Meg Jacobs P.T.
Momentum Physical Therapy and Sports Rehab
“Hands-on care for faster results”
www.WeGetYouHealthy.com

Knee Injuries
Screening, prevention, rehabilitation and return to sport...Are we doing enough???

• I have no relevant financial relationships with commercial interests to disclose.

This presentation is the intellectual property of the author. Contact them for permission to reprint and/or distribute.
American Orthopedic Society for Sports Medicine

- 150,000-200,000 ACL injuries in the US per year
- Approximately half are surgically repaired
- 70% are non contact, 30% are from contact
- Females are 2-8x more likely to injure their knees than males

Screening

- Screening tools are being sought out to curb the number of non contact injuries
- Low cost field tests can be used to help identify individuals at high risk for non contact LE injuries
Screening

- Most common risk factors include:
  - previous injury
  - BMI (high or low)
  - flexibility deficits
  - faulty LE biomechanics
  - dysfunctional movement patterns
  - poor core motor control

Screening

- Y Balance test
  - looking for symmetry between B LE
  - Requires SL dynamic balance while other extremity moves through an open chain movement in anterior, posteromedial and posterolateral directions.
- Functional Movement screen
  - Attempts to identify imbalances in mobility and stability during fundamental movement patterns

Y Balance Test
**Y Balance Test**

- Can be performed for LE and UE
- Average of 3 trials each direction
- Asymmetry of > 4cm helps to identify an athlete at increased risk for non contact injuries (mostly assoc with the anterior movement)

---

**Functional Movement Screen**

- Accesses muscle and flexibility imbalances, as well as functional deficits (movement limitations and asymmetries)
- This screen exacerbates compensatory movement patterns
- These movement flaws lend into the breakdown in the kinetic system
- Breakdown in the kinetic system causes inefficiency and micro trauma during activities/sports

---

This presentation is the intellectual property of the author. Contact them for permission to reprint and/or distribute.
Functional Movement Screen

• 7 fundamental movement patterns
• 3 clearing tests
• Individual scores are given for each test to include 0,1,2,3 according to the testing/scoring guidelines (Cook et al., 2006a,b; Minick et al., Teyhen et al., 2012)
• Low scores have been shown to be good indicators for high risk for injury

Prevention

• Sportsmetrics- scientifically proven to decrease serious knee injuries
• KIPP- Knee Injury Prevent Program- neuromuscular training program
• PEP- Prevent injury and Enhance Performance
• Sports performance programs

Rehabilitation Post OP

• Standard goals of rehabilitation
  – Knee ROM equal to contra lateral side
  – Quad strength > than 85% of the good knee with isokinetic testing
  – Neg edema
  – Completion of an agility and sports specific training program

This presentation is the intellectual property of the author.
Contact them for permission to reprint and/or distribute.
Rehabilitation Post Op

- Individualized per MD or MD preference
- In general:
  - 1-6wks- decrease edema, increase quad control, full AROM
  - 6-12wks- increase strength, increase muscle endurance, increase neuromuscular control
  - 12 wks- straight ahead running (quad 60% of contralateral side)
  - 18wks- agility activities
  - 6mos- return to sport

Rehab to Pre Injury Sports following ACL Reconstruction

- Lentz et al- 55% RTS pre injury level at 1 yr
- Ross et al- 70% of indiv previously in contact sports, were unable to return to same sport after surgery
- Many others- 8-50% did not return to sport
- Smith et al- of those that did not return to sport, 21% were reporting major limitations leading to decreased level of performance

What is the cause of these alarming statistics???

- Lack of standardized RTS guidelines
- Incomplete resolution of physical and psychological impairments
So what are the contributors to post op self reported disability?

