Simple rules to reduce second injury risk after ACLR and return to sports:
Lessons from the Delaware Oslo ACL Cohort
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What are successful outcomes? (Lynch BJSM 2015)
• Return to sports (previous activity)
  – Does this really happen?
  – MOON cohort
    • 63% college AFB and 69% HS FB. 43% of the players were able to
      return to play at the same self-described performance level.
      Approximately 27% felt they did not perform at a level attained
      before their ACL tear, and 30% were unable to return to play at all.
    • 72% of soccer players
  – Arderen et al meta analysis 2011
    • 63% return to preinjury level of sports, 44% to competitive sports

What are successful outcomes? (Lynch BJSM 2015)
• Return to sports (previous activity)
  – NFL (Andrews)
    • Shah et al ASIM 2010
    • 61% 31/49 returned to the NFL a mean of 11 months after surgery

What are successful outcomes? (Lynch BJSM 2013)
• No reinjury (Does this really happen?)
  – MOON soccer (20% in women)
  – Paterno et al (Hewett prevention cohort) – 20% in
    those 18 and younger
  – Shelbourne data set – 17% in college age and
    younger
  – Pinzczewski data set 17% - higher in younger and
    males
  – All rates higher with allografts in young athletes

Disclosure: I DO NOT have a financial relationship with
any commercial interest.
Paterno et al AJSM 2014

- They followed post-ACLR and control (teammates) of athletes who played sports that require cutting or pivoting movements for 24 months.
- 29.5% of the athletes with a history of ACLR and 8.5% of the control athletes suffered a second ACL injury.
- Athletes in the ACLR group who suffered another ACL injury did so soon after they returned to play: 30.4% were injured in less than 20 athlete-exposures (AE), and 52.2% were injured in less than 72 AE.

Webster et al AJSM 2014

- In patients younger than 20 years at the time of surgery, 29% sustained a subsequent ACL injury to either knee.
- The odds for sustaining an ACL graft rupture or contralateral injury increased 6- and 3-fold, respectively, for patients younger than 20 years.
- Returning to cutting/pivoting sports increased the odds of graft rupture by a factor of 3.9 and contralateral rupture by a factor of 5.
- A positive family history doubled the odds for both graft rupture and contralateral ACL injury.

What should we be counseling patients?

- Just because you have ACLR, doesn’t mean you will return to sports at all, and most likely not at the same level of performance
- Your risk of reinjury is high in the near term, higher if you are younger, higher (ipsilateral) if you are male and (contralateral) if you are female, 5 times higher if you return to a level I sport.
- Regardless of surgery, your risk of OA is high in the long term
  - If you need revision surgery risk of OA is higher

Criteria to enter running progression

- Full ROM equal to contralateral
- 80% QI
- Trace or zero effusion

Can we change these odds?

YES

IF YOU DO NOT HAVE AN ISOKINETIC DYNAMOMETER USE A 1 RM ON A KNEE EXTENSION MACHINE. DO NOT USE HDD OR LEG PRESS – THEY BOTH UNDERESTIMATE!!!
Clearance for RTA is commonly time based (Barber-Westin 2011)

Outcomes after surgery
- Decreased quadriceps strength (Schmitt 2012)
- Decreased functional performance (Logerstedt 2012, KSSTA, AJSM, Hartigan 2010)
- Low patient-reported measures (Hartigan 2010, Logerstedt 2012, KSSTA, Schmitt 2012)

### Test Score

<table>
<thead>
<tr>
<th>Quadriceps Strength Index (QI)</th>
<th>≥ 90%</th>
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<tbody>
<tr>
<td>All 4 single-legged hop tests</td>
<td>≥ 90%</td>
</tr>
<tr>
<td>Knee Outcome Survey- Activities of Daily Living scale (KOS-ADLs)</td>
<td>≥ 90%</td>
</tr>
<tr>
<td>Global Rating score (GRS)</td>
<td>≥ 90%</td>
</tr>
</tbody>
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PASS vs. FAIL

Grindem et al (BJSM 2016)
- The risk of knee reinjury was reduced by 58% for each month RTS was delayed until 9 months after surgery
- Only 5.6% of patients who passed RTS criteria before returning to level I sports suffered reinjuries compared to 37.5% of those who didn’t pass
- More symmetrical quadriceps strength prior to return to sport significantly reduced the risk of knee reinjury
- Those who returned to level I sports had a 4.68 times higher risk of knee reinjury than those who did not.

Using these simple decision rules could reduce second injury by 84%
Key Points:
Return to play - Level I without reinjury

- Very early impairment resolution after ACLR
- Criterion based progression

- Pass all criteria for
  - Running
  - Return to activity
    - 90% QI
    - 90% Hop LSI
    - 90% PROs

NO RETURN BEFORE 9 MONTHS