Do Older Skiers Have Worse Outcomes Following ACL Reconstruction Compared to Non-Skiers or Younger Skiers?

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Disclosures

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Introduction

- Anterior cruciate ligament reconstruction (ACLR) is common in high-risk activities such as skiing (Blanke et al, 2016; Granan et al, 2013; Raschner et al, 2007; Warme et al, 1995).

- Desai et al (2014) investigated the outcomes of 1,990 patients >40 years old who underwent ACL reconstruction between 2005-2012 and found that 28.8% of ACL injuries were due to alpine skiing.

- However, there remains a paucity of literature among recreational skier versus non-skier outcomes following ACLR, particularly in older patient populations.
Purpose

- To compare outcomes following ACLR between skiers versus non-skiers, with a sub-analysis based on age.
Methods

A nested cohort of 128 patients from the Multicenter Orthopaedic Outcomes Network cohort who underwent primary ACLR completed a series of validated outcome instruments preoperatively and postoperatively at 2 and 6 years.

Outcomes Assessed:

- Demographics
- Graft Type
- Sport participation
- Patient Reported Outcomes (PROs)
  - Knee Injury and Osteoarthritis Outcome Score (KOOS)
  - International Knee Documentation Committee Score (IKDC)
  - Marx Activity Rating Scale

Patients were stratified by participation in skiing (skiers vs. non-skiers) and by age subgroup. (\(\leq 29\), 30-39, \(\leq 40\) years)
## Results

### Skiers vs Non-Skiers

Table 1. Patient Demographics by Participation in Skiing. Age is presented as mean ± standard deviation.

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Participation in Skiing</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Skiers</td>
<td>Non-Skiers</td>
</tr>
<tr>
<td>No. of patients, n (%)</td>
<td>44 (34.4)</td>
<td>84 (65.6)</td>
</tr>
<tr>
<td>Female sex, n (%)</td>
<td>26 (59.1)</td>
<td>29 (34.5)</td>
</tr>
<tr>
<td>Age, years</td>
<td>35.3 ± 11.6</td>
<td>27.7 ± 11.3</td>
</tr>
<tr>
<td>Graft Type, n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allograft</td>
<td>22 (50.0)</td>
<td>25 (30.0)</td>
</tr>
<tr>
<td>Autograft</td>
<td>19 (43.2)</td>
<td>56 (66.7)</td>
</tr>
<tr>
<td>Hybrid graft</td>
<td>3 (6.8)</td>
<td>3 (3.6)</td>
</tr>
</tbody>
</table>
# Results

## Age Subgroups of Skiers

Table 2. Skier Demographics by Age Subgroup. Age is presented as mean ± standard deviation.

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Skiers ≤ 29 years</th>
<th>Skiers 30-39 years</th>
<th>Skiers ≥ 40 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of patients, n (%)</td>
<td>15 (34.1)</td>
<td>14 (31.8)</td>
<td>15 (34.1)</td>
</tr>
<tr>
<td>Female sex, n (%)</td>
<td>11 (73.3)</td>
<td>7 (50.0)</td>
<td>8 (53.3)</td>
</tr>
<tr>
<td>Age, years</td>
<td>23.4 ± 3.5</td>
<td>34.1 ± 2.5</td>
<td>48.4 ± 7.6</td>
</tr>
<tr>
<td>Graft Type, n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allograft</td>
<td>5 (33.3)</td>
<td>8 (57.1)</td>
<td>9 (60.0)</td>
</tr>
<tr>
<td>Autograft</td>
<td>10 (66.7)</td>
<td>4 (28.6)</td>
<td>5 (33.3)</td>
</tr>
<tr>
<td>Hybrid graft</td>
<td>0 (0.0)</td>
<td>2 (14.3)</td>
<td>1 (6.7)</td>
</tr>
</tbody>
</table>
Results

Skiers vs Non-Skiers

- Both non-skiers and skiers demonstrated improvements in outcomes from baseline to 2 years and to 6 years.
- Between 2 and 6 years postoperatively, skiers demonstrated significantly increased mean improvement in KOOS symptoms ($p=.01$), KOOS pain ($p=.002$) and KOOS activity of daily living ($p=.03$) compared to non-skiers who demonstrated a significant decrease in overall improvement in these outcomes.
Results

Age Subgroups of Skiers

- Skiers ≥40 demonstrated significant mean improvement in KOOS symptoms ($p=0.02$) and KOOS quality of life (QoL) ($p=0.008$) at 2 years and KOOS QoL ($p=0.01$) at 6 years postoperatively compared to skiers ≤29 years.

- At 2 and 6 years post-op, middle age skiers 30-39 reported a significantly lower KOOS symptoms score than older skiers ($p<0.05$).
Discussion

The most significant finding of this study is that

1. Skiers demonstrated significantly increased mean improvements in KOOS scores between 2 and 6 years following ACLR.

2. Skiers ≥40 had significantly greater improvement in KOOS quality of life at two and six years post ACLR when compared to skiers ≤29.

Outcomes between younger skiers, middle age skiers, and older skiers were comparable in the present study demonstrating that older skiers undergoing ACLR can expect similar positive outcomes as their younger counterparts. This finding is similar to other studies with a focus on older patient ACLR outcomes (Kim et al, 2018).
Conclusions

Compared to non-skiers, skiers demonstrated significantly increased mean improvements in KOOS scores between 2 and 6 years following ACLR.

Skiers ≥40 years show greater improvement in KOOS QoL and KOOS symptoms compared to younger skiers.

This information can counsel skiers ≥40 years, as to their expected outcomes following ACLR.
References


Thank you!

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