EARLY MOBILISATION OF COLLES' FRACTURES

A PROSPECTIVE TRIAL

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The results of a prospective controlled trial of early mobilisation of Colles' fractures in the elderly are presented. Early mobilisation produced less pain and a stronger grip. It did not lead to any greater loss of reduction of the fracture. However, there was no significant improvement in the final range of movement of the wrist. Immobilisation of the wrist for six weeks in plaster is extremely inconvenient for the elderly living alone and the patients greatly appreciated the reduction of this period of time to a minimum.

Colles' fracture is extremely common but is often discounted as a trivial injury. Many reports, however, have shown considerable morbidity, particularly in the short term (Gartland and Werley 1951; Lidström 1959).

Dissatisfaction with the results of conventional treatment has led to alternative approaches being adopted. Various forms of internal fixation have been used in order to achieve a better anatomical reduction in the hope that this will produce a better functional result (DePalma 1952; Scheck 1962). Another approach has been to concentrate on early movement of the wrist by the use of functional bracing (Sarmiento et al. 1975, 1980). Neither of these approaches has been shown to improve the functional result significantly and both have their own problems. Internal fixation is difficult in these patients who are usually elderly and osteoporotic. The additional insult of surgery may increase the stiffness that inevitably follows the initial injury. Functional bracing is more expensive than conventional plaster and needs more expertise in its application and supervision. Moreover, Stewart, Innes and Burke (1984) found that it did not produce a better result than conventional treatment.

This present trial was designed to test the hypothesis that the main cause of a poor result after a Colles' fracture is stiffness of the wrist and that this stiffness can be prevented by reducing the length of time that the wrist is immobilised.

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Table I. Lidström's classification of Colles' fractures

I	Undisplaced extra-articular
IIA	Fracture with only dorsal angulation and not involving the joint surface
IIB	Fracture with dorsal angulation and involving the joint but without comminution of the articular surface
IIC	Fracture with complete displacement but not involving the joint
IID	Fracture with complete displacement and involving the joint surface, but without comminution of the articular surface
IIE	Fracture with complete displacement and comminution of the joint surface

Lidström (1959)

METHODS

From August 1983 until May 1985 all women over the age of 60 years presenting to the fracture clinic of the London Hospital were allocated alternately to a regime involving either three or five weeks' immobilisation in plaster. The fractures were initially reduced in the casualty department and the arm placed in a plaster backslab which was completed the following day. A radiograph was taken at one week and the fractures were remanipulated if there had been gross loss of reduction. Plaster immobilisation was continued for three weeks (Group A) or five weeks (Group B). On removal of the plaster the wrist was placed in a crepe bandage and the patient given instructions on active mobilisation.

The fractures were classified according to Lidström (Lidström 1959; Table I) and the quality of reduction graded at one week using a points system (Stewart et al. 1984). The radiographs were assessed using Sarmiento's modification of Lidström's criteria (Sarmiento et al. 1980).

Patients were assessed at three months and at one year. A subjective functional assessment was made using Gartland and Werley's criteria (Gartland and Werley

Table II. Subjective functional assessment of Colles' fractures

<i>Excellent</i>	No pain, disability or limitation of motion
<i>Good</i>	Occasional pain, slight limitation of motion, no disability
<i>Fair</i>	Occasional pain, some limitation of motion, feeling of weakness in wrist, no particular disability if careful, activities slightly restricted
<i>Poor</i>	Pain, limitation of motion, disability, activities markedly restricted

Gartland and Werley (1951)

Table III. Characteristics of each group

	Group A	Group B
Number of patients at three months	54	54
Number of patients at one year	41	39
Average age (years)	72	73
Dominant hand injured	25	26
Average duration of immobilisation (days)	22 (range 19-22)	38 (range 34-45)

1951; Table II). An objective functional assessment was made by an independent physiotherapist (KMH) who also assessed the patients' degree of pain using a linear visual analogue scale of 1 to 10.

RESULTS

The characteristics of the two groups of patients are compared in Table III. It can be seen that they were evenly matched. Twenty-eight patients were lost to follow-up because of death or general debility or were untraceable at one year. The distribution of types of fracture was similar in each group (Fig. 1). However, the fractures in Group A were on average more displaced and less well reduced at one week than those in Group B (Fig. 2). This difference was statistically significant ($p=0.05$).

