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Original article

Return to recreational sport and clinical outcomes with at least 2 years follow-up after arthroscopic repair of rotator cuff tears

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ABSTRACT

Introduction: The main objective of the study was to assess return to sports in recreational athletes after arthroscopic repair of rotator cuff tear (RCT).
Material and methods: A retrospective single-center study included all recreational athletes operated between 2008 and 2012 for arthroscopic repair of RCT, with regular sports activity, and aged less than 70 years. All were recontacted at a minimum follow-up of 2 years. The main outcome was return to sports (yes/no). The secondary criteria were return to sports, time to return to sports, number of hours per week of sports activity, and at the last follow-up the subjective assessment of sports level, patient satisfaction, and the Western Ontario Rotator Cuff (WORC) Index.
Results: Seventy-six patients (37 females, 39 males) with a mean age of 57.0 ± 7.3 years were included. Of these 76 patients, 53 (69.7%) patients participated in a sport that specifically involved the upper limb. The mean follow-up was 45 ± 14 months. Postoperatively, 67 of 76 (88.2%) patients returned to a sports activity, the same sport for 52 out of 76 (68.4%). The mean time to return to sports was 6 ± 4.9 months. For patients who had taken up their sport again, the mean number of hours a week was not significantly modified ($P = 0.58$). At the last follow-up, the subjective sports level was judged better or identical to the preoperative level by 52 of 67 (77.6%) patients. The factors significantly associated with absence of return to the previous sport were pain symptoms evolving for more than 9 months before surgery (OR = 3.6 [1.01–12.5], $P = 0.04$) and preoperative sports intensity less than 2 h/week (OR = 4.1 [1.4–12.3], $P = 0.01$). At the last follow-up, the functional improvement evaluated by the WORC Index was strongly significant ($P < 0.00001$) and 73 of 76 (96%) patients were satisfied.
Conclusion: The majority of the recreational athletes returned to sports after arthroscopic rotator cuff repair, most often at the same level and with equivalent intensity compared to before surgery.
Level of evidence: IV, retrospective study.

1. Introduction

Arthroscopic repair is currently considered as the reference surgical treatment for rotator cuff tear (RCT). Compared to classic open techniques, recovery after arthroscopic repair is faster and the long-term functional results are identical [1].

Regular recreational sports practice, encouraged by public health policies designed for the general public, is widespread in all age groups up to 70 years of age and even beyond. The onset of an RCT is frequent in these age groups and will encumber the pursuit of regular sports in these patients, most of whom do not wish to stop.

The possibilities for returning to sports after arthroscopic repair of rotator cuff tears have not been frequently documented in the literature. The publications on the subject are relatively old [2,3], including classic open techniques [2–6], isolated debridements without cuff repair [6,7], or only with professional athlete subjects [2,4,5,8,9]. Very few data are available on arthroscopic rotator cuff repair in recreational sports athletes, even though this population accounts for the majority of the patients operated compared to professional athletes. In a recent study, Bhatia et al. [10] assessed a series of 31 recreational sports patients over 70 years of age operated for RCT with an arthroscopic technique and they noted that 24 (77%) of these patients returned to their sport at the same intensity.

The main objective of this study was to evaluate the return to sports of these under 70-year-old patients undergoing arthroscopic

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rotator cuff repair. The secondary objectives were to search for the factors favoring return to sports and to assess the functional results in this population. The main hypothesis was that arthroscopic repair of the rotator cuff allowed the majority of patients under 70 years of age to return to recreational sports at the same level.

2. Methods

This single-center, retrospective study was approved by the institution's ethics committee (CPP IDF VI, hôpital Pitié-Salpêtrière, 47, boulevard de l'Hôpital, 75651 Paris, France).

2.1. Inclusion/exclusion criteria

The patients included participated in recreational sports at a minimum once a week, were aged 70 years or older at the time of the intervention, underwent arthroscopic surgery for unilateral full-thickness rotator cuff tear on preoperative imaging (supraspinatus [SSP] and/or infraspinatus [ISP], and/or subscapularis [SSC]). Repair had to be complete with a watertight cuff at the end of surgery. The minimum follow-up was 2 years and the patients were operated on between 2008 and 2012.

The exclusion criteria were patients operated on for repeated tear, those presenting a preoperative neurological lesion in the upper limb, posterosuperior glenoid impingement, and those who refused to participate in the study.

