

## Psychological effects on Return to Sports after ACL Reconstruction



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### Introduction

The knee joint is the largest and most complicated joint in the human body.<sup>1</sup> Primary knee stabilization is achieved through knee ligaments, while muscles around the knee play a secondary role.<sup>2</sup>

The Anterior Cruciate Ligament (ACL) is an intra-articular but extra synovial collagenous structure with limited healing capacity.<sup>3</sup> ACL originates at the tibial plateau, anterior to and between the intercondylar eminences and continuous posteriorly to attach to the posterior middle portion of the lateral femoral condyle.<sup>4</sup> ACL can be divided into two functional and anatomic separate bundles: the antero-medial (AM) and the postero-lateral (PL) bundle.<sup>5</sup> Several mechanoreceptors such as Ruffini endings, Pacinian corpuscles, and Golgi tendon organs are present in the ACL.<sup>6</sup>

The role of the ACL in resisting internal tibial torque is partly due to the mechanical coupling of anterior tibial translation with this axial torque.<sup>7</sup>

Sportsmen frequently suffer from the crippling anterior cruciate ligament (ACL) injury. Both indirect as well as direct approaches may lead to it.<sup>8</sup> The several forms of tears include proximal avulsion (distal remaining length >90% of the overall ligament length; type I), proximal (75%-90%); mid-substance (25%-75%); distal (10%-25%; type IV); and distal avulsion (>10%; type V).<sup>9</sup> For further analysis, an MRI may be performed.<sup>10</sup>

Over 75% of participants undergoing ACL reconstruction within the first year of injury, include majority of subjects under the age of eighteen.<sup>11</sup> According to Webster and Feller, 84% of patients expect to be able to resume their pre-injury level of athletic activity, but just 24% of them had done so twelve months following surgery, and 15% of all patients had already made the decision to give up sports completely.<sup>12</sup>

After ACL reconstruction these individuals require long term rehabilitation to improve physical function and return to the sports they participated in before the ACL injury. Accelerated rehabilitation program has been evident in decreasing disability, depression, and pain, increasing functionality and improved quality of life.<sup>14</sup>

With reconstruction 80% patients return to sports but only 65% return to pre injury level of participation, and 55% return to competitive sports. Multiple studies have investigated 3 different factors associated with an individual decision to return to pre injury sports level. Some of them are demographic factors, physical impairment, functional and psychosocial measures.<sup>12</sup> Emotion, confidence and risk appraisal in combination representing psychological readiness, contribute to ability to return to sports after reconstruction. An ACL-RSI scale was developed to quantify the state of psychological readiness during recovery after injury and reconstruction. The ACL-RSI score of the patient after reconstruction is related to whether the individual can return to their sport. Lower ACLRSI scores have been associated with the occurrence of secondary injuries after ACL reconstruction. Information about specific factors of physical function that contributes to psychological readiness is needed to plan the rehabilitation for returning to sport. ACL-RSI score of athletes aiming to return to sports six months after reconstruction was affected by symmetry of lateral single leg hop. For patients undergoing ACL repair, identifying specific pre-injury, pre-surgery, and post-operative characteristics may predict return to pre-injury sports.<sup>13</sup>

### Material and Method

#### Study Period

October 2022- September 2023

#### Study Subjects

Sports persons undergoing ACL reconstruction

#### Sampling Criteria

##### Inclusion Criteria

1. Subjects in the age group of 18-30 years were included in the study.
2. Subjects with evidence of ACL tear on MRI.
3. Subjects who have undergone ACL reconstruction surgery.

##### Exclusion Criteria

1. Revised ACL Reconstruction.

2. Subject who is not willing to participate in study.
3. Any complication in which accelerated rehabilitation program is contraindicated.

