

# Arthrolysis in the relief of post-traumatic stiffness of the elbow

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## SUMMARY

A retrospective clinical study of 34 patients treated by arthrolysis for elbow stiffness is presented. These patients had sustained previous injury which was a simple fracture in 44%. The average age at operation was 31 years with a range from 6 to 57 years. Follow up for a minimum of one year, and an average of four years, showed an increase of motion from a preoperative average of 45° to a postoperative average of 92° with few complications and only three unsatisfactory results. This analysis has allowed conclusions concerning the technique and indications for operation.

## RÉSUMÉ

Présentation de l'étude rétrospective de 34 raideurs 'du coude traitées par arthrolyse. Ces patients avaient subi un traumatisme qui n'était, dans 44% des cas, qu'une simple fracture. L'âge moyen au moment de l'opération était de 31 ans, avec des extrêmes de 6 à 57 ans. Le rectal moyen était de 4 ans, avec un minimum d'un an. On a obtenu une amélioration de la mobilité qui est passée de 45° en moyenne en pré-opératoire à 92° en moyenne après l'arthrolyse. Il n'y a eu que peu de complications et seulement 3 échecs. Cette étude permet des conclusions concernant la technique et les indications de cette opération.

## INTRODUCTION

The function of the elbow depends largely on the extent of the flexor-extension movement and on the sector of this movement. A moderate extension deficit does not result in functional limitations but loss of flexion can affect everyday activities [3, 10, 11, 19].

Stiffness in the elbow is disabling due to the intermediate site of the joint in the arm, as the hand must be brought nearer to or moved away from objects. The maximum degree of incapacity occurs when there is a total loss of joint movement and ankylosis will be less functional if it is in extension [4, 8, 12, 14]. This study is a retrospective analysis of patients with stiff elbows treated by operation to obtain a greater range of motion.

## **MATERIALS AND METHODS**

Forty patients with stiffness of the elbow treated at the Clinic of the University of Navarra over the past fifteen years have been reviewed. Thirty-four patients with a follow up of a minimum of one year, with a range from one to 16 years and a mean of four years, have been analysed.

The average patient age was 31 years (range 6-57 years). There were 21 men and 13 women. The right elbow was affected in 19 and the left in 15.

The normal range of elbow movement is from 0° to 140°, with 180° of pronosupination. Twelve patients had a preoperative range of 60° to 90°, 15 had 30° to 60°, 5 had less than 30° and 2 were ankylosed (Fig. 1). Twenty-four patients had an associated limitation of pronosupination. Measurements were obtained by a goniometer and lateral projection radiographs in the extremes of flexion and extension (Fig. 2). Soft tissue radiographs were used in 7 patients, technicium bone scans in 5 and a CT scan in 4.

All patients had a traumatic cause for the stiffness. Eighteen had undergone closed treatment and 16 had an open reduction and internal fixation. The troublesome stiffness resulted from simple fractures in 44% the cases. Stiffness was usually near the angle of 90° with only a few stiff in a more extended position. Only 11% had occasional pain on use of the elbow; 24% had clinical ulnar neuropathy.

Arthrolysis was carried out from 3 months to 9 years after the initial injury, with an average interval of 19 months. General anaesthesia or a brachial plexus block with a tourniquet were used. The surgical approach at operation depended on the pathology, with both medial and lateral approaches used in 18 cases (Fig. 3), a lateral approach alone in 10, a posterior approach in 4 and an anterior approach in 2. In the past seven years a combined medial and lateral approach has been used as a routine. After excision of capsular and ligamentous tissue, bone overgrowths or calcification were removed in 26 cases, the head of the radius was excised in 4, the ulnar nerve was released or transposed in 8, the epicondylar or epitrochlear muscles were released in 13, the brachialis muscle were sectioned in 2 and the biceps or triceps tendons were lengthened in 2. Hemostasis was obtained after release of the tourniquet and suction drainage was used for three days postoperatively. Prophylactic cefazoline was administered as one gram intramuscularly 1 h before operation and three intravenous doses at 8 h intervals after.

Continuous passive and active movement was initiated for 8 h day, 24 h after operation and continued in a specialized rehabilitation centre.

## **RESULTS**

Sixty-two percent of patients obtained a 50% improvement in motion, 29% gained between 30 and 50% improvement and 9% improved less than 30%. The preoperative average of 45° of motion was increased to an average of 103° at operation and afterwards was maintained at 92° (Fig. 4). The arc of movement was often more functional. The age of the patient or the time interval between injury and the operation did not influence the result.

