LONG-TERM FOLLOW-UP OF COLLES'S FRACTURE

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"One consolation only remains, that the limb will at some remote period again enjoy perfect freedom in all its motions and be completely exempt from pain: the deformity, however, will remain undiminished through life." This was the prognosis given to patients with untreated "Fractures of the Carpal Extremity of the Radius" by Abraham Colles in 1814. He then proceeded to describe how the fracture should be treated so as to "recover without the smallest defect or deformity of the limb, in the ordinary time for the cure of fractures."

How far have we progressed in the 150 years since Colles published his classical description? In an attempt to answer this question I reviewed the records and radiographs of ninety-seven patients who sustained Colles's fractures five to six years previously.

**Method of study**—All ninety-seven were circularised and forty-one attended for re-examination. Of the remainder, eight were found to be seriously ill or deceased. The average age at the time of fracture was fifty-six years and there was a range from eighteen years to eighty-seven years with 78 per cent women. The left wrist was affected in 53 per cent of cases and the right wrist in 47 per cent.

At the review the patients were asked about pain, appearance, functional limitation, complications and whether the wrist had reached a stable state. The wrist was examined for deformity or swelling, and the range of finger, wrist, elbow and shoulder movements was measured. Antero-posterior and lateral radiographs of both wrists were taken, from which measurements of residual dorsal tilt and shortening of radius were made.

**METHOD OF TREATMENT**

Manipulation after injection of local anaesthetic into the fracture haematoma was done on seventy of the ninety-seven patients. A dorsal plaster slab was then applied with the wrist in palmar flexion, ulnar deviation and pronation. The following day, or as soon as swelling had ceased, the plaster was completed from just proximal to the metacarpal heads to just below the elbow. The plaster was usually changed ten to fourteen days later and removed at four weeks. Check radiographs were taken after manipulation and again at seven and fourteen days and on removal of the plaster. Only those patients with more than usual stiffness of the wrist or fingers were referred for physiotherapy after removal of the plaster. The initial manipulation was carried out by a number of house surgeons and registrars.

**OBJECTIVE FINDINGS**

**Appearance**—Some cosmetic defect was found in twenty-five of the forty-one patients examined. Three patients had slight prominence of the radial styloid process, three had slight generalised thickening of the wrist, and nineteen—or about a fifth of the patients examined—had some prominence of the ulnar styloid, occasionally associated with radial deviation of the wrist or dinner fork deformity; in eight patients this deformity was moderate or severe.

Prominence of the ulnar styloid process did not appear necessarily to be associated with previous fracture of the process; only ten of the nineteen patients with prominence had had such a fracture. There were fifty-three fractured ulnar styloids in the ninety-seven fractures.

**Movement**—Since the great majority of Colles's fractures are sustained by falling on the outstretched hand, some injury to other bones or joints might be expected. In none of the forty-one patients examined was there any other injury of the upper limbs likely to influence the treatment or ultimate outcome of the Colles's fracture.
The range of movements of the fingers, wrist and elbow was measured with a goniometer. This method is not very accurate for absolute measurement, but, for the purposes of comparison between the two sides, and with the one examiner throughout, it was considered adequate.

Fingers and hand—Two patients were found to have early Dupuytren’s contracture involving the little finger but not restricting movement. It had not progressed any more rapidly in the years since the fracture.

Two patients had arthritis involving the interphalangeal joints of both hands, but movements were virtually full. Two patients had rupture of the extensor pollicis longus tendon which had caused limitation of active extension at the interphalangeal joint of the thumb. All other patients had a full range of finger movements. An attempt to assess the power of

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<th>Smallest range of movements in degrees</th>
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the grip was done by the somewhat crude method of asking the patient to squeeze two of the examiner’s fingers. One patient had marked weakness of grip on the injured side, and three others had slight weakness.

Wrist—Among the components of a Colles’s fracture are listed dorsal tilt and radial displacement of the distal radial fragment. If uncorrected these may lead to limitation of palmar flexion and ulnar deviation. Measurements of the various wrist movements showed surprisingly little difference between the range of movements on the injured and uninjured sides (Tables I and II).

Rotation—Damage to the inferior radio-ulnar joint, shown by fracture of the ulnar styloid or by much shortening of the radius, might also be expected to affect rotation (Table III).

Elbow and shoulder movements—No patient had any limitation of elbow movements and only one patient had limitation of shoulder movements, which had been present for only a few months and was not associated with the Colles’s fracture.
Radiographic findings—For the purposes of this study antero-posterior and lateral views of both wrists were taken (Fig. 1). Measurements of residual dorsal tilt and shortening of the radius were made. Evidence of osteoarthritis in the wrist or inferior radio-ulnar joints was sought.

It was found that in the uninjured wrists there was an average of 13 degrees ventral tilt at the distal radial articular surface. It was found on the antero-posterior view that, on the uninjured side, the head of the ulnar was level with or very slightly proximal to the distal articular surface of the radius. The effects of residual dorsal tilt on dorsiflexion and palmar flexion are shown in Table IV.

