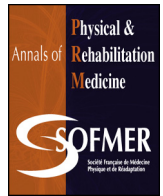




Available online at
ScienceDirect
www.sciencedirect.com

Elsevier Masson France
EM|consulte
www.em-consulte.com



Original article

No beneficial effect of bracing after anterior cruciate ligament reconstruction in a cohort of 969 athletes followed in rehabilitation

P. Bordes^{a,*}, E. Laboute^b, A. Bertolotti^c, J.F. Dalmay^d, P. Puig^b, P. Trouve^b, E. Verhaegue^b, P.A. Joseph^a, P. Dehail^a, M. De Seze^a

^aService de Médecine Physique et Réadaptation, CHU de Bordeaux, place Amélie-Raba-Léon, 33076 Bordeaux cedex, France

^bCERS, 83, avenue Maréchal-de-Lattre-de-Tassigny, 40130 Capbreton, France

^cU897 Inserm, 146, rue Léo-Saignat, 33076 Bordeaux cedex, France

^dUMR 1094, Inserm, faculté de médecine de Limoges, 2, rue du Docteur-Marcland, 87025 Limoges cedex, France

ARTICLE INFO

Article history:

Received 18 April 2016

Accepted 3 February 2017

Keywords:

Knee brace

Anterior cruciate ligament reconstruction

Rehabilitation

Postoperative complications

ABSTRACT

Objective: Compare the clinical outcomes of different knee braces in the early phase of rehabilitation after anterior cruciate ligament reconstruction (ACLR) in athletes.

Materials and methods: We conducted a retrospective database study of athletes during early rehabilitation in a tertiary referral hospital between 1 February 2008 and 30 October 2010 after ACLR using bone patellar tendon bone (BPTB) or hamstring autograft. Differences in mid-patellar knee circumference, pain, and range of motion were assessed at admission. All patients followed the same rehabilitation protocol. Patients who had complications preventing them from following the assigned rehabilitation program were analyzed separately. Patients who completed their rehabilitation program were also assessed for thigh muscle atrophy, extension deficit $\geq 2^\circ$, quality of walking, PPLP1 and subjective IKDC scores. The type and frequency of complications and their frequency was documented. The above-mentioned parameters were analyzed in 3 different groups: rigid brace in full extension, articulated brace (0° – 90° for first 3 weeks then 0° – 120°) or no brace.

Results: The analysis included 969 patients. Rehabilitation started at 4.5 ± 2.9 days after surgery and ended at 32.4 ± 3.0 days postoperative. At the beginning, flexion was lower in patients with a rigid brace ($P < 0.01$). There was no difference in the frequency or severity of complications between the three study groups, nor was there a significant difference in the clinical outcomes listed above.

Conclusion: Postoperative bracing after ACLR has not beneficial effect on clinical outcomes and the complication rate. Patients who wore the rigid brace had limited flexion early on.

© 2017 Elsevier Masson SAS. All rights reserved.

1. Introduction

Anterior cruciate ligament (ACL) tears are common. There are 100,000 to 250,000 new cases each year, based on epidemiological data from the USA [1]. Surgical reconstruction is often used to prevent chronic instability, especially in younger patients who participate in pivot sports, are highly competitive and want surgery [2]. Between 60,000 and 175,000 ACL reconstruction procedures are done each year in the United States [1]. A postoperative knee brace is used in 85% of these cases, according to the American Orthopaedic Society for Sports Medicine (AOSSM) [3].

A brace is said to protect the repair by reducing the mechanical loads to prevent retears, while supporting early motion [4]. This rationale is based in part on histological observations of ligamentization [5,6] and in part on in vitro biomechanical studies that show the repair is subjected to increased loads if the quadriceps and hamstrings are weak, as is the case postoperatively [7,8]. Consequently, wearing a brace is recommended until the ability to activate the quadriceps muscle to lock the knee is regained [3,4,9]. The duration of brace use varies between studies from 3 weeks to 3 months [4,9–15].

However, most studies have found little effect of a stabilizing brace on the medium-term and long-term clinical outcomes when it is used in combination with a standard rehabilitation program [10,12–16]. Wearing a brace can actually cause discomfort and be inconvenient [17]. Other studies have shown that it reduces the

* Corresponding author.

E-mail address: pborde101e@gmail.com (P. Bordes).

extension deficit [18], improves the subjective feeling of stability [19] and prevents widening of the bone tunnels during an accelerated rehabilitation protocol, which is a potential source of laxity [20]. But only a few clinical studies have actually looked into the protective ability of a brace when used in the initial postoperative rehabilitation phase. In these studies, the immobilization protocols vary and the results are inconsistent in terms of postoperative pain, restoration of joint range of motion, change in edema and clinical scores [10,13–15,18] (Table 1).

The knee brace can either be rigid, which holds the knee in extension [12,13,18], or articulated, which has stops used to set the joint range of motion [10,11,14,15]. The type of brace used varies between studies and there are few elements that suggest one model is superior to another. One study reported that a rigid hyperextension brace reduced the extension deficit after 3 months [18]. All of the published brace studies involved ACL repairs done with the middle third of the patellar tendon [10,12–16,18]. No study has assessed the benefit of using a brace after ACL reconstruction with a hamstring graft, which is now one of the most common methods [21] (Table 1). Also, comparative clinical studies on this topic have limitations related to sample size and the study population [10,12–16,18] (Table 1). Because of this, the effect of wearing a brace on the retear rate of the graft is not known.

