ACL Re-Injury

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ACLR—Return to Play?

• Rate of return to play (RTP) after ACLR in NFL players is only 63%
  – Shah, AJSM 2010
  – Level IV study

• ACL failure rate is variable across the literature
  – From <2% to as high as 29%
  – Failures skewed towards young adolescents with allograft ACLR
ACL Return to Play Failure

- Peri-operative complications
  - Infection
  - Arthrofibrosis
- Poor surgical technique
- Psychological factors
- Graft failure/re-tear
- [Contralateral ACL injury]
Allograft vs. Autograft

• Pallis, AJSM 2012
  – Prospective cohort of 122 ACLR in West Point cadets
  – Avg 2 yr f/u
  – Failure rate measured as need for revision ACLR
  – Results:
    • BTB autograft: 11% failure rate
    • HS autograft: 13% failure rate
    • Allograft: 44% failure rate
  – Level 2 Evidence
Allograft

• Kaeding, *SportsHealth* 2011
• MOON study group
• Prospective longitudinal cohort, Level II
• Findings: Patient age and ACL graft type significant predictors of graft failure
• Risk of graft rupture: Allograft 4x that of auto
• Youngest, most active patients are not good candidates for allograft ACLR
Incidence of 2\textsuperscript{nd} Injury: What’s the Evidence?

- Substantial Level 2 evidence emerging re: risks of additional injury to the knees
- Wright, \textit{AJSM} 2007  MOON group
- 2 year f/u
- 3\% risk of re-tear of ACL graft; 3\% risk of new c/l ACL tear
- Phone interviews, Op note f/u.....
Risk of 2\textsuperscript{nd} injury: What’s the Evidence?

- Shelbourne, *AJSM* 2009
- Prospective cohort with 5 year f/u
- Level II evidence
- 1,415 patients followed
- 4.3% re-injured the ACL; 5.3% had c/l ACL injury
- Females reinjured the same knee 4.3%, but injured the c/l knee at a higher rate 7.8% (men, 3.7%)
- Risk to either knee age dependant: 17% if <18yrs, 7% if 18-25yrs, 4% if > 25 yrs old
Incidence of 2nd Injury: What’s the evidence?

- Andernord, *AJSM* 2015
- Swedish Nat’l Knee Ligament Registry
- Level 2 Evidence cohort, 5yr f/u
- 3% of pts required c/l ACLR
- Age <20 increased this risk by 3x
2nd ACL Injury

- Paterno, *AJSM* 2014
- 78 young (avg age 17yrs) athletes followed prospectively for 24 mos.
- Pivoting, cutting sports
- Level 2 cohort study
Paterno, *AJSM* 2014

**Results**
- Control group: 8.5% rate of primary ACL tear
- **Prior ACLR group: 29.5% rate of 2nd injury**
  - 70% c/l tear
  - 30% re-tear of ACL [graft]
  - Females likely more likely to tear c/l ACL than graft....
  - Risk of 2nd injury calculated as 6x greater than controls (both genders)

**Mean time from RTP to 2nd injury: 215 days**
What is the risk of re-injury after ACLR?

• What does the evidence tell us?
  – Level II or higher
  – As much as a 30% chance of re-injury (ipsilateral or contralateral)
  – Risk is highest in young, active, female athletes, especially if used allograft
Re-Injury References


ACL Injury Risk Factors?

- **Modifiable**
  - High BMI?
  - Jump landing mechanics
  - Hormonal?
  - Playing surface?
- **Non-modifiable**
  - Female Gender
  - Genetics?
  - Notch width
  - ACL size
  - Tibial slope
  - Ligamentous laxity
  - **PRIOR Hx ACL Surgery**
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What about bracing?
Functional Bracing after ACLR

- Wright RW, Fetzer GB. Bracing after ACL reconstruction. *CORR* 2007;455:162-168
- Systematic Review of 12 randomized studies
- Level I

- “No evidence to support the use of functional braces after ACLR”
- However....Recommendations vary; surgeon specific
ACL and Osteoarthritis

• Patients with a history of an ACL tear are thought to have increased risk of developing osteoarthritis
  • Daniel, AJSM 1994 “Fate of the ACL-injured patient”

• Questions:
  – What factors contribute to OA after an ACL injury?
  – Does ACLR prevent the onset of OA?
ACL and OA

- Neuman, *AJSM* 2008
- Prospective prognostic cohort study, Level II, Sweden
- 15yr f/u of non-operatively tx’d ACLIs
  - Avg age at injury: 26yrs
  - all underwent initial arthroscopy, then therapy
  - Neuromuscular physical therapy and activity modification
  - 60/100 pts had meniscal tear at presentation; 25 had meniscectomy at initial surgery (35 did not!)
Neuman, *AJSM* 2008

**Results:**
- Most patients were doing well (KOOS scores)
- 31% required add’l menisectomy
- 16% osteoarthritis (OA)**  (avg age 45yrs)
- Meniscectomy major risk factor for OA, ACLR or not
- 23% eventually underwent ACLR at an avg of 4yrs
- 68% were asymptomatic
- Patients with non reconstructed knees and intact menisci had best KOOS scores
ACL and OA

• Keays, AJSM 2010
• Level I cohort study
• 56 patients followed over 6 years for development of OA after ACLR
• Graft choice, presence of meniscus and chondral injuries among factors investigated
Keays, *AJSM*, 2010

- **Results:**
  - 48% of patients (now avg age 33yrs) had mild or moderate OA. No one had severe OA
  - Tibiofemoral osteoarthritis

- **Risk factors for OA post-ACLR**
  - Meniscectomy at time of ACLR
  - Chondral damage at time of ACLR
  - BTB autograft (62%) vs HS autograft (33%)
  - Quads strength and Q/HS strength ratio <1.27

- Delay from injury to surgery trended towards significance......
Does ACL surgery alter the Natural History of ACL injury?

• Chalmers, *JBJS* 2014
  – Systematic Review
  – Level III Evidence

  ~14 yrs after ACLR, patients had fewer subsequent meniscus injuries, less need for further surgery, and better (Tegner) activity level compared to non-op treatment

  However, no difference in IKDC and Lysholm knee scores and no difference in development of OA
ACL and Osteoarthritis

• Bottom Line:
  – Patients who have suffered an ACL injury are at increased risk of developing osteoarthritis in that knee
  – ACLR likely does NOT alter that risk….yet
  – ACLR may protect against further meniscus injury/surgery
  – Meniscectomy at time of ACLR appears to be a risk factor for OA
  – But, ACLR has not been proven to prevent OA…..
ACL and OA References


THANK YOU!