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Debridement for osteoarthritis of the elbow in athletes

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Abstract The results of surgical treatment for osteoarthritis of the elbow in athletes were investigated. Athletic activities consisted mainly of judo wrestling and baseball; and included 26 elbows. The mean age was 32 years. The radiological changes were mild in most cases. Debridement consisted of resecting osteophytes and removing loose bodies. Pain scores were improved, and the range of movement was improved by an average of 24 degrees with an average follow-up of 4 years and 2 months. Recurrence of mild symptoms occurred in most cases.

Résumé Les caractéristiques et les résultats cliniques d'athlètes atteints d'ostéoarthrite du coude ont été étudiés. Il s'agissait de 26 coudes, surtout de judokas et de joueurs de base-ball de 32 ans en moyenne. Une douleur intense était ressentie à la flexion et l'extension maximales du coude dans tous les cas. Les radiographies on montré que la plupart des cas étaient bénins. L'articulation du coude a été explorée le plus fréquemment par approche médiane, et parfois par approche latérale et bilatérale. L'arthroplastie de parage de la plaie, qui a consisté à réséquer les ostéophytes et à éliminer les éléments libres, a été pratiquée dans chaque cas. La chirurgie a permis de soulager la douleur. L'amplitude de mouvement de coude a été améliorée de 24 degrés, avec un suivi moyen de 4 ans et 2 mois. Le résultat à long terme de 8 patients, avec suivi de 5 ans ou plus, a été étudié. Il y eu récurrence de l'ostéoarthrite dans la plupart des cas. Mais ces phases n'ont pas été sévères et les symptômes associés bénins. L'arthroplastie de parage de la plaie s'est avérée efficace pour les athlètes.

Introduction

Pain and limitation of movement (ROM) associated with osteoarthritis of the elbow are major concerns for athletes

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who use their upper limbs extensively [1, 7, 18]. Many patients are reluctant to undergo surgical treatment, and conservative treatment is usually pursued [6, 8, 12, 14, 15, 17].

Patients and methods

Twenty-six elbows in 26 patients with osteoarthritis of the elbow associated with sporting activities were investigated (Table 1). The patients were all male with a mean age of 32 (18–59) years. The right elbow was involved in 19 cases and the left in 7 cases. The specific sports included judo and baseball (9 cases each), aikido (3 cases), apparatus gymnastics (2 cases), and karate, volleyball and bodybuilding (one case each). The mean length of sports participation was 12 (3 to 30) years.

In assessing the outcome, the degree of pain in the elbow was classified into the following four grades: grade 0, no pain; grade 1, slight pain (without limitation of sporting activities); grade 2, moderate pain; and grade 3, severe pain.

All patients complained of grade 2 or grade 3 pain. ROM was limited with a mean extension deficit of 16° (0°–30°), and a mean flexion range of 113° (80°–140°). Severe pain occurred at terminal flexion or extension in all cases. This resulted in decreased performance and anxiety during sports activities. Ulnar nerve symptomatology was seen in 12 patients.

Radiographs and tomograms showed osteophytes on the coronoid process, the olecranon tip and in the coronoid fossa, the radial fossa and the olecranon fossa; with loose bodies. The degree of osteoarthritis was classified into four grades: none, mild (including a case with only loose bodies), moderate, and severe [5, 11]. Most cases were mild (16 elbows). 6 elbows were graded as moderate and 4 as severe. Loose bodies, many of which were relatively large, were present in 18 cases.

Surgery was indicated in patients with pain, limitation of ROM or cubital tunnel syndrome with radiographic evidence of spur formation and bony ridges, or loose bodies in the joint. Particular attention when considering surgical treatment was given to pain at the limit of flexion and extension.

Surgical procedure

The elbow was exposed using a medial approach (method 1), a lateral approach (method 2a) [3], a lateral approach with a medial incision for ulnar neurolysis (method 2b), or a bilateral approach (method 3).