Shortening of the radius was found in twenty patients which ranged from 2 to 6 millimetres. This amount had no significant effect on movements at the inferior radio-ulnar joint. Fractured ulnar styloid—This is invariably associated with subluxation of the inferior radio-ulnar joint as the triangular fibrocartilage is attached to the proximal part of the ulnar styloid rather than to the fossa at its base (Mayer 1940). Some writers attribute most of the poor end-results after Colles's fracture to the failure to recognise the loss of integrity of the radio-ulnar joint as shown by fracture of the ulnar styloid (Grasby and Trick 1929, Taylor and Parsons 1938); motion is also said to be limited, chiefly in pronation and supination, and likely to be painful and perhaps accompanied by a click (Taylor and Parsons 1938).
This review confirms that rotation is limited more often in those wrists in which there was a fracture of the ulnar styloid, but that the incidence of pain later is no greater than in those injuries where the ulnar styloid was left intact (Table V).

**Osteoarthritis**—Evidence of osteoarthritis of the wrist was found in the radiographs of ten of the forty-one patients examined. Usually this was shown by asymmetrical narrowing of the joint space with some subchondral condensation of the bone. In a few wrists there was some generalised decalcification. In none was there any evidence of involvement of the inferior radio-ulnar joint; the changes in most wrists were slight. This is contrary to the findings of Grasby and Trick (1929) but supports the views of Platt (1932).

Three of the ten arthritic wrists caused slight and infrequent aching, precipitated by cold weather. The others were symptom free.

**SUBJECTIVE FINDINGS**

Though the subjective findings are less easy to assess, to the patient they are all important. It is impossible to set a single standard of efficiency beyond which all results are declared good.
and others poor. What would be considered a good result in an old arthritic patient might be deplored as a comparative failure in a young working man (Edwards and Clayton 1929). Factors of importance to the patient are pain, functional limitation, and appearance.

**Pain**—Fourteen patients complained of some pain in the injured wrist. In only one wrist was the pain continuous and in no case was it of more than moderate severity—usually it was slight. Nine of the fourteen had pain only in cold weather; the site of the pain varied considerably, ranging from the first carpo-metacarpal joint to radial styloid, ulnar styloid, wrist or arm. The type of fracture did not seem to have any bearing on where the pain was felt. Three patients felt pain only when they had been gardening or doing heavy work. Almost always it was necessary to question the patients closely before they would admit to any pain at all.

**Function**—The patient was asked if there was anything that he was not able to do so well with the hand or wrist after the fracture than he could before. Limitation of function was found in sixteen patients and was of three main types. Four patients had difficulty in twisting movements, such as wringing clothes or opening doors. Five had difficulty in picking up small objects such as pins. These included two patients with rupture of the extensor pollicis longus tendon. Seven patients found that the wrist was weaker than before their accident. No patient was forced to a change of occupation because of the injury—indeed most were housewives—and most were not seriously inconvenienced by their disability.

**Appearance**—The assessment of appearance varied considerably with the type of patient. Some patients complained of deformity not readily detected by the observer, while others were satisfied with the appearance of a wrist which was badly deformed.

Fourteen patients thought that there was some residual deformity of a varying degree. Five thought the wrist was generally thicker than the uninjured side and six noticed that the ulnar styloid was more prominent than on the normal side. Three complained that the wrist looked crooked. This was a more serious complaint than the others.

**COMPLICATIONS**

There are a number of recognised complications following Colles's fractures such as carpal tunnel syndrome, Sudeck's atrophy and ruptured extensor pollicis longus tendon. In this series no patient developed a carpal tunnel syndrome necessitating operation. A few had transient paraesthesiae in the fingers about the time of the fracture, but this settled spontaneously. Sudeck's atrophy did not occur.

Two patients presented at review with ruptured extensor pollicis longus tendons. They had become used to the lack of dexterity which it imposed and declined operation. It seems likely that the tendon ruptured after their discharge from the fracture clinic about eight weeks from the time of the fracture, because there was no mention of it in the records and it is unlikely to have been overlooked even if the patient did not draw attention to it.

**PROGRESS**

None of the patients examined felt that there had been any change, for better or for worse, in the state of the injured wrist over the previous three years. In fact most had remained the same from two or three months after removal of their plaster.

**DISCUSSION**

This survey was made to confirm or deny a clinical impression that the overall results following Colles's fractures were not so bad as some writers would lead one to believe (Grasby and Trick 1929, Gartland and Werley 1957). There has recently been a trend towards more complicated forms of treatment (DePalma 1952, Scheck 1962) for Colles's fracture because it was felt that the position could not be maintained by the more orthodox splints or plasters.
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This is a more disturbing development of a controversy which has raged throughout the years on how best to hold a Colles’s fracture after reduction (Grasby and Trick 1929, Fairbank 1932, Girdlestone 1932, Howell 1932, Jones 1932, Page 1932). It is a development which I feel is quite unjustified in the light of the present study.

No attempt has been made to award points for movements, appearance or complications, because it is felt that this is an artificial and invalid method of assessing a result in patients with such widely varying ages and occupations. The real criterion of a good result is whether the patient is, on the whole, perfectly satisfied with the result. In this series there was no doubt that the vast majority were quite satisfied.

SUMMARY

1. A five-year follow-up of forty-one patients who sustained Colles’s fractures was made.
2. The objective results were not so satisfactory as the subjective, but overall there seems to be no reason to depart from the present methods of managing these injuries by manipulation and immobilisation in plaster.
3. Colles’s belief that in time the patient would regain full painless function irrespective of how the fracture was treated seems to be vindicated.

I wish to thank Mr J. H. North, Superintendent-in-Chief, Wellington Hospital, for permission to publish this paper and also Sister M. F. Marsh, Mr L. G. Symons and Miss P. I. Keith for their considerable assistance in its preparation.

REFERENCES


