

ANATOMIC ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

aspects of surgical technique

Akademisk avhandling

Akademisk avhandling som för avläggande av medicine doktorsexamen vid Sahlgrenska akademien vid Göteborgs Universitet kommer att offentliggöras i Hörsal Arvid Carlsson, Academicum, Medicinargatan 3, Göteborg, fredagen den 13 maj 2016, klockan 09.00

av **Neel Desai** Leg. läkare

Fakultetsopponent:
Docent Björn Engström

Capio Arthro Clinic, Institutionen för molekylär medicin och kirurgi, Centrum för idrottskadeforskning och Utbildning (CIFU), Karolinska Institutet, Stockholm

This thesis is based on the following papers:

- I. **Anatomic single- versus double-bundle ACL reconstruction: a meta analysis**
Desai N, Björnsson H, Musahl V, Bhandari M, Petzold M, Fu FH, Samuelsson K
Knee Surgery, Sports Traumatology, Arthroscopy. 2014; 22(5): 1009-1023
E-published 2013 Dec 17
- II. **A systematic review of single- versus double-bundle ACL reconstruction using the anatomic anterior cruciate ligament reconstruction scoring checklist**
Desai N, Alentorn-Geli E, van Eck CF, Musahl V, Fu F, Karlsson J, Samuelsson K
Knee Surgery, Sports Traumatology, Arthroscopy. 2016; 24(3): 862-872
E-published 2014 Oct 26
- III. **Comparison of anatomic double- and single-bundle techniques for anterior cruciate ligament reconstruction using hamstring tendon autografts: a prospective randomized study with 5-year clinical and radiographic follow-up**
Kariis I, Desai N, Serner N, Rostgard-Christensen L, Kartus J
The American Journal of Sports Medicine
E-published 2016 Mar 6, doi:10.1177/0363546515626543
- IV. **Revision surgery in anterior cruciate ligament reconstruction - A cohort study of 17,682 patients using the Anatomic Anterior Cruciate Ligament Reconstruction Scoring Checklist applied to the Swedish National Knee Ligament Register**
Desai N, Andernord D, Sundemo D, Alentorn-Geli E, Musahl V, Fu F, Forsblad M, Karlsson J, Samuelsson K
Manuscript

Göteborg 2016



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Neel Desai

Department of Orthopaedics, Institute of Clinical Sciences
Sahlgrenska Academy at the University of Gothenburg
Gothenburg, Sweden, 2016

Abstract

Anatomic anterior cruciate ligament (ACL) reconstruction is a concept that has gained in interest and it aims to more effectively restore native ACL anatomy and function. Despite extensive research on the topic, the optimal surgical technique to accomplish this is still the subject of debate.

Study I is a meta-analysis to determine whether anatomic double-bundle (DB) reconstruction compared with anatomic single-bundle (SB) reconstruction more effectively restores knee laxity, and reduces rates of graft failure. A total of 15 studies were included for analysis. The results revealed significantly less antero-posterior (AP) laxity after anatomic DB reconstruction. No statistically significant differences were seen between anatomic DB and SB techniques in terms of the pivot-shift test, Lachman test, anterior drawer test, total knee rotation or graft failure rates.

Study II is a systematic review including the implementation of the Anatomic Anterior Cruciate Ligament Reconstruction Scoring Checklist (AARSC) on studies comparing SB and DB reconstruction in order to evaluate the reporting of surgical details, and the degree to which these clinical studies fulfil the criteria of anatomic ACL reconstruction. Seventy-seven studies were included. Details of the surgical techniques used were more thoroughly reported for DB reconstructions than for SB reconstructions. There was substantial underreporting of surgical data for both the SB and DB groups in clinical studies.

Study III is a prospective randomised clinical trial comparing the outcomes of the anatomic DB technique and anatomic SB technique using hamstrings tendon autograft. A total of 105 patients were randomised and underwent ACL reconstruction. At five-year follow-up, no statistically significant differences were found between the groups in terms of subjective or objective outcomes, or in terms of the presence of osteoarthritis (OA).

Study IV is a cohort study with data from the Swedish National Knee Ligament Register with the focus on the risk of revision ACL surgery. A total of 17,682 patients were included. Surgical details pertaining to their primary ACL reconstruction were collected via an online questionnaire comprised of items from the AARSC, distributed to the surgeons. Non-anatomic bone tunnel placement via transtibial drilling resulted in the lowest risk of revision surgery. Non-anatomic surgical techniques in general were associated with a lower risk of revision. Anatomic techniques utilising several pertinent items from the AARSC were associated with a lower risk of revision compared with anatomic techniques utilising only some items.

Keywords: Knee, Anterior Cruciate Ligament, Anatomic, Reconstruction, Double-Bundle, Single-Bundle, Laxity, Register, Score, AARSC, Graft Failure, Revision, Outcome

ISBN 978-91-628-9625-6 (print) correspondence to:
ISBN 978-91-628-9626-3 (pdf) neel@desai.nu
<http://hdl.handle.net/2077/41829>



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