

A comparison of conservative and delayed surgical treatment of anterior cruciate ligament ruptures

A matched pair analysis

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Summary. A series of 60 matched and paired patients with complete rupture of the anterior cruciate ligament (ACL) was studied; 30 were treated conservatively, even though operation was recommended, and 30 were operated on within 35 months (range 18 to 48 months) after the ACL rupture. The average age was 34 years in each group. They were assessed 39 months after arthroscopy or reconstruction. At follow up, no patient had flexion of less than 100°, 13 of the reconstructed knees had an extension deficit, but in only one was this more than 10°. Thirty-six percent of the reconstructed and 14% of the conservatively treated patients graded their sports activity as unlimited, while 13% of the ACL reconstructions and 21% of those treated conservatively were severely limited. The Lysholm, Cincinnati and OAK scores were significantly better in the reconstructions. The anterior drawer sign was positive in 24% of the ACL reconstructions and in 81% of the conservatively treated patients; 19% had a positive pivot shift after reconstruction compared to 75% of those treated conservatively. Even though there was a considerable number of patients with a decreased range of motion after ACL reconstruction because of the slow regime of postoperative mobilisation used, the results of operation are significantly better than after conservative treatment even when ACL reconstruction was carried out late after injury.

Résumé. 60 patients avec une rupture complète du ligament croisé antérieur furent traités soit conservativement (30) soit chirurgicalement (30) avec une transplantation os-tendon-os provenant du tiers médian de la rotule sous arthroscopie en moyenne 35 mois après la rupture. Dans les deux groupes l'âge

moyen était de 34 ans. Le flexion obtenue était toujours d'au moins 100 degrés, un déficit d'extension était noté chez 2 patients du groupe traité conservativement et chez 13 patients du groupe traité par reconstruction. L'activité sportive était illimitée chez 31 patients avec reconstruction et chez 14 patients traités conservativement. Les scores Lysholm, Cincinnati et OAK étaient meilleurs chez les patients traités par reconstruction. Un phénomène de pivot-shift était retrouvé dans 19% des cas de reconstruction et 75% des cas de traitement conservatif. Bien qu'un grand nombre de patients avait une diminution de la mobilité après reconstruction, les résultats du traitement chirurgical étaient significativement meilleurs qu'après traitement conservatif.

Introduction

The purpose of this study was to compare the stability, clinical outcome and functional scores in patients with anterior cruciate ligament ruptures (ACL) treated by arthroscopic reconstruction with the medial third of the patellar ligament in a matched-pair analysis with those treated conservatively.

Material and method

Between 1988 and 1991 a total of 220 patients with ACL injuries underwent an arthroscopy; 65 had a partial rupture and were treated conservatively. Out of 155 with a total rupture, 95 were operated on, and 60 treated conservatively. One hundred and twenty-five of these patients were reassessed after an average of 38.6 months (24 to 86 months). Out of the two groups, 30 patients who had chosen conservative treatment, even though operation had been recommended, were selected by means of age and sex, and matched with 30 patients who had an operative reconstruction. There were 14 women and 16 men

in both groups with an average age of 34.3 years (22 to 50 years). Nineteen patients had isolated ACL ruptures and 11 additional collateral ligament lesions. The average interval between injury and ACL repair was 35 months (18 to 48 months), and in the conservative group between injury and arthroscopy 34 months (0 to 54 months).

The ACL reconstruction was performed arthroscopically using an autologous bone-tendon-bone middle third patellar tendon graft, which was tightened with sutures over cancellous bone screws. Patients were given a knee brace immediately after the operation and cold packs. Passive motion was started from 30° to 60° initially and increased to 0 to 90° after one week. From the second day active hamstring and quadriceps exercises were performed; proprioceptive muscle training, as well as hydrotherapy, were added later. The patients wore the brace for active motion with partial weightbearing for 8 weeks.

All patients were seen for clinical follow up and additional instrumented instability measurements were made in the hospital. Using a KT-1000 machine, 4 anterior translations were measured at 20 kilopounds, as well as maximum force and posterior translation. The results of both knees were compared. With an ultrasonographic instability measurement, defined forces of about 150 Newtons were applied to the fixed tibia at varying degrees of flexion, while the anterior translation was measured ultrasonographically. In addition, the Lysholm, Cincinnati, OAK and Tegner Activity Scores were used to evaluate functional outcome.

Results

Sixteen reconstructions and 5 conservatively treated patients had decreased knee motion, but none had flexion of less than 100°. One of the conservatively treated patients had decreased motion of the patella; 3 of the reconstructions had a decrease and 2 an increase of motion of the patella. At follow up, 13 ACL reconstructions and 2 of those conservatively treated had an extension deficit, but in only one of the reconstructions was this more than 10°.