An analysis of the three cases with less than 30% increase in motion indicates one with only a lack of extension and hence little to gain by surgery, one postoperative infection which was resolved with residual stiffness, and one patient with three previously unsuccessful operations.

Complications included the one postoperative infection and one neuropraxia of the ulnar nerve that later resolved. Postoperative pain was not a problem.

## **DISCUSSION**

Trauma to the elbow frequently leads to stiffness as a result of soft tissue involvement by fractures, initial joint pain and inadequate efforts at mobilization [6, 7, 9]. We found no significant difference in elbow stiffness whether the initial treatment was nonoperative or operative; 44% of the cases in this series were secondary to simple elbow fractures.

Many techniques have been applied to the treatment of elbow stiffness [1, 5, 10, 13, 15-17]. The varied approaches to the joint do not seem to affect the result [2, 15, 17, 18, 20]. We prefer a combined medial and lateral approach for arthrolysis since it permits total removal of capsule and ligament with reduced risk to the nerves. Rarely, an anterior or posterior approach may be used depending on the joint pathology. It is important to deal with all structures that interfere with mobility until good motion is obtained at the time of the operation.

Postoperative use of continuous passive and active motion with symptomatic control of pain is important and began 24 h after operation.

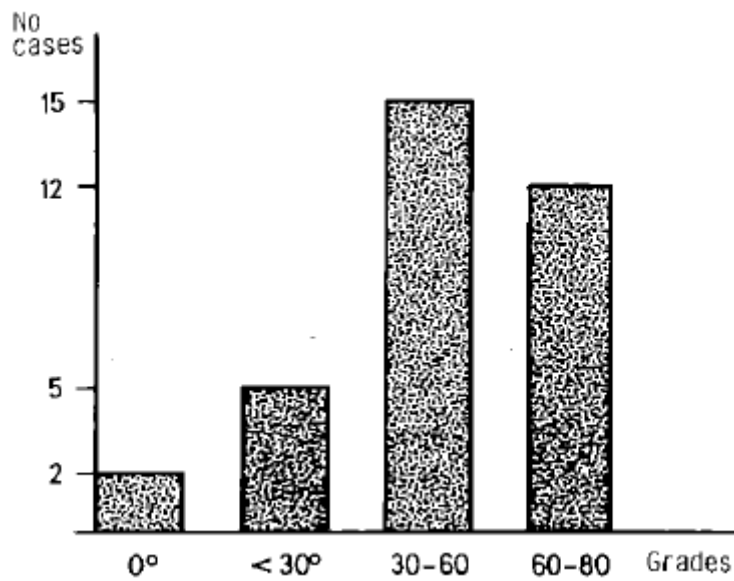
Only an 11° loss of the movement gained at operation has been found in the follow up of this series of cases, so the early results can be satisfactory and long lasting.

Operation is contraindicated for a small loss of extension motion, a severely altered joint surface or a major neuromuscular deficit. Other types of surgical treatment may be appropriate in such cases [11, 15, 16, 18]. Other contraindications may include elderly patients with previous operations or those patients who are not well motivated to mobilize the elbow.

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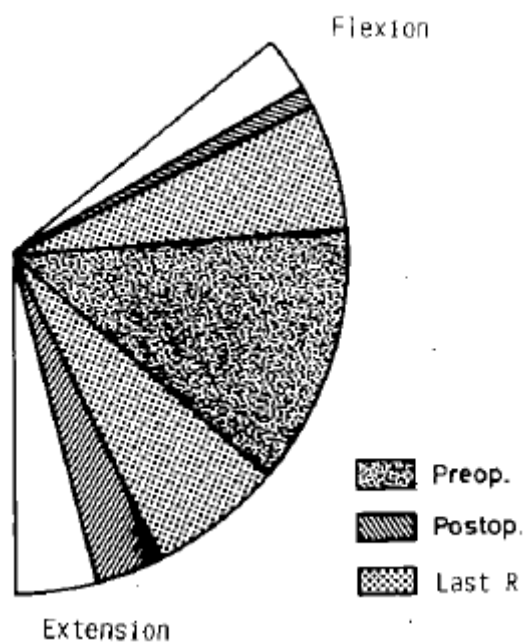
**Figure 1.** Range of elbow motion before operation



**Figure 2.** Anteroposterior and lateral radiographs show intraarticular and extraarticular abnormalities, including periarticular ossification, after a fracture of the lower end of the humerus



**Figure 3.** **a** The medial exposure of the elbow with the ulnar nerve released. **b** The lateral exposure including the head of the radius after complete capsulectomy with removal of intraarticular star and extraarticular bone overgrowth



**Figure 4.** Range of elbow motion at operation and postoperatively