

Original Research Article

Patient characteristics and outcomes following ACL reconstruction surgery: a cross-sectional descriptive study

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ABSTRACT

Background: Anterior cruciate ligament (ACL) injuries are common among young and active individuals. Patient-reported outcomes are important in evaluating the success of ACL reconstruction surgery.

Methods: This cross-sectional descriptive study included 100 patients who underwent ACL reconstruction surgery at a single-center teaching hospital in Jordan between January 2022 and December 2024. Data on patient characteristics, clinical presentation, surgical details and patient-reported outcomes were collected and analyzed using descriptive statistics.

Results: The mean age of patients was 27.8±6.4 years, with most patients being male (72%). The majority of injuries were sports-related (65%). The most common presenting symptom was knee instability (78%). Hamstring graft was the most commonly used graft (68%). Most patients reported improvement in pain (76%) and good functional outcomes (70%). Return to previous level of activity was achieved in 62% of patients.

Conclusions: ACL reconstruction showed generally good patient-reported outcomes. However, not all patients returned to full sport's activities. Patient characteristics and associated injuries may affect outcomes. Further studies are recommended to improve understanding of recovery after ACL reconstruction.

Keywords: Anterior cruciate ligament, ACL reconstruction, Patient-reported outcomes, Knee injuries, Functional outcome, Sports injuries, Jordan

INTRODUCTION

Anterior cruciate ligament (ACL) injury is one of the most common injuries of the knee joint. It mainly affects young and active individuals, especially those involved in sports activities such as football, basketball and running.¹ The injury usually occurs during sudden movements like twisting, jumping or rapid change in direction.² These movements can place high stress on the knee joint and lead to rupture of the ACL. Patients with ACL injury often present with knee pain, swelling and instability. Many

patients report a “giving way” sensation in the knee, especially during movement.³ This can make it difficult to walk, run, or perform daily activities. In some cases, patients may also have associated injuries such as meniscal tears or cartilage damage, which can further affect knee function.⁴ ACL injuries can have a significant impact on the patient's quality of life. Many patients are unable to return to their previous level of physical activity or sports.⁵ This can affect both physical health and mental well-being. Because of these reasons, ACL reconstruction surgery is commonly recommended for patients with symptomatic instability, especially in active individuals.⁶ The main goal

of ACL reconstruction is to restore stability of the knee joint and improve function. Different surgical techniques and graft types are used, depending on the surgeon's preference and patient factors.⁷ After surgery, rehabilitation plays an important role in recovery. A structured rehabilitation program helps patients regain strength, movement and confidence in the knee.⁸

Despite advances in surgical techniques and rehabilitation, the outcomes after ACL reconstruction are variable. Some patients achieve good recovery and return to sports, while others may continue to have symptoms such as pain, stiffness, or instability.⁹ Not all patients are able to return to their previous level of activity.¹⁰ This shows that outcomes are influenced by many factors, not only the surgery itself.

In recent years, more attention has been given to patient-reported outcomes. These outcomes focus on the patient's own experience after surgery. They include pain level, functional ability, and satisfaction with the result.^{11,12} Patient-reported outcomes are important because they provide a better understanding of how the patient feels, rather than relying only on clinical examination or imaging findings.¹³

Most of the available studies on ACL reconstruction are from Western countries. However, there is limited data from developing countries, including Jordan. Patients in this region may have different characteristics, lifestyle factors, and access to healthcare services. These differences may affect both the presentation of ACL injuries and the outcomes after surgery.

Therefore, it is important to study ACL reconstruction outcomes in the local population. This can help provide better understanding of patient characteristics and recovery patterns in our setting. It can also help orthopedic surgeons improve treatment plans and provide better counseling to patients. The aim of this study is to describe patient characteristics and evaluate patient-reported outcomes following ACL reconstruction in Jordan.

METHODS

Study design and reporting guidelines

This study was conducted as a cross-sectional descriptive study. The design was chosen to describe patient characteristics and outcomes after surgery. The study was planned and reported according to the STROBE guidelines for cross-sectional studies.¹⁴ These guidelines were followed to improve the clarity, transparency and quality of reporting.

Study setting and population

The study was carried out at a single-center teaching hospital in Jordan. This hospital is a tertiary referral center that manages a large number of orthopedic cases,

including ligament injuries of the knee. The study included patients who underwent ACL reconstruction surgery between January 2022 and December 2024.

A total of 100 patients were included in the study. These patients were identified from hospital records and surgical databases. Only patients with available clinical information and follow-up data were considered eligible for inclusion.