Subjective assessment. The patients' own assessment of pain, disability and range of movement at three months (see Table II) showed similar results in the two groups, with a good or excellent result in 72% of patients in Group A and 66% in Group B (Fig. 3). The analysis at one year was also similar except that both groups had improved, with 85% having a good or excellent result in Group A and 77% in Group B. However, this difference was not statistically significant.

Range of movement. The range of movement of the wrist was measured independently by a physiotherapist. Table IV compares the two groups at three months and a year; although the results in Group A were better, this was only statistically significant for pronation at one year ($p=0.02$).

Pain. When pain was assessed by the physiotherapist,

Table IV. Average ranges of movement (degrees) at three months and a year

Movement	Three months		One year	
	Group A	Group B	Group A	Group B
Palmarflexion	24	21	27	24
Dorsiflexion	47	46	57	54
Radial deviation	34	32	37	39
Ulnar deviation	25	21	25	23
Pronation	83	77	92	81
Supination	75	71	82	73

patients in Group A had much less pain than Group B at the time their plasters were removed. This difference was highly significant ($p=0.004$), and was still apparent at three months ($p=0.056$) and at one year ($p=0.02$).

Strength. Grip strength was measured using a dynamometer developed at the London Hospital. Patients in Group A recorded much better results at one year and this was a highly significant difference ($p=0.001$).

Fig. 1 Distribution of types of fracture. **Fig. 2** Reduction of fractures at one week. **Fig. 3** Subjective assessment at three months.

Radiographic assessment. The three standard measurements of dorsal angulation, radial deviation and radial shortening were recorded after reduction of the fracture, at three months and a year. There was no significant alteration in these measurements after three months (Table V) nor any significant difference between the two groups. Thus early mobilisation does not appear to produce a worse anatomical result.

Overall 38% of patients had a good or excellent radiographic result according to Lidström's criteria. Table VI shows that whether or not the radiographic result was classified as good, fair or poor a similar percentage in each classification gained a good or excellent range of movement; thus a good radiograph does not necessarily produce a good functional result.

A similar comparison between fracture reduction shown on the radiograph and the patients' subjective assessment was also performed (Table VII). The subjective results were similar whether the radiograph showed a good or only fair reduction. However, where the radiographic result was poor, only 54% of patients had a good or excellent result.

DISCUSSION

The original hypothesis that early mobilisation leads to a better range of movement has not been upheld by this study. However, it has been shown that early mobilisation leads to significantly less pain in both the short and the long term. Moreover the patients who were mobilised early did have marginally better wrist movement at three months and a year (Table IV) even though as a group they had less satisfactory reduction of the fracture (Fig. 2). It has been shown that the final anatomical result is no worse in the patients placed in plaster for three weeks than in those immobilised for five. It has also been shown that the patients immobilised for only three weeks retain a better grip strength. In these elderly patients, often living alone, a lengthy period of immobilisation of the wrist is particularly inconvenient. There would appear to be no reason to prolong this period beyond three weeks.

It might be argued that there is no need to reduce these fractures since patients with a good radiographic result were no more likely to have a good functional result than those with only a fair radiograph. However, those with a poor reduction were less likely to have a good subjective result and this was undoubtedly due to the greater deformity of the wrist in the poorly reduced fractures. The importance to these elderly women of a good cosmetic result should not be underestimated and this alone is sufficient reason for reducing these fractures.

Conclusion. It is suggested that elderly women with Colles' fractures should have their fractures reduced. The position of the wrist should then be accepted unless there is gross loss of reduction. The wrist should be taken out of

Table V. Average loss of position at three months

Measurement	Group A	Group B
Dorsal angulation (degrees)	8.5	8.9
Radial angulation (degrees)	4.2	4.8
Radial shortening (mm)	3.3	3.8

Table VI. Correlation of radiographic result and range of movement

Radiograph	Range of movement (degrees)			
	Excellent	Good	Fair	Poor
Good	3	36	50	11
Fair	0	40	57	3
Poor	0	36	55	9

Table VII. Correlation of radiographic and subjective result

Radiograph	Subjective result (%)			
	Excellent	Good	Fair	Poor
Good	22	47	17	14
Fair	20	50	22	8
Poor	18	36	41	5

plaster after only three weeks and the patient actively encouraged to mobilise the wrist. This will lead to less short-term disability and will not worsen their anatomical result. It will produce less pain and a stronger grip. It may also improve the range of wrist movement.

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