

# Is anterior cruciate ligament reconstruction necessary for the non-sporting population?

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## Abstract

**Background:** Anterior cruciate ligament injury (ACL) is a common injury in both sporting and non-sporting population. All patients with an ACL injury may not require surgery. The criteria for deciding whether a reconstruction should be performed are not absolute and the trend is to offer reconstruction to the sporting population as they require a stable knee to perform in their line of work. The non-sporting population also require a stable knee to perform their daily activities.

**Objectives:** To assess functional outcome in the non-sporting patients following reconstruction.

**Methods:** A prospective observational analytical study was conducted in the age group from 18 to 55 years, with symptomatic ACL injury who were not involved in sporting activities from July 2020 to December 2021. Fifty patients participated in the study. Convenience sampling technique was used. The IKDC and Lysholm scores were used preoperatively and six months post-operatively to assess the benefit of the treatment.

**Results:** Out of 50 patients, four were lost to follow up. Out of total 46 patients, 29 (63.04%) patients were male and 17 (36.96%) patients were female. The mean age of patients was  $31.61 \pm 7.38$  years. The IKDC and Lysholm scores measured preoperatively were  $47.07 \pm 7.51$  and  $52.17 \pm 7.91$  and the six-month post-operative scores were  $86.73 \pm 5.54$  and  $90.69 \pm 4.63$  respectively.

**Conclusion:** The patients from the non-sporting population who underwent ACL reconstruction had significantly improved IKDC as well as Lysholm scores compared to their function prior to the procedure.

**Key words:** Anterior cruciate ligament reconstruction; Non-sporting; Outcome.

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## INTRODUCTION

Anterior cruciate ligament (ACL) tears account for nearly 50% of knee injuries.<sup>1</sup> It is known that not all patients with ACL injury require reconstruction.<sup>2</sup> The patient selection has not been clearly defined. It is assumed that participation in contact sports are indications for reconstruction, hence is mostly offered to the sporting population.<sup>3-5</sup>

Noyes et al. reported results of rehabilitation on symptomatic ACL deficient knees but could not predict which patients would improve.<sup>6</sup> Statistical analysis showed that those who had "giving way," were at significant risk for developing arthritic changes.<sup>7</sup> ACL tears also result in instability and deficits in neuromuscular control, potentially resulting in decrease in balancing capabilities.<sup>8</sup> Numerous individuals with ACL tears, including non-sports professionals, have thus opted for ACL reconstruction, aware of the benefits of surgery.<sup>9</sup>

The ACL is a primary stabiliser of the knee.<sup>10</sup> The patients who do not play sports also perform daily activities which require a stable knee. Daily life is like contact sports in developing countries and for the population that live in the mountains.

Hence, a study was performed to assess functional outcome of non-sporting patients with symptomatic knees following ACL reconstruction.

## METHODOLOGY

A prospective observational analytical study was conducted on adult patients who presented at Kathmandu Medical College Teaching Hospital outpatient department from July 2020 to December 2021, with symptomatic ACL injury, who were not involved in sporting activities. Adult patients within the age group of 18 to 55 years were included in the study and meniscal injuries requiring partial meniscectomy or repair were included. Multi-ligamentous injuries and ACL injuries with bony avulsions were excluded. The permission to conduct the study was obtained from the Institutional Review Committee of KMC (Ref. 2506202007).

A total of 50 patients were enrolled in current study. Four patients were lost to follow up. Convenience sampling technique was used. Informed written consent was taken from all participants. After clinical assessment, an MRI of the knee was obtained and preoperative International Knee Documentation Committee (IKDC) and Lysholm score was documented prior to surgery. All patients underwent a rehabilitation program prior to surgery consisting of inflammation control, range of motion exercises, quadriceps and hamstring exercises. The patients underwent ACL reconstruction using hamstring graft.

Operative technique: The patient was placed supine and the injured limb was positioned on the ACL leg holder at 90 degrees. The knee was examined under anaesthesia and the findings were confirmed. High anterolateral and anteromedial portals were made. Diagnostic arthroscopy was performed and findings confirmed. Then the hamstring graft was harvested and prepared. The remaining ACL stump remnant was preserved. The accessory anteromedial portal was then made and the femoral aimer was used to make the femoral tunnel. The tibial tunnel was then created using the tibial jig keeping it at an angle of 50 degrees. The graft was then passed and fixed proximally with a closed loop endobutton and a biodegradable screw in the tibia. In patients having meniscal repairability was assessed. Meniscal

tears amenable to repair were repaired and partial meniscectomy was done for irreparable tears.