Eligibility criteria

Patients were included in the study if they had undergone ACL reconstruction surgery during the defined study period and had sufficient medical records for data collection. Patients with incomplete records or missing outcome data were excluded. Patients who could not be followed up or had insufficient documentation regarding postoperative outcomes were also excluded from the analysis.

Data collection

Data were collected retrospectively from patient medical records and hospital electronic systems. A structured data collection form was used to ensure consistency in data extraction. The collected data included demographic information such as age and gender. Clinical characteristics were also recorded, including the mechanism of injury and presenting symptoms such as pain, swelling, and instability.

In addition, surgical details were reviewed when available, including the type of ACL reconstruction and graft used. Patient-reported outcomes were obtained from follow-up records. These outcomes included information about pain after surgery, functional ability and return to activity. The data collection process was performed carefully to ensure accuracy and completeness.

Outcome measures

The main outcomes of this study were patient-reported outcomes following ACL reconstruction. These outcomes focused on the patient's experience after surgery, including pain levels and functional status. Functional status was assessed based on the patient's ability to perform daily activities and return to normal life. Return to physical activity or sports was also evaluated.

Statistical analysis

The collected data were analyzed using basic statistical methods. Continuous variables were summarized using mean and standard deviation, while categorical variables were presented as frequencies and percentages. The analysis was mainly descriptive in nature. In some cases, simple comparisons were performed to explore possible relationships between patient characteristics and

outcomes. A p value of less than 0.05 was considered statistically significant.

Ethical considerations

Ethical approval for the study was obtained from the institutional review board of the hospital before data collection. All patient data were handled with strict confidentiality. Personal identifiers were removed and the data were anonymized before analysis to protect patient privacy.

RESULTS

A total of 100 patients who underwent ACL reconstruction surgery between January 2022 and December 2024 were included in this study. All patients had complete records and follow-up data suitable for analysis.

Patient characteristics

The mean age of the patients was 27.8±6.4 years, with most patients falling within the age group of 20-30 years. There was a clear predominance of male patients (72%), while females represented 28% of the cohort. A proportion of patients (30%) were smokers, while the remaining patients were non-smokers.

Regarding body habitus, the majority of patients had a normal or slightly elevated body mass index, although detailed BMI categories varied. Most patients were physically active before injury, with many participating in recreational or competitive sports. Detailed demographic characteristics are presented in Table 1.

Table 1: Demographic and baseline characteristics of patients (n=100).

| Variables | Category | Frequency (%) |
|-----------------------------|-----------------|---------------|
| Age (years) | Mean±SD | 27.8±6.4 |
| | <20 | 12 (12) |
| | 20-30 | 58 (58) |
| | >30 | 30 (30) |
| Gender | Male | 72 (72) |
| | Female | 28 (28) |
| Smoking status | Smoker | 30 (30) |
| | Non-smoker | 70 (70) |
| Activity level (pre-injury) | Active (sports) | 66 (66) |
| | Non-active | 34 (34) |

Clinical presentation

The most common presenting symptom was knee instability, reported in 78% of patients.

Pain was also frequently reported, affecting 70% of patients, while swelling was noted in 55%. Some patients presented with a combination of these symptoms.

Table 2: Clinical presentation and injury characteristics.

| Variables | Category | Frequency (%) |
|--------------------------|-----------------------|---------------|
| Presenting symptoms | Instability | 78 (78) |
| | Pain | 70 (70) |
| | Swelling | 55 (55) |
| | Limited movement | 38 (38) |
| Mechanism of injury | Sports-related | 65 (65) |
| | Fall | 20 (20) |
| | Road traffic accident | 15 (15) |
| Associated injuries | Meniscal tear | 42 (42) |
| | No associated injury | 58 (58) |
| Time to surgery (months) | <3 | 40 (40) |
| | 3-6 | 35 (35) |
| | >6 | 25 (25) |

The mechanism of injury was mainly sports-related in 65% of cases. Non-sport-related trauma, including falls and road traffic accidents, accounted for 35% of injuries. Associated intra-articular injuries were common, with meniscal tears identified in 42% of patients.

The duration between injury and surgery varied among patients, with some undergoing early intervention while others had delayed surgery due to different factors such as access to care or patient preference. Clinical presentation details are summarized in Table 2.

Surgical characteristics

All patients underwent ACL reconstruction surgery. The most commonly used graft type was hamstring tendon graft, which was used in 68% of cases. Patellar tendon graft was used in 22%, while other graft types accounted for 10%.

