Acl reconstruction rehabilitation protocol pdf

A Systematic Review of Anterior Cruciate Ligament Reconstruction Rehabilitation

Part II : Open Versus Closed Kinetic Chain Exercises, Neuromuscular Electrical Stimulation, Accelerated Rehabilitation, and Miscellaneous Topics

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ABSTRACT: Anterior cruciate ligament (ACL) reconstruction is a common surgical knee procedure that requires intensive postoperative rehabilitation by the patient. A variety of randomized controlled trials have investigated aspects of ACL reconstruction rehabilitation. A systematic review of English language level 1 and 2 studies identified 54 appropriate randomized controlled trials of ACL rehabilitation. This part of the article discusses open versus closed kinetic chain exercises, neuromuscular electrical stimulation, accelerated rehabilitation, and miscellaneous topics.

[*J Knee Surg*, 2008;21:225-234.]

INTRODUCTION

Anterior cruciate ligament (ACL) reconstruction is a common procedure to allow patients to return to their former active lifestyle. Rehabilitation of the reconstructed knee is critical for the successful return to risky cutting and jumping activities. Although many of the individual aspects of ACL rehabilitation have been evaluated using randomized trials, few reviews have used an evidence-based approach to create an overall protocol for ACL rehabilitation. Previous systematic reviews were not inclusive of all possible aspects of rehabilitation (ie, bracing) and did not encompass many recently published studies.[19,22,23,30]

The goal of this systematic review is to assemble the available randomized controlled trials in ACL rehabilitation to facilitate the development of evidence-based rehabilitation protocols. This article represents the second in a 2-part systematic review.

METHODS

PubMed 1966-2005, Embase 1980-2005, and the Cochrane Controlled Trials Register were searched for ar-

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Knee Surg Sports Traumatol Arthrosc
DOI 10.1007/s00167-013-2577-x

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Quadriceps function following ACL reconstruction and rehabilitation: implications for optimisation of current practices

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Received: 9 January 2013 / Accepted: 9 June 2013

Abstract
Purpose To determine the most effective practices for quadriceps strengthening after ACL reconstruction.
Methods An electronic search has been performed for the literature appearing from January 1990 to January 2012. Inclusion criteria were articles written in English, German or Dutch with unilateral ACL-reconstructed patients older than 13 years, RCT rehabilitation programmes containing muscle strengthening, protocol described in detail and time frame of measurements reported. Quadriceps muscle strength and patient-reported outcomes were the endpoints. Included studies were assessed on their methodological quality using the CONSORT Checklist.
Results From 645 identified studies, 10 met the inclusion criteria. Seven studies found an increase in quadriceps strength after intervention programmes regardless of type of training. An eccentric exercise programme showed significantly better values for isometric quadriceps strength compared to a concentric exercise programme. The Tegner activity scale showed a significant increase in activity level for all training programmes. The Cincinnati Knee Rating System showed significant improvements in particular for the neuromuscular training group.
Conclusions The evidence from this review indicates that eccentric training may be most effective to restore quadriceps strength, but full recovery may not be achieved with current rehabilitation practices. Neuromuscular training incorporating motor learning principles should be added to strengthening training to optimise outcome measurements.
Level of evidence II.

Keywords ACL · Rehabilitation · Knee surgery · Quadriceps strength · External focus

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Published online: 28 June 2013

Introduction

Anterior cruciate ligament (ACL) ruptures are common injuries among athletes, with an estimated 250,000 ACL reconstructions performed each year in the United States [44]. Athletes who desire to participate at their pre-injury level of sport are often advised to undergo ACL reconstruction, although more recently it was recommended that conservative treatment could give satisfactory results for many patients [8, 49]. Regardless of the treatment chosen,


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Early Range of Motion and Extension

1) Passive extension of the knee by using a rolled towel. Note the towel must be high enough to raise the calf and thigh off the table. See Figure 1 on page 4.
   - Remove the knee immobilizer from your knee every 2 - 3 hours while awake
   - Position the heel on a pillow or rolled blanket with the knee unsupported
   - Passively let the knee sag into full extension for 10 - 15 minutes. Relax your muscles, and gravity will cause the knee to sag into full extension.