The patient was started on the rehabilitation program from the first post-operative day. The patient performed pelvic bridging and ankle pumps. He was mobilised with axillary crutches and taught partial to full weight bearing crutch walking. The patient was followed up at two, four, six, 12, and 24 weeks. The patient underwent suture removal at two weeks. The crutches were discarded at four weeks and brace at six weeks. The patients underwent a standard physiotherapy protocol which was supervised by qualified physiotherapists.<sup>11,12</sup>

The collected data was charted in Microsoft Excel 2013. Analysis of data was done using Statistical Package for Social Sciences (SPSS) Statistics for windows version 12.0 (SPSS Inc., Chicago, Ill., USA). The IKDC and Lysholm score was assessed preoperatively and compared six months after ACLR. The functional outcome was analysed using "paired sample t test".

## RESULTS

A total of 50 patients were enrolled in current study. Four patients were lost to follow up. Out of the 46 patients 29 (63.04%) patients were male and 17 (36.96%) patients were female. The mean age of patients in current study was  $31.61 \pm 7.38$  years (Range: 18-51 years). Twenty-four (52.17%) patients in current study sustained injury over right knee whereas 22 (47.83%) patients sustained injury over left knee. The commonest mode which lead to injury was road traffic accident (RTA) followed by fall injury (Table 1). Patients were involved in variety of occupation at the time of injury (Table 2). The most common presenting symptom was instability of knee followed by pain and locking.

Seventeen (36.96%) patients had associated meniscal tear. Seven patients had lateral meniscus injury, eight had medial meniscus injury whereas two patients had both meniscus injury. Eleven (64.71%) patients underwent meniscal repair. The mean duration from injury to day of surgery was  $14.57 \pm 27.03$  months. Functional outcome was assessed using IKDC and Lysholm score. Both of these scores were measured preoperatively and six months after the surgery. The mean IKDC score at baseline was  $47.07 \pm 7.51$  which increased to  $86.73 \pm 5.54$  at six months follow up ( $p < 0.05$ ). Similarly, the mean Lysholm score at baseline was  $52.17 \pm 7.91$  in comparison to  $90.69 \pm 4.63$  at six months follow up ( $p < 0.05$ ) (Table 3).

Four (8.69%) patients developed complications during the study. Two (4.34%) patients had hemarthrosis which

resolved with joint aspiration. One (2.17%) patient had presented with swelling at the tibial tunnel site after six months and occasional scanty discharge. The site was explored and the screw was removed and culture and sensitivity were sent which yielded no growth and the wound thereafter healed uneventfully. The second complication occurred in a patient who had undergone lateral meniscal repair using all inside implants and the patient presented at four months with a cyst corresponding to the side of repair. Exploration was done and all inside implant was seen in the cyst. The cyst was excised. The lateral meniscal tear had healed.

**Table 1: Demographic variables of patients**

Number of patients	Total	46
Gender, n (%)	Male	29 (63.04)
	Female	17 (36.96)
Age	Mean $\pm$ SD	31.61 $\pm$ 7.38 years
Involved side, n (%)	Right	24 (52.17)
	Left	22 (47.83)
Duration of injury and surgery	Mean $\pm$ SD	14.57 $\pm$ 27.038 months
	RTA	26 (56.52)
Mode of injury, n (%)	Fall	16 (34.78)
	Others	6 (13.04)
	Lateral meniscus	7 (15.22)
Associated meniscal injury, n (%)	Medial meniscus	8 (17.39)
	Both	2 (4.35)

**Table 2: Occupation of patients**

Occupation	n (%)
Student	10 (21.74)
Businessman	9 (19.56)
Farmer	7 (15.22)
Housewife	6 (13.04)
Engineer	2 (4.35)
Doctor	2 (4.35)
Teacher	2 (4.35)
Shopkeeper	2 (4.35)
Others	6 (13.04)

**Table 3: Comparison of mean preoperative and post-operative IKDC and Lysholm scores**

Measurement	Preoperative	Post-operative 6 months	p-value
IKDC score	47.07 $\pm$ 7.51	86.73 $\pm$ 5.54	<0.05
Lysholm score	52.17 $\pm$ 7.91	90.69 $\pm$ 4.63	<0.05

