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Review

Outpatient versus inpatient anterior cruciate ligament reconstruction: A systematic review with meta-analysis

Deisi Ferrari ^{a,b,*}, Thiago J.A. Lopes ^{c,d}, Paulo F.A. França ^c, Fábio M. Azevedo ^e, Evangelos Pappas ^c

^a University of São Paulo, Post-Graduation Program Interunits Bioengineering EESC/FMRP/IQSC-USP, São Carlos, Brazil

^b CAPES Foundation, Ministry of Education of Brazil, Brasília, DF 70.040-020, Brazil

^c Discipline of Physiotherapy, Faculty of Health Sciences, The University of Sydney, Sydney, Australia

^d Research Laboratory of Exercise Science, The Brazilian Navy, Rio de Janeiro, Brazil

^e University of São Paulo State, School of Science and Technology, Physical Therapy Department, Presidente Prudente, Brazil

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ABSTRACT

Background: Efforts to reduce the financial costs related to anterior cruciate ligament reconstruction (ACLR) include reducing the length of hospitalization of the patient undergoing ACLR. However, it is unclear if inpatient and outpatient ACLR differ in terms of safety, satisfaction, costs and clinical outcomes.

Aim: To systematically review and synthesize the literature that directly compared costs and outcomes after outpatient and inpatient ACLR.

Methods: Studies that directly compared outcomes of inpatient and outpatient ACLR were retrieved via searches in MEDLINE, EMBASE, CINAHL, AMED, Cochrane, SPORTDiscus, Web of Science and SCOPUS databases. Random effects meta-analysis and descriptive analysis were performed for relevant outcomes.

Results: Costs analysis suggests that outpatient ACLR may be a cost effective procedure with savings ranging from \$1371 to \$7390. There were no differences for systemic and local complications $p = 0.64$ (odds ratio 1.65, 95% confidence interval 0.20 to 13.49) and $p = 0.72$ (0.81, 0.26 to 2.56) respectively, or pain in the second and seventh days after surgery, $p = 0.78$ (mean difference -0.16 ; 95% confidence interval -1.28 to 0.96) and $p = 0.44$ (0.48, -0.75 to 1.71), respectively. However, the outpatient group had less pain than the inpatient group in the first and third days after surgery, $p = 0.0001$ (-0.39 , -0.57 to -0.21) and $p = 0.0001$ (-0.39 , -0.39 to -0.20), respectively. Descriptive analysis revealed that the outpatient group experienced similar or better satisfaction, strength and knee function compared to the inpatient group.

Conclusion and key findings: Complications, pain, satisfaction, knee function and strength are similar or better after outpatient compared to inpatient ACLR. Furthermore, cost savings may be achieved with outpatient ACLR. However, included studies presented low methodological quality and the quality of evidence was very low, so these results need to be confirmed by future studies.

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Abbreviations: ACLR, anterior cruciate ligament reconstruction; ACL, anterior cruciate ligament; MD, mean difference; OR, odds ratio; CI, confidence interval; PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses; VAS, Visual Analogue Scale; PSQ, Patient Satisfaction Outcome Questionnaire; IKDC, International Knee Documentation Committee.

* Corresponding author at: Rua Florianópolis, 23, apto 11, Presidente Prudente, SP 19023-510, Brazil.

E-mail addresses: deisiferrari@hotmail.com, deisiferrari@usp.br (D. Ferrari), tjam7956@uni.sydney.edu.au (T.J.A. Lopes), paulofermando82@hotmail.com (P.F.A. França), micolis@uol.com.br (F.M. Azevedo), evangelos.pappas@sydney.edu.au (E. Pappas).

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1. Introduction

Anterior cruciate ligament (ACL) injury is one of the most commonly studied musculoskeletal injuries within orthopaedic practice. The subsequent knee instability is frequently managed by ACL reconstruction (ACLR), so that patients have a better chance to return to their previous physical activity level. The incidence of ACLR has increased dramatically in recent years, rising from 86,687 in 1994 to 129,836 in 2006 in the USA [1]. In France, approximately 42,000 ACLR were performed in 2013 [2] while in Australia more than 10,000 ACLR take place every year with an increase of 14% from 2003 to 2008 [3]. In Brazil, the number of ACLR has increased by 64% from 2008 to 2014 [4].

Efforts to reduce the financial costs related to ACLR include reducing the length of hospitalization for patients. Medical advances such as improvement in surgical procedure and pain control, allow the patient to be discharged on the same day after surgery. The incidence of outpatient surgery for ACLR has increased significantly from 57.3% in 1997 to 95.1% in 2006 in the USA [5]. The rate of outpatient ACLR procedures increased by 300% between 1994 and 2007, while inpatient procedures decreased by 70.6% between 1994 and 2006 [6]. While in the USA there is a strong shift away from inpatient and towards outpatient ACLR, in the English NHS (National Health Service) only 20% of ACLR are performed in outpatient settings [7]. Similarly low rates of outpatient ACLR are also observed in Germany, Austria and Brazil [8,9]. Even within the Scandinavian countries there is wide variability; only 38% of ACLR take place in outpatient settings in Norway while in Denmark it reaches 79% [10].

Several individual studies have investigated cost and outcomes after inpatient and outpatient ACLR [11–13]. Insurance companies, patients with ACL deficiency, orthopaedic surgeons, and physical therapists have great interest in knowing if there are any differences between the two procedures in terms of safety and outcomes. Considering the wide variation among countries, it is currently unclear if one procedure is superior and safer because a systematic review that could provide these answers does not currently exist. Synthesizing the findings about complications, pain, function, satisfaction and costs of inpatient and outpatient ACLR is imperative to provide guidelines that will allow stakeholders to make informed decisions. Thus, the purpose of this study was to systematically review the literature that directly compared outpatient and inpatient surgery for ACLR in terms of costs and outcomes such as complications, pain, function, patient satisfaction and isokinetic torque after. Our hypothesis was that outpatient and inpatient groups would have similar outcomes and outpatient ACLR would be a cost effective procedure with large savings.

2. Methods

2.1. Protocol and registration

This systematic review with meta-analyses was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines and the protocol has been registered at PROSPERO (CRD42015024990 – http://www.crd.york.ac.uk/prospero/display_record.asp?ID=CRD42015024990).

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