apparently shortened and flexed upon the arm; if it is incomplete, the forearm will be extended upon the arm. It is reduced by extension alone, or, if this does not suffice, by extension and forced flexion.

Complete lateral dislocation of both bones is quite rare, and incomplete dislocations are possibly less so; they are produced by violence acting in opposite directions on the arm and forearm. The arm will be found flexed and inclined either inward or outward; the olecranon will project beyond the internal condyle in the one instance, and the head of the radius beyond the external condyle in the other. In dislocations outward the external condyle is quite prominent owing to the absence of the head of the radius. The hand will be pronated. In reducing such a dislocation, while extension and counter-extension are being carried out, the bones of the arm and forearm should be pushed in opposite directions.

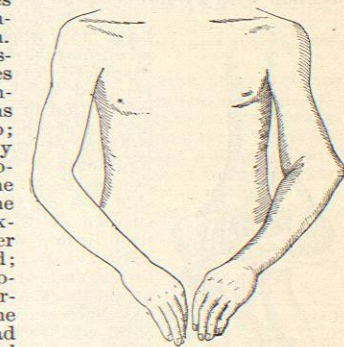


Fig. 1622.—Backward Dislocation of Both Bones of Left Forearm. Showing Prominence of Olecranon and Shortening of Forearm. (Helfferich.)

should be pushed in opposite directions.