2.2. Surgical and postoperative protocols

All patients underwent surgery with general anesthetic and interscalene block. The entire procedure was performed arthroscopically. The patient was positioned in lateral decubitus, with upper limb traction. Double-row repair was performed in 69 (90.8%) cases and single-row repair in seven (9.2%) cases. Tenotomy of the long head of the biceps without tenodesis was performed in 68 (89.5%) cases and tenodesis in eight (9.5%). An acromioplasty using a motorized reamer was performed in all cases. The lateral centimeter of the clavicle was resected in seven (9.2%) cases, to treat symptomatic acromioclavicular arthropathy. Postoperatively, the upper limb was immobilized in a Mayo Clinic-type brace for 1 month, with no mobilization authorized. Rehabilitation was started after the 1-month follow-up consultation with recovery of passive and active range of motion. Muscle strengthening and resistance work were deferred until the 3rd month.

2.3. Patient follow-up and evaluation protocol

The patients were systematically seen and clinically reexamined at 1 month, 3 months, 6 months, and 1 year after surgery. Return to sports was authorized by the surgeon after the 3rd-month visit if the patient so desired. All patients were contacted at the minimum 2-year follow-up by an independent evaluator.

A questionnaire on the patients' preoperative sports activities, the return to sports after the surgery, and their sports practice at the last follow-up was completed by telephone by an independent evaluator (Appendix A). Later, the WORC (Western Ontario Rotator Cuff index) score [11] was sent to them by mail to be completed at the last follow-up and retrospectively for the preoperative items. This self-administered questionnaire is a tool to evaluate the quality of life of patients suffering from rotator cuff pathology and comprises 21 questions. On a visual analog scale from 0 (none) and 10 (extreme) the patient was asked to indicate the extent to which he or she had felt symptoms caused by the shoulder over the last 7 days. The five items were: physical symptoms, recreational sports, work and daily activities, lifestyle, and emotions.

2.4. Endpoints

The main endpoint was return to sports activity (yes/no). The secondary criteria were return to sports, the time to return to sports and stabilization of the sports level after the surgery, the number of hours a week of sports practice, subjective evaluation of the sports level at the last follow-up, patient satisfaction, and the Western Ontario Rotator Cuff (WORC) index at the last follow-up.

2.5. Statistical analysis

The normality of the distributions was tested using the Shapiro–Wilk test. If the distributions were normal, parametric tests were used: the Student *t*-test for independent groups or paired tests for the quantitative variables and the Chi^2 test for the qualitative variables. If the distributions were not normal, nonparametric tests were used: the Mann–Whitney test or the Wilcoxon test was used for continuous variables and the Fisher exact test for binary variables. The risk factors for non-return to sports activity were sought in univariate analyses and then in multivariate analyses according to logistic regression comparing the group of patients who had returned to their sports at the last follow-up and those who had not returned to any sports activity. All variables with $P < 0.25$ in the univariate tests were included in the multivariate model. A *P*-value less than 0.05 was considered statistically significant.

3. Results

3.1. Population

During the 2008–2012 inclusion period, 196 patients underwent surgery in the department for rotator cuff repair. Eighty-six of these patients fulfilled the study's inclusion criteria. Ten out of 86 (11.6%) patients refused to participate in the study or were lost to follow-up; 76 out of 86 (88.4%) were analyzed. This group included 37 females and 39 males with a mean age of 57 ± 7.3 years at the time of surgery. Of these 76 patients, 14 (18.4%) had a manual job, 40 (52.6%) had a non-manual job, and 22 (28.9%) were retired. The most frequent sports practiced before surgery were tennis, swimming, physical exercises, and golf (Fig. 1). Fifty-three out of 76 (69.7%) patients did a sport that involved the upper limb (tennis, swimming, golf) and 23 out of 76 (30.3%) solicited the upper limb less (physical exercises, running). The patients had been active in their sport(s) a mean 16.7 ± 12.2 years before the intervention. The intensity of the sports activity before surgery was 4.3 ± 4 h/week on average for the entire series. The mean follow-up was 45 ± 14 months.

3.2. Description of lesions

The shoulder pain symptoms had evolved for 19.4 ± 23.6 months at the time of surgery. The dominant side was involved in 57 (75%) cases. Two (2.6%) cases involved an occupational accident or occupational disease. The tear involved one (43.4% of the patients), two (43.4%), or three tendons (16.2%). The characteristics of the tendon tears are described in Table 1.

3.3. Return to sports

Fig. 2 summarizes the conditions of the patients' return to sports. Of the 53 patients participating in a sport that solicited the