Ninety-six per cent of the ACL reconstructions and 49% of the conservatively treated patients wore a knee brace; the average duration of physical therapy was 3.7 months in both groups, ranging from 1 to 12 months in the reconstructions and 0 to 24 months in the conservatively treated group.

Scores

The results from the Lysholm, Cincinnati and OAK scores were significantly better in the patients who had an ACL reconstruction (Fig. 1). When the results of the two groups were analysed, there was a significantly higher number of good and excellent results according to the Lysholm score among the reconstructions compared to those treated conservatively (Fig. 2). Twenty-four per cent of the reconstructions and 49% of those treated conservatively had pain during slight and severe activity, while 28% of the reconstructions and 65% of those treated conservatively reported instability during normal activity or light sports.

When the two groups were graded by the Tegner activity score before injury, they were graded 7 (com-

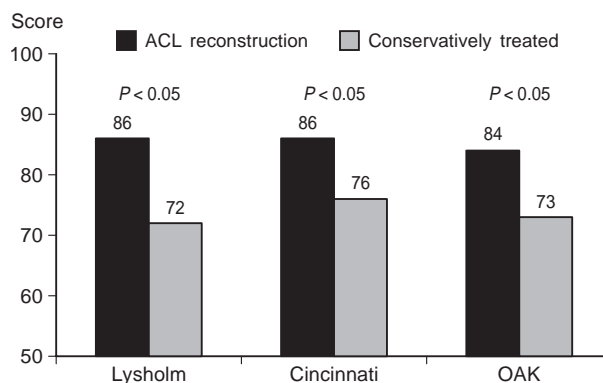


Fig. 1. Subjective knee function using the 3 different scoring methods after conservative treatment and surgical reconstruction for ACL injuries. The group who had reconstruction was significantly better than the patients treated conservatively in all 3 groups ($P < 0.05$ – derived from an hypothesis)

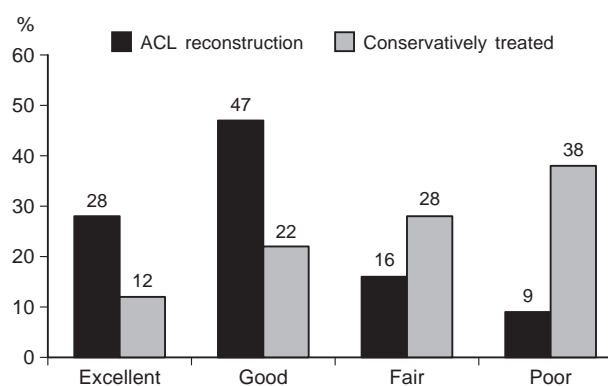


Fig. 2. Functional results assessed by the Lysholm score for patients with an ACL reconstruction and those treated conservatively

Table 1. Tegner activity score and patient history

Activity level	ACL reconstruction	Conservatively treated
7–10	12 (40%)	6 (20%)
4–6	15 (50%)	19 (63%)
1–3	3 (10%)	5 (17%)
Twisting and contact sports	18 (60%)	10 (34%)
Unlimited sports	11 (36%)	4 (14%)

petitive to recreational sport), falling to grade 3 (only light duty) after the accident. At follow up, the reconstructions had a greater degree of activity with a significantly lower decrease from the postoperative maximum. The scores at follow up are shown in Table 1.

Instability measurements

Manual testing of the anterior drawer sign was positive (2+ and 3+) in 24% of the anterior cruciate ligament reconstructions and 81% of the conservatively treated patients; 19% had a positive pivot shift after reconstruction compared with 75% after conservative treatment.