The medial approach consisted of a curved incision alongside the ulnar nerve. After freeing the ulnar nerve, the proximal one-

Table 1 Data and results for 26 patients treated by debridement arthroplasty of the elbow in athletes (Pain grade: 0 none; 1 slight; 2 moderate; 3 severe. Approach: 1 medial; 2a lateral; 2b lateral+medial neurolysis; 3 bilateral; O-K Outerbridge Kashiwagi)

Cases	Preop		Approach				Follow-up (months)		Postop		Pain grade	Terminal pain		Numbness
	Age	Deficit of extension	Flexion	Pain grade	Grade of OA	Free body			Deficit of extension	Gain of extension		Extension	flexion	
1	30	0	110	2	mild		55	0	0	25	0	0	0	0
2	24	20	95	3	mild	exist	63	15	5	35	1	1	1	0
3	22	10	125	3	moderate	exist	42	0	10	2	1	1	1	0
4	55	5	95	3	severe	exist	29	-4	9	35	0	0	0	0
5	59	10	125	2	moderate	exist	54	13	-3	-2	0	0	1	1
6	50	12	135	3	moderate		34	4	8	140	0	0	0	0
7	18	25	110	2	mild	exist	33	5	20	125	0	0	0	0
8	28	25	120	2	mild	exist	105	5	20	125	0	1	0	1
9	23	0	140	3	mild	exist	31	5	-5	135	1	0	0	0
10	22	20	130	3	mild	exist	26	0	20	135	0	0	0	0
11	22	0	120	3	mild	exist	28	-10	10	134	1	0	1	0
12	30	10	110	2	mild	exist	100	5	5	130	0	0	0	0
13	19	12	130	3	mild	exist	64	0	12	145	0	1	0	0
14	21	25	90	3	mild	exist	42	10	15	110	0	1	0	0
15	36	15	100	2	moderate		62	10	5	120	0	0	0	0
16	42	10	120	3	moderate	exist	84	5	5	114	2	2	2	1
17	22	20	100	2	severe	exist	47	25	-5	105	0	0	0	0
18	41	30	120	2	moderate	exist	74	20	10	145	0	0	0	1
19	20	20	120	2	mild	exist	61	5	15	130	0	0	0	1
20	38	20	90	2	mild		51	5	15	125	0	0	0	0
21	27	20	120	2	mild		34	5	15	130	0	1	0	0
22	50	25	112	3	severe	exist	30	7	18	118	1	1	1	1
23	30	12	100	2	mild	exist	39	8	4	124	1	1	1	1
24	41	30	80	2	severe	exist	32	8	22	120	0	0	0	0
25	41	8	110	2	mild	exist	29	0	8	120	0	0	0	0
26	19	20	125	2	mild	exist	51	5	15	125	1	0	0	0

half of the insertion of pronator teres was detached without detaching the flexor muscles from the medial epicondyle. The anterior portion of the elbow joint was entered by incising the joint capsule, preserving the anterior bundle of the ulnar collateral ligament. Next, the olecranon fossa was exposed beneath the triceps muscle, separating the posterior oblique fibres of the ulnar collateral ligament. This allowed adequate resection of the osteophytes from the coronoid process, the coronoid fossa, the olecranon, and the olecranon fossa. Surgery could be accomplished solely with this medial approach in many cases. However, lateral pathology involving the radial head and radial fossa could not be treated sufficiently in severe cases. In these cases a lateral incision was added.

The lateral approach consisted of a lateral J-shaped incision. The annular ligament was divided longitudinally. The lateral collateral ligament was detached. The joint capsule was opened to visualize the radial head, the radial fossa and the proximal radioulnar joint. Using this approach, coronoid process and fossa, and the olecranon and olecranon fossa could also be treated. However, the ulnar edge of the trochlea of the humerus and the semilunar notch of the ulnar could not be inspected adequately. For patients who underwent a lateral approach and exhibited cubital tunnel syndrome, a medial skin incision was also used for ulnar nerve neurolysis. In patients with severe degenerative change in whom a bilateral approach was anticipated, a posterior longitudinal incision that curved around the olecranon was used.

Using these approaches, osteophytes were resected and excess bony formation was shaved away to near normal anatomy using a burr drill. Loose bodies were removed.