The goal of our study was to compare the effect of wearing a rigid brace, an articulated brace or no brace at all on the clinical outcomes and complications during the early postoperative inpatient rehabilitation phase of athletes who have undergone isolated ACL reconstruction.

2. Patients, materials and methods

In this study, three groups of athletic patients were followed clinically during their initial postoperative rehabilitation phase performed at a specialized national reference center. They were separated into groups based on whether they wore a rigid brace, an articulated brace or no brace after ACL reconstruction.

2.1. Patients

We carried out a retrospective study using a patient database from a single hospital facility. It contained information on adult patients who were admitted to a hospital specialized in orthopedic rehabilitation between 1 February 2008 and 30 October 2010. This tertiary referral hospital is a government-registered facility that cares for regional, national and international level athletes who are part of a sports federation, along with sports professionals such as coaches, athletes in the armed forces and physical education teachers.

The included patients were admitted to the hospital for early postoperative rehabilitation (D0–D45) after primary isolated ACL reconstruction. This ACL reconstruction was done arthroscopically

and performed under general or regional anesthesia. The techniques used were 2-tunnel or 4-tunnel hamstring graft harvested from the gracilis and semitendinosus (GST), or a bone-tendon-bone graft taken from the patellar tendon. Patients with meniscus or cartilage damage that was addressed during the same procedure were also included. These lesions have no effect on the short-term postoperative clinical symptoms [22,23]. For the same reason, we did not exclude patients who had a mild sprain (grade I) of the collateral ligaments.

To harmonize the postoperative course, patients were excluded if they had undergone another type of reconstruction (MacIntosh, quadriceps tendon graft, Lemaire techniques, DT4 TLS), if they specifically underwent meniscal repair, chondroplasty, or osteotomy during the same operative session, or reconstruction of other ligaments, along with those who have a history of leg surgery.

2.2. Ethical considerations

Our study was performed in accordance with good clinical practices and followed the ethical recommendations of the Helsinki declaration. It was approved by the institutional review board at our facility (CPP ref. DC 2015/154).

2.3. Immobilization and rehabilitation protocol

The type of brace to be used was determined by the surgeon. There were three options: Zimmer-type rigid brace, articulated brace or no brace. The brace was worn during the immediate postoperative period. It was worn continuously during the first 3 weeks, and then upon waking, but not during the rehabilitation session, for the remainder of the protocol. The rigid brace was set at 0° extension. The amplitude of the articulated braces was 0 to 90° during the first 3 weeks, then 0 to 120°. The brace was removed before the final evaluation if quadriceps locking had been achieved.

All of the athletes followed the same postoperative rehabilitation protocol [4,24,25]. This was an accelerated protocol [26,27], started early on, with multiple progressive daily sessions. Upon the patient's admission, they received education about their treatment. This consisted of an information session about ACL surgery and its outcomes, the goals of rehabilitation (primary and future) and the potential complications, with emphasis on preventing them [25].

2.4. Assessments

The data was collected by physical medicine and rehabilitation specialists and sports medicine specialists. It was captured on a computer system in a database with the SURGICA software (Medialog, Mérignac, France).

Table 1

Comparative studies on postoperative knee brace after ACL reconstruction.

| Study | Patients | Surgery | Methods | Follow-up | Results |
|------------------------------|----------|---------|--|---------------------|---|
| Brandsson et al., 2001 [10] | 50 | BPTB | RCT, no specified A 3 w/ø | 2 w, 6 m, 24 m | NS but higher VAS in group ø at 2 w |
| Feller et al., 2002 [11] | 40 | BPTB | RCT, A 6 w/ø | 4 m | NS |
| Harilainen et al., 2006 [16] | 60 | BPTB | RCT, R 3 w then A from 3 w at 3 m/ø | 1, 2, 5 y | NS |
| Karthus et al., 1997 [12] | 78 | BPTB | Prospective controlled trial, R 6 w/ø | 22, 28 m | NS |
| Möller et al., 2001 [13] | 62 | BPTB | RCT, R 6 w/ø | 6 m, 2 y | NS but Tegner score better in group ø at 6 m |
| Muellner et al., 1998 [15] | 40 | BPTB | RCT, 6 w A/B 6 w | 6, 12, 24, 52 w | NS but ROM better at 12 w in group B |
| Risberg et al., 1999 [14] | 60 | BPTB | RCT, A 3 m/ø | 6 w, 3, 6, 12, 24 m | More thigh atrophy in group A but better Cincinnati score |
| Mikkelsen et al., 2003 [18] | 54 | BPTB | Prospective controlled trial, R (0°)/R (–5°) | 3 m | Less extension deficit in group R (–5°) |

ø: no brace; R: rigid brace; A: articulated brace; B: neoprene bandage applied just under patella; w: week; m: month; NS: no significance; y: year; ROM: range of motion; RCT: randomized controlled trial; BPTB: bone patellar-tendon bone graft.

Download English Version:

<https://daneshyari.com/en/article/5705983>

Download Persian Version:

<https://daneshyari.com/article/5705983>

[Daneshyari.com](https://daneshyari.com)