

Over 50, 000 Patients Analyzed for Demographic Data, Surgical Trends, and Patient-Related Outcome Preoperatively and at 5- and 10-Year Follow Ups – A Review of the Swedish National Knee Ligament Register

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INTRODUCTION: As anterior cruciate ligament (ACL) injuries often occur in young athletes and increase the risk in lower activity and future osteoarthritis, evaluation of the surgical treatment and patient-related outcome (PROs), both short- and long term is important. The purpose of this study was to perform an overall analysis of the patients included in the Swedish National Knee Ligament Register (SNKLR) for demographic data, surgical methods and PROs preoperatively and at 5- and 10-year follow up for primary ACL reconstructions (ACLR), revisions and contralateral reconstructions (CACLR). The main hypothesis was that patients undergoing revisions have worse PROs than the ACLR group, however less at 10 years compared to 5 years. Furthermore, that concomitant injuries and smoking affect the PROs negatively in all groups.

METHODS:

All patients > 16 years of age who were registered for ACLR, revision or CACLR in the SNKLR between 2005 and 2021 were included. For revision and CACLR, the index surgery had to be registered to be included. The follow up related only to the latest surgery. Severe concomitant injuries such as nerve- and multi-ligament injuries were excluded. Trends regarding activity at injury, time from injury to surgery, graft choice, and fixation methods for tibia and femur were analyzed. PROs consisted of the KOOS score and was analyzed in each group and in subgroups based on sex, smoking, graft choice, and concomitant injuries (meniscal- and chondral). For statistical analyses t-test and chi-square test were used and the p-value set to < 0.05. Minimal clinical important difference (MCID) was set to 8-10 points (pts).

RESULTS:

A total of 52,199 patients were included and analyzed. The mean age for ACLR was 27.9- and 26.7 years for males and females respectively, mean age for revisions and CACLR was 25.2 and 27.1 years respectively. The most common activity at injury was soccer (47.1%) and males more often than females were injured in contact sports (69.0% vs. 53.4%, p-value <0.001). The mean time between injury to surgery was 591 days. In the register, 5.2% M and 5.5% F underwent revision, while 4.4% M and 5.2% F underwent CACLR. Males suffered significantly more concomitant injuries than females in the ACLR group (59.8% vs. 40.2%, p < 0.001).

For ACLR, 86.7% of all grafts were hamstring tendon, while patellar- (BPTB) and quadriceps tendon accounted for 7.0% and 5.9% respectively. Correspondingly, the most common fixation method in the femur in 2005-2007 was trans-fixation (57.4%), whereas this method accounted for 0% in 2020-2021. Instead, cortical button fixation gained popularity, and in 2020-2021 was used in 85.6% of the cases. Fixation method in the femur for hamstring tendon grafts was cortical button in 90.8% in 2020-2021 vs. 20.3% in 2005-2007.

Metal screw fixation in the femur was the most common method used for BPTB grafts for the whole period, however button fixation increased and was used for 16.3% in 2020-2021 vs. 3.6% in 2005-2007.

For primary ACLR, significant differences in favor of males were seen preoperatively for all KOOS subscores (p= 0.004), at 10 years this was only seen for sports/rec (p<0.001). Smokers had lower KOOS at all follow ups and at 10 years MCID was found for pain and sports/rec (8, 14 pts, p<0.001). Concomitant injuries had lower KOOS than isolated ACL injuries on every follow-up occasion (p<0.001).

For revisions, lower scores were found for symptoms, pain, and sport/rec preoperatively for females compared to males (p=0.03); this difference was not found during follow ups. Smoking rendered lower PROs preoperative and at 5 years (p=0.04), but not at 10 years. Those with concomitant injuries had significantly lower KOOS preoperatively, except for pain, (p=0.02), although this was not seen at 5 years. At 10 years, symptoms and QoL were lower (p=0.048).

For CACLR, significant differences between sexes were seen only preoperatively (p=0.01) in favor of males. Hamstring- and BPTB grafts showed no significant difference preoperatively in terms of KOOS, however at 5 years symptoms and sports/rec had significantly lower scores for BPTB grafts (p=0.04). At 10 years the corresponding was found for sports/rec and QoL (p=0.04). Those with concomitant injuries scored significantly lower in all subscores preoperatively and at 5 years (p=0.03) and at 10 years in all scores, except QoL (p<0.001).

When comparing ACLR and revisions, statistical differences in favor of ACLR were seen for all KOOS subscores on all occasions. At 5- and 10 years MCID was reached for symptoms, sports/rec and QoL (p=0.003, 8-15 and 8-17 pts respectively).

Comparing ACLR and CACLR, lower scores were seen for both hamstring tendon- and BPTB grafts (for CACLR) at 5- and 10-years in most subscores (p=0.003) and MCID was found for BPTB grafts used in CACLR for all subscores at 10 years except ADL (10-18 pts).

DISCUSSION AND CONCLUSION:

The PROs for revision are still worse at 10 years compared to the other groups. Smoking and concomitant injuries are prognostic factors for worse outcomes both at 5 and 10 years.