## DISCUSSION

The patient selection for ACL reconstruction has not been clearly defined and there are no scientifically proven absolute indications or contraindications.<sup>13</sup> The need for ACL reconstruction in sporting individuals has been accepted and practiced as a routine. There are wide differences in opinion on managing ACL injuries in the non-sporting population. Many injuries are either missed initially or managed conservatively due to the treating physician presuming that non-sporting persons do not have a significant degree of instability.<sup>14</sup> The approach to these patients needs appraisal and the norms that are used to assess them need consideration. The daily lives and professions of these patients are also demanding and in some situations daily life is like contact sports. The importance of counselling is also a matter of great focus. The counselling that is done by the physician makes a difference in the fate of the ACL injury. The history obtained and the clinical examination and methods used for assessment and the decision to label the patient a copper or non-copper are significant for the long-term prognosis of the injured knee.<sup>15</sup>

Some of the patients underwent reconstruction after three months (21 patients), 3-6 months (13 patients) and >1 year (12 patients). Delayed presentation has its detrimental effects. The incidence of meniscal injuries in present study was seen in 17 (36.96%) patients. Eleven (64.71%) patients with meniscus injury underwent repair and healed well and they were salvaged. There is an increased incidence of meniscal tears as the ACL injury becomes more chronic with an increase in medial meniscus tears. The complexity of the tears increases and the number of repairs decreases.<sup>16</sup> The results from studies demonstrate that both athletes and non-athletes are equally susceptible for long-term meniscal and cartilage injuries if ACL reconstruction is not carried out early.<sup>14</sup>

The age of the participants of current study was 31.61  $\pm$  7.38 years. This is comparable with demographics of other published studies.<sup>17,18</sup> Males were more affected compared to females (63.04%), though females have a higher risk of sustaining ACL tears due to various intrinsic risk factors, such as smaller notch size, higher Q-angle, increased foot pronation and tibial internal rotation.<sup>19</sup>

The prevalence of ACL tears among males was most likely due to the higher risk exposure among males.

The patients participating in the studies were from various professions ranging from students to businessmen to farmers to housewives and so on. This shows that the need for stability of the knee is not limited to only sports performers and ACL tears result in instability and deficiency in neuromuscular control and potentially result in decrease in balance capabilities required to perform in many professions. Numerous individuals with ACL tears, including non-sports professionals, have thus opted for ACL reconstruction, aware of the disadvantages of the ACL-deficient knee and benefits of surgery.<sup>9</sup>

The mode of injury in non-sporting general population in current study was road traffic accidents with use of two wheelers as they are a common mode of transport in Nepal. Though it has been proved by many foreign researches that injury to ACL mainly affects the sports persons and is also termed as sports injury. But some authors have found that road traffic accidents are also a major cause of ACL injury.<sup>20</sup> Current study was conducted on non-sporting individuals and RTA was the commonest cause followed by falls.

The functional outcome of the patients was assessed comparing the preoperative and post-operative six months IKDC and Lysholm scores. The comparison of the preoperative and post-operative (six months) IKDC and Lysholm scores were found to be statistically significant (<0.05). This reflects the improvement in the daily lives of the patients who were living with the compromised knee function though they were not playing sports. They were able to perform their activities with more

confidence and ease. The results of functional outcome are comparable with many other studies which have not only been restricted to non-sporting persons. Negi found in his study conducted using hamstring graft that the mean Lysholm score preoperatively was  $60.2 \pm 6.02$ , and mean Lysholm score six months after surgery was  $91.72 \pm 3.17$ .<sup>21</sup> Singh performed a study on non-athletes with ACL injury who underwent ACL reconstruction using hamstring grafts.<sup>22</sup> The mean preoperative IKDC score in their study was  $34.605 \pm 1.9784$  which when compared to the postoperative IKDC score at six months which was  $79.020 \pm 1.3073$  was found to be statistically significant.<sup>22</sup> This was similar to the finding in current study.

Current study has some limitations. The sample size in current study was small compared to other studies. A larger patient group would be preferable so that data would have been more valid and there would have been more number of patients to study further subgroups. The duration of follow-up period was only six months. A longer follow-up would be desirable to know whether the good functional outcome is retained in the long-term also.

## CONCLUSION

The functional outcome of patients from the non-sporting population following ACL reconstruction have been found to improve significantly in comparison to the preoperative functional status. The non-sporting individuals who are symptomatic should be recommended a reconstruction.

**Conflict of interest:** None

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