   This exercise can also be done by sitting in a chair and supporting the heel on the edge of a stool, table or another chair and letting the unsupported knee sag into full extension.
2) Active-assisted extension is performed by using the opposite leg and your quadriceps muscles to straighten the knee from the 90 degree position to 0 degrees. Hyperextension should be avoided during this exercise. See Figure 7:

Figure 7. Use the non-injured leg to straighten the knee

3) Passive flexion (bending) of the knee to 90 degrees. (See Figure 8 below)
   - Sit on the edge of a bed or table and letting gravity gently bend the knee.
   - The opposite leg is used to support and control the amount of bending.
   - This exercise should he performed 4 to 6 times a day for 10 minutes. It is important to achieve at least 90 degrees of passive flexion by 5 - 7 days after surgery.

Figure 8. Passive Flexion allowing gravity to bend the knee to 90 degrees

ORIGINAL ARTICLE

doi: 10.5455/medarh.2014.68.350-352

Published online: 15/10/2014
Published print: 10/2014

Med Arh. 2014 Oct; 68(5): 350-352
Received: September 20th 2014 | Accepted: October 15th 2014

The Effects of Rehabilitation Protocol on Functional Recovery After Anterior Cruciate Ligament Reconstruction

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ABSTRACT

Introduction: The use of rehabilitation protocol which corresponds to surgical technique results in optimal postoperative outcome and functional recovery of patients to a pre-injury level of activity. The aim of this paper is to show the effects of the official rehabilitation protocol in our Institute on functional recovery of patients after anterior cruciate ligament (ACL) reconstruction. **Patients and methods:** In prospective study, we evaluated 70 males after ACL reconstruction using hamstring graft. Patients were divided into two groups according to the manner of conducting the postoperative rehabilitation. Group A consisted of 35 patients that followed postoperative rehabilitation according to the rehabilitation protocol. Group B also 35 patients, which did not undergo the rehabilitation protocol. We evaluated thigh muscle circumference and modified Tegner Lysholm Score, preoperatively and postoperatively after 1,3,6 and 12 months. In the statistical analysis, the Stadentov T-test was used. **Results:** In the first postoperative month, the difference between groups in thigh muscle circumference is statistically significant ($p<0.05$).This difference between groups is statistically highly significant after 3, 6 , and 12 months postoperative ($p<0.01$). Results of the modified Tegner Lysholm Score is statistically highly significant in 1, 3 and 6 postoperative months in patients from the experimental group ($p<0.01$). **Conclusion:** The positive effects of the rehabilitation protocol results in significant increase of the thigh muscle circumference and faster functional recovery of patients after ACL reconstruction.

Key words: rehabilitation protocol, anterior cruciate ligament, reconstruction.

1. INTRODUCTION

Anterior cruciate ligament ruptures are the knee's most commonly diagnosed sport injuries (1). Reconstruction is the method of choice in treatment of anterior cruciate ligament rupture for young, functional and sports active population (2). Rigorous postoperative rehabilitation is necessary for a successful surgical outcome. Current trend in rehabilitation after anterior cruciate ligament reconstruction suggest "aggressive" or "accelerated" exercise protocols (3, 4, 5, 6). The use of rehabilitation protocol which corresponds to surgical technique results in optimal postoperative outcome and functional recovery of patients to a pre-injury level of activity. The ideal rehabilitation program is based on biological and mechanical knowledge of the ligament (3). Despite a huge amount of research articles on this topic, a rehabilitation standard still has not been established, due to the complexity of this problem (7).

Aim of this work is to show the effects of the official rehabilitation protocol in our Institute on functional recovery of patients after anterior cruciate ligament reconstruction.

2. PATIENTS AND METHODS

This paper covers 70 males which have undergone arthroscopic assisted ACL reconstruction using hamstring graft. It is a prospective study that lasted from 2009 until 2013. Patients were divided into two groups according to the manner of conducting the postoperative rehabilitation. All patients have a similar rehabilitation program during hospitalization. After discharge, rehabilitation program had significant differences between compared groups. Group A, consisted of 35 men, average age of 27 that followed postoperative rehabilitation according to the rehabilitation protocol. As well as group B 35 men average age of 27 that did not undergo the rehabilitation protocol.

Group	Number of subjects	Male	Female	Mean/Age	Standard deviation	Coefficient of variation
A	35	35	0	26,77	3,37	0,27
B	35	35	0	26,97	7,23	0,27
Total	70	70	0			

Table 1. Structure of groups A and B

The rehabilitation protocol in group A consisted of cryotherapy, neuromuscular electrostimulation for eight postoperative weeks, mobilization exercise, stretching

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