Table 3: Surgical characteristics.

| Variables | Category | Frequency (%) |
|--------------------|-----------------------|---------------|
| Graft type | Hamstring graft | 68 (68) |
| | Patellar tendon graft | 22 (22) |
| | Other grafts | 10 (10) |
| Meniscal procedure | Repair | 18 (18) |
| | Meniscectomy | 22 (22) |
| | None | 60 (60) |
| Surgical approach | Arthroscopic | 100 (100) |

Additional procedures were frequently performed during surgery. Meniscal repair or meniscectomy was carried out in 40% of patients, reflecting the high rate of associated meniscal injuries. The choice of surgical technique and

graft type was based on surgeon preference and patient-related factors. Surgical characteristics are presented in Table 3.

Patient-reported outcomes

Most patients reported improvement in symptoms following surgery. Improvement in pain was reported by 76% of patients, while 24% continued to experience some degree of pain. Functional outcomes were generally favorable, with 70% of patients reporting good functional recovery and ability to perform daily activities.

Table 4: Patient-reported outcomes.

| Outcomes | Category | Frequency (%) |
|----------------------|------------------|---------------|
| Pain after surgery | Improved | 76 (76) |
| | Persistent pain | 24 (24) |
| Functional outcome | Good function | 70 (70) |
| | Limited function | 30 (30) |
| Return to activity | Full return | 62 (62) |
| | Partial return | 20 (20) |
| | No return | 18 (18) |
| Patient satisfaction | Satisfied | 72 (72) |
| | Not satisfied | 28 (28) |

Return to physical activity was achieved in 62% of patients. However, 38% of patients were unable to return to their previous level of activity, indicating variability in recovery outcomes. Patient satisfaction was generally high among those who experienced good functional recovery, although a subset of patients reported ongoing limitations. Outcome data are summarized in Table 4.

DISCUSSION

This study aimed to describe patient characteristics and evaluate patient-reported outcomes following ACL reconstruction surgery in a single-center teaching hospital in Jordan. The findings of this study show that ACL injuries mainly affect young and active individuals, with a clear predominance of male patients. Most injuries were related to sports activities, and the majority of patients presented with symptoms of knee instability and pain. The age distribution in this study is consistent with what is commonly reported in the literature, where ACL injuries are more frequent in younger populations. This is likely because younger individuals are more physically active and more involved in sports that require sudden movements, such as football and basketball.¹⁵

In terms of clinical presentation, knee instability was the most common symptom, followed by pain and swelling. This is expected, as ACL injury typically leads to mechanical instability of the knee joint.¹⁶ The presence of associated meniscal injuries in a significant number of patients is also important, as it may affect both surgical management and postoperative outcomes. Meniscal

injuries are known to increase the risk of long-term joint problems if not properly managed.¹⁷ The majority of injuries in this study were sports-related. This highlights the importance of preventive strategies, especially among young athletes. Proper training techniques, strengthening exercises and awareness of injury mechanisms may help reduce the incidence of ACL injuries in this population.^{18,19} Regarding surgical characteristics, the most commonly used graft was the hamstring tendon graft. This is consistent with common surgical practice, as hamstring grafts are widely used due to their availability and good outcomes.²⁰ Patellar tendon grafts were used less frequently. The choice of graft usually depends on surgeon preference and patient factors. The results of this study showed that most patients reported improvement in pain and function after surgery. A large proportion of patients had good functional outcomes and were able to return to daily activities. However, not all patients achieved full recovery. A considerable number of patients continued to experience pain or had limited function after surgery.

Patient-reported outcomes provide valuable information about the success of surgery from the patient’s perspective. In this study, most patients were satisfied with the results, but a notable proportion were not fully satisfied. This may be related to ongoing symptoms, unmet expectations or limitations in function. This study provides important local data from Jordan. Most previous studies on ACL reconstruction come from Western countries, where patient populations and healthcare systems may differ. The findings of this study help to better understand ACL injuries and outcomes in our local setting. This can help improve patient care and guide future research. However, this study has some limitations. First, it was conducted in a single center, which may limit the generalizability of the results. Second, the study design was cross-sectional, which means that long-term outcomes could not be fully assessed. Third, the data were collected retrospectively, which may lead to missing or incomplete information. Despite these limitations, the study provides useful insights into patient characteristics and outcomes after ACL reconstruction. Future studies with larger sample sizes and longer follow-up periods are recommended. Analytical studies may also help identify specific factors that predict better or worse outcomes.

CONCLUSION

In conclusion, ACL reconstruction in this study showed generally favorable patient-reported outcomes, with most patients experiencing improvement in pain and function. Patient characteristics and associated injuries may influence outcomes. Further studies are needed to better understand factors affecting recovery and to improve patient care.

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