Methods 1, 2a, 2b and 3 were used on 9, 5, 5 and 6 elbows respectively. The Outerbridge-Kashiwagi method [4] was used in one case.

A plaster splint was used for postoperative immobilization. Active movement and continuous passive motion was started at 5 days, and a dynamic splint was applied 2 weeks after surgery. Light work was permitted at 6 weeks and return to sporting activities at 10–12 weeks.

Results

Eighteen, seven, and one elbows were designated with pain grades 0, 1, and 2 respectively. Pain associated with terminal flexion or extension was present in eleven el-

bows. In these cases, with the exception of one with terminal pain rated as grade 2 (a recurrent case), pain was alleviated significantly postoperatively. Mean flexion was 126°, and mean loss of extension was 6°. This represented an improvement in ROM of 24° (14° of flexion and 10° of extension).

Six cases had mild numbness in the area served by the ulnar nerve. One case had residual moderate numbness.

Twenty-five patients with grade 0 and grade 1 pain fully returned to their sporting activities. One patient with grade 2 pain (case 16) also returned to their original sport (Aikido), albeit with some limitation. Three of the judo wrestlers were able to achieve first and second class records in national and international competitions.

A representative case (case 3) is shown. The patient was a 22-year-old college judo wrestler (Fig. 1). He was unable to compete effectively during matches, because of severe pain at the limit of extension of the elbow and a decrease in grip strength. The ROM of the elbow was from 10° to 125° of flexion. Radiographs indicated moderate osteophytes and several loose bodies. Debridement through a medial approach was performed in conjunction with anterior transposition of the ulnar nerve. He resumed judo 2.5 months after surgery. A year later, he was the national champion in his weight class, and 3½ years later remained pain-free.

Recurrent osteoarthritis commonly occurs. Therefore, the long-term results were investigated in 8 cases. The mean follow-up period was 6 years and 5 months (range, 5.1 to 8.9 years). Six cases remained pain-free. One patient experienced grade 1 pain. Recurrence of grade 2 pain occurred at 2 years after surgery in one patient (case 16). The mean improvement in ROM was 25° [range, -1° to 40°]. Radiographs showed a minor occurrence of osteophytes in all cases, with the exception of one moderate case.

Discussion

Pain and limited movement associated with osteoarthritis is of particular concern of athletes who use their upper limbs extensively. Judo wrestlers [13] and baseball players may not be able to use their arms sufficiently due to

Fig. 1a–c Radiographs of a 22-year-old college judo wrestler. **a** Lateral radiograph before surgery. Moderate spur formation of the coronoid process and the olecranon tip, a bony ridge on the coronoid process and a loose body in the olecranon fossa were seen. **b** A pre-operative tomogram. Several small loose bodies were seen in the olecranon fossa. **c** Lateral radiograph 3 years and 6 months after surgery showing an almost normal elbow joint

pain associated with hyperextension of the elbow by an opponent, or with full elbow extension in the follow through phase of throwing.

Osteoarthritis in athletes is more likely to occur in younger patients. When the articular surface was inspected at operation it was nearly normal in many of the cases. Furthermore by radiographic assessment, 85% of the cases were mild or moderate. Loose bodies were encountered frequent [10]. Pain in the the elbow was most severe in maximum flexion and extension suggesting that impingement of the osteophytes and loose bodies are the major cause of pain, rather than degeneration of the articular cartilage [2, 9].

Therefore, surgery limited to the resection of osteophytes and removal of loose bodies can be sufficient. Arthroscopic surgery has been advocated [8, 14]. The author has performed arthroscopic debridement on several patients, but adequate debridement cannot be obtained for the posterior and medial joint spaces. Therefore, an open procedure is suggested. Surgery resulted in improved pain relief and ROM. Indeed, only one case suffered residual pain rated as grade 2. Numbness and grip power also improved. All of the active athletes were able to return to their prior activities and a few achieved first class accomplishments. Long-term results also indicate that the improvement in pain and ROM is maintained over a prolonged period despite minor recurrence of osteophytes.

The author concludes that debridement can be recommended for the surgical treatment of athletes with osteoarthritis of the elbow.

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