Playing Performance Among Australian Football League Players Following Anterior Cruciate Ligament Reconstruction

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Background:
Elite athletic performance following ACL reconstruction

“Pre-injury level of performance” is not easy to define

However...
Returning to pre-injury level of performance following ACL-R is challenging\(^1,2\)
(e.g. NBA\(^3\), NFL\(^4\), NHL\(^5\))
Background:
ACL reconstructions in the Australian Football League

Audit from 1999–2013
(n = 158)⁶

Return to sport
121 of 158 players (77%)

Subsequent ACL injury
48 of 158 players (30%)

Post-surgical performance
Not reported
Aims

Calculate level of playing performance among AFL players who underwent ACL reconstruction

Compare post-surgical performance with pre-injury performance
Methods

• Inclusion criteria: AFL-listed players who
  – Underwent ACL-R between 1999 and 2013
  – Played ≥ 10 AFL matches in a season prior to ACL injury (Baseline season)

• Player performance measure: Ranking Points Per Match (RPPM)
  – Official AFL statistics used to measure overall individual performance
    • Includes ball possession, ball movement, scoring, defence
  – Analysis of pre-surgical and post-surgical playing performance done if person played ≥ 10 AFL matches in two seasons following ACL-R (Post-surgery seasons 1 & 2)

• Return to pre-injury level of performance: Definition
  – Performance in post-surgery season 1 or post-surgery season 2 within 4 RPPM (small effect size) of performance in baseline season
Flowchart of players

AFL players who underwent ACL-R from 1999 to 2013 ($n = 158$)

- Played ≥ 10 AFL matches in a season prior to ACL injury: $110/158 (70\%)$
- Had not played ≥ 10 AFL matches in a season prior to ACL injury: $48/158 (30\%)$

Baseline season in 1999 or later: $104/110 (95\%)$

Baseline season before 1999: $6/110 (5\%)$

Returned to play ≥ 10 AFL matches in two seasons after ACL-R: $53/104 (51\%)$

Did not return to play ≥ 10 AFL matches in two seasons after ACL-R: $51/104 (49\%)$
Results:
Post-surgery performance compared to Pre-injury performance

- Returned to pre-injury level of performance in post-surgery season 1: 23/104 (22%)
- Returned to pre-injury level of performance in post-surgery season 2: 13/104 (13%)
- Did not return to pre-injury level of performance: 17/104 (16%)
- Did not return to play at least 10 matches in 2 seasons: 51/104 (49%)
Factors associated with return to pre-injury performance

Age < 25 years
OR = 2.9, p = 0.01

Mass < 90kg
OR = 2.7, p = 0.03
AFL performance among players who played ≥ 10 matches in a season prior to injury and played ≥ 10 matches in two seasons post-surgery

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SEM</th>
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<tbody>
<tr>
<td>Baseline season</td>
<td>80.6</td>
<td>2.5</td>
</tr>
<tr>
<td>Post-surgery season 1</td>
<td>75.5</td>
<td>2.1</td>
</tr>
<tr>
<td>Post-surgery season 2</td>
<td>79.5</td>
<td>2.2</td>
</tr>
<tr>
<td>AFL average 1999–2013</td>
<td>76.0</td>
<td>0.2</td>
</tr>
</tbody>
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Performance in Post-operative season 1 significantly below Baseline season level of performance (p = 0.03)

Pre-injury and post-surgical average level of performance among included players comparable with AFL average level of performance.
Returning to play on a consistent basis was challenging

- 51 of the 104 included players (49%) did not return to play 10 AFL matches in two seasons after ACL reconstruction
  - Likely that players need to demonstrate capacity to perform well soon after return to play to warrant further selection at elite level
- Younger players (< 25 years at time of ACL injury) had greater odds of return to pre-injury performance
  - Consistent with findings in NHL\(^5\) and elite alpine skiers\(^7\)
- Lighter players (< 90kg) were also more likely to return to pre-injury performance
  - Possibly due to differing roles of lighter players
Players who did return to play consistently over two seasons, on average, performed well

• Compared to own pre-injury levels
  – Did drop 5.1 ranking points per match in Post-surgery season 1 compared to Baseline season
    • Statistically significant but likely only of marginal “clinical” significance
  – Back to Baseline level of performance in Post-surgery season 2

• Compared to AFL competition average
References