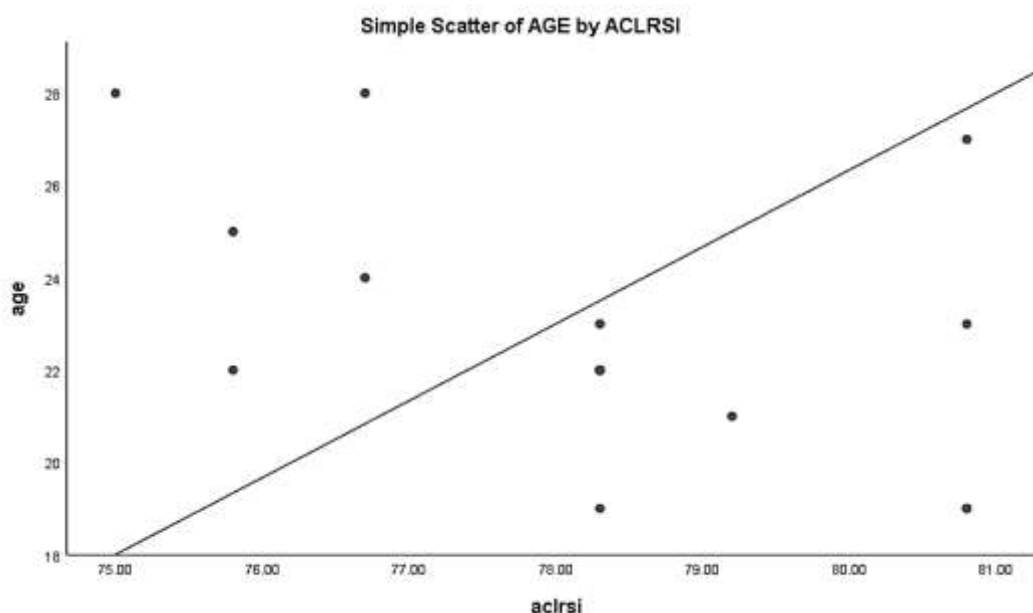
### Reliability of ACL-RSI

The ICC had a value of 0.91 ( $P < .001$ ), and the 95% CI ranged from 0.86 to 0.94. Cronbach  $\alpha$  was 0.95, indicating good internal consistency. MDSCind, MDCgrp, and SEM were 10.9, 1.1, and 3.9, respectively. The Bland-Altman plot showed a mean difference between the I-ACL-RSI assessments of 2.4 (95% CI, 0.2-4.6; 95% limits of agreement, -48.6 to 43.9). The I-ACL-RSI showed a correlation  $>0.6$  with the I-PRRS ( $r = 0.68$ ) and  $>0.3$  with the TSK ( $r = 0.65$ ) and IKDC ( $r = 0.45$ ), indicating that it was more strongly related to the I-PRRS and TSK than to the IKDC.

**ACL-RSI scale:** - Patients completed the ACL-RSI, a 12-item scale designed to measure psychological readiness to return to sport after ACL injury or reconstruction. ACL-RSI includes three domains: emotions; confidence; and risk appraisal. Scores for each domain are summed and averaged for a total score between 0 and 100, with higher scores indicating greater psychological readiness. This scale was recorded at 24th week.<sup>13</sup>

### Results

Karl Pearson correlation test was used to find the correlation of ACL-RSI score with return to sports criteria. The result of the study shows that there was significant correlation of ACL-RSI score with return to sports criteria. The  $r$  value shows negative moderate correlation.



Scatter diagram of ACL-RSI correlation

### Discussion

Readiness of return to sports was measured by using ACL-RSI scale. Statistically significant differences were observed in ACL-RSI score and return to sport ( $p < 0.05$ ). The present research was consistent with the study of Kate E Webster et al. who investigated factors associated with a return to pre-injury level of sport performance after anterior cruciate ligament reconstruction surgery, and reported that 61% of patients return to sport after ACL reconstruction surgery. They concluded that having a greater psychological readiness to return during rehabilitation was the most significant predictor of a subsequent return to comparable performance.

One key aspect of psychological readiness to return to sport is confidence. This includes confidence in

the injured body part (i.e., that the knee will not give way) and confidence in being able to perform at the same pre-injury level. It therefore makes sense that patients who scored higher in psychological readiness at 12 months were more likely to subsequently report that they returned to their pre-injury levels of performance.

### Conclusion

There was significant correlation between ACL-RSI score and return to sport. Most sports persons were able to return to their sports after ACL rehabilitation program.

**Keywords** ACL, RSI, Sports

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