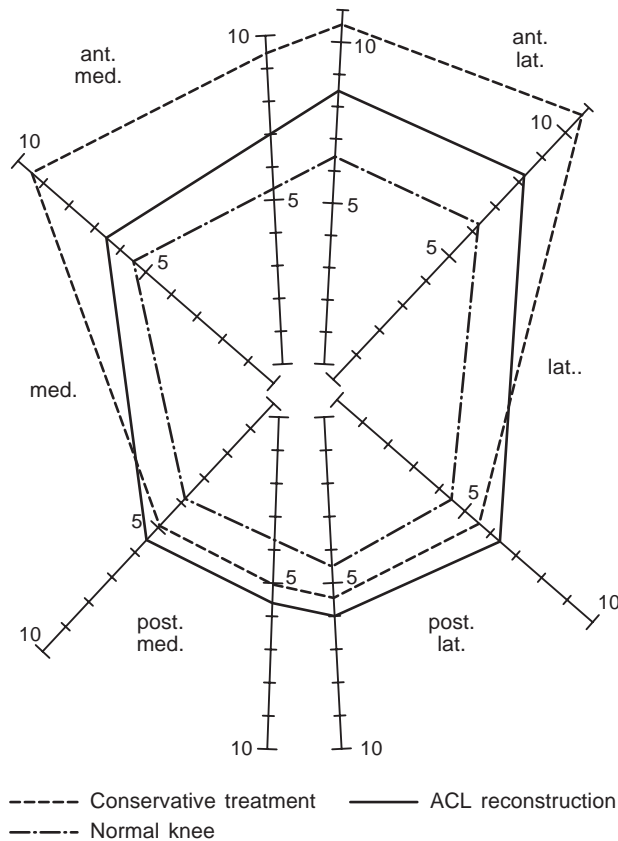


Fig. 3. Sonographic instability measurement in the groups with ACL reconstruction and conservative treatment, with their normal knees for comparison

Sonographic instability measurement revealed significantly more anterior sliding in the conservative group (range 9.5 to 10.7 mm) compared to the ACL reconstructions (range 6.7 to 8.4 mm), and between both groups and their healthy opposite knee (Fig. 3) [6]. These results were confirmed by KT-1000 measurement with maximum manual power.

Discussion

The optimum method of studying the value of a given procedure is by a prospective randomised trial. The next best method is to perform a matched pair study, where patients all have the same injuries and demographic data. We have compared a group of patients who were treated conservatively with another group who had an ACL reconstruction using a patellar ligament graft during the same period. A surgical reconstruction was recommended to all the patients in both groups, but some chose the operation and others conservative treatment. The data regarding the accompanying injuries, as well as the age and sex, were identical in the two groups.

Whether a total rupture of the ACL should be treated conservatively or by reconstruction is still under discussion, but it is agreed that conservative treatment should be recommended in patients over 50 years, who are not active in sports. In younger pa-

tients with multi-directional instability, which cannot be compensated by the muscles, surgical reconstruction is always preferable [9, 10, 15]. It has been shown that the medium term results of conservative treatment of unidirectional instability are very successful, but long term results are associated with increasing instability and severe degeneration of the cartilage and menisci are likely to occur [9, 10, 13, 15]. Conservative treatment needs good co-operation for a long period of time and training has to continue after the muscles have been built up.

Reconstruction of the ACL has some technical problems, particularly the strength of the implant and the possibility of developing some proprioceptive function; the correct isometric position at implantation is also very important.

Instrumental measurements of instability, as well as manual testing and grading, showed large numbers of knees with high grade instability in the conservatively treated group which correlates with the higher degree of poor functional results as judged by the Lysholm, Cincinnati and OAK scores, and a lower activity Tegner grading. The correlation between a higher degree of stability and a better functional outcome for reconstructed ACLs has been described, but a comparative study of these results has not been reported [2, 3, 13]. When the scores were evaluated in the patients with a poor functional result, they were significantly higher in those treated conservatively. The problem is to determine those patients who will have a poor subjective and functional outcome after conservative treatment. In our group of ACL reconstructions, there were patients who showed increased stability and function after muscle training, but there were also some who had poor function and increased instability after such management. These results are in accordance with other studies, but no reliable predictors are available [5]. All the patients in our group of ACL reconstructions had their operation more than 18 months after the initial accident, but they had no worse results than those reported in other studies who had an initial reconstruction carried out. Reconstruction can therefore still be considered as a valuable option when initial conservative treatment is not effective.

Comparison between the two groups showed that the patients with an ACL reconstruction had significantly more swelling of the knee after exercise (40%) and more frequently had an extension deficit (43%) for which the swelling may be responsible. Harner et al. compared 21 patients with more than a 10° extension deficit, or less than 125° flexion, with 24 patients with normal knee motion, and found a significantly greater amount of swelling in the group with decreased motion [7]. In our series, the extension deficits were all less than 10° with one exception. Harner et al. found that in their study of 242 patients one year after operation, 11.1% had an extension deficit of more than 10°, and flexion of less than 125°. Furthermore, our series had a longer follow-up, and a brace was the standard postoperative treatment.

Nowadays, early free flexion-extension movements are allowed and deficits are no longer a major

problem [11, 12]. The large number of patients practising twisting and contact sports after ACL reconstruction compared with the conservatively treated might be another explanation for the swelling after operation. Degeneration of the meniscus following conservative treatment is another argument for operation.

Although good and acceptable results are seen after conservative treatment of ACL ruptures, the results have to be assessed 6 months or a year after injury. If there is instability during normal activities or in sport, reconstruction should be considered, and this delay is not detrimental to the final outcome.

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