• # of concomitant injuries
• Quad strength
• Knee pain
• Knee ROM
• Single leg hop
• Pain related fear avoidance

• Lentz et al- did a study in 2012 looking at the demographics, knee impairment, and self reporting measures that contribute to the return to pre injury sports following repair.
  – They looked at: knee impairment measures, self reporting questionnaires, knee pain intensity, episodes of knee injury, kinesiophobia, IKDC, and return to sport status

  • Knee impairment measures- to include knee edema, knee ROM, KT100, and isokinetic quad testing.
  • Self reporting questions- Tenger activity level scale: they rate their current level of sports participation in comparison to pre injury level.
  • Knee pain intensity- ave of current, best and worst pain in past 24hrs scale 0 no pain-10 worst

This presentation is the intellectual property of the author. Contact them for permission to reprint and/or distribute.
• Episodes of knee injury- 0-5 and >5
• Tampa scale for Kinesiophobia- fear of movement
• IKDC-International Knee Documentation Committee Subjective Knee Eval Form- rate 10 questions that are related to knee symptoms and physical function
• RTS status- 2 questions: “Have you RTS or rec activities since surgery?” & “Have you returned to same level of sports as before your injury?”

Lentz et al 2012 findings...

• Of athletes that reported “non return to pre injury” sports level, 45% showed fear of injury/lack of confidence as the primary reason for non return.
• Knee symptoms: pain, edema, instability, muscle weakness collectively accounted for 40% as the reason for “non return to pre injury” sport level.
• Also noted that age, sex, concomitant injuries, graft types and time from injury to surgery may not play a significant role in RTS status.

Return to Sports

• Utilization of outcome measures
  – Used to evaluate athletes progress to minimize risk of re injury, return to training and or sport competition.
  – Limb Symmetry Index (LSI)- most common method to compare one limb to the other.
    • 85% was the gold standard indicating normal limb symmetry existed between both limbs
    • Munro et al- recent study indicates that the LSI should now be more approp set at 90%
Functional Performance Tests (FPTs)- helps to objectively measure the ability to simulate sport activity

- **Hop Test**- determines athletes function by evaluating limb symmetry and predict muscle strength.

- **Agility T-Test**- accesses athletic function and is sensitive to changes in training patterns and differences in athletic skill levels during rehab and training.

<table>
<thead>
<tr>
<th>Males (seconds)</th>
<th>Females (seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>9.5 to 10.5</td>
</tr>
<tr>
<td>Good</td>
<td>10 to 11.5</td>
</tr>
<tr>
<td>Average</td>
<td>11.5 to 12.5</td>
</tr>
<tr>
<td>Poor</td>
<td>&gt; 12.5</td>
</tr>
</tbody>
</table>
Functional Performance Testing

- There have been learning affects assoc with FPTs
- Studies have shown that scores stabilize after 4 trials of the cross over hop test and 3 trials with the other 3 hop tests
- Studies have shown that only 1 trial is needed with the Agility T-Test

Are We Doing Enough???
Can We Do Better???

Return to Sport

- American Orthopedic Society for Sports Medicine 2013 meeting discussed the trend for athletes risk for 2nd injury whether to the same knee or contra lateral knee.
  - Risk for 2nd injury within 24 months of ACL repair and rehab is 6x > than those with no repair.
  - Paterno et al- found these results...
    - Females demonstrate 4x > rate of 2nd injury within 24mos compared to male counterparts
Kevin Wilk PT,DPT,FAPTA brings up a good question...

“Is returning a patient to the pre injury level good enough?”

Gold standard of rehab: return to pre injury level, comparing test results to the uninjured side

- We know from Arden et al meta analysis of 48 studies, an ave of 63% of patients return to previous level of function, 44% returned to competitive sports.
- Paterno et al reported that patients that returned to sport following ACL reconstruction were at risk for injury to the other side.

So is comparison to the uninjured side throughout the rehabilitation process good enough???

- **Reality**: over time from injury to recovery, doesn’t the uninjured side go through a loss of quad strength, neuromuscular control and functional activity naturally?
- Unless we have pre injury testing levels for the athlete, do we really have true measurements of what we need to get the athlete achieve?
• With a non contact injury, there are predisposing factors for the athlete's injury:
  
  – valgus knee  
  – weakness of the hip  
  – poor quad to hamstring ratios  
  – poor muscle firing patterns  
  – improper techniques with running, jumping, landing and cutting.

New Rehabilitation Thinking
• Individualize  
• Set higher goals of enhancing and improving the whole body functional level  
• Evaluate, address and correct any predisposing factors that might lead to future injury: physical, bio mechanical, environmental and psychological.  
• Preventing second injury decreases health costs.  
• "A significant risk factor for a second ACL injury is a first ACL injury", Kevin Wilk DPT

New Rehabilitation Thinking
• Through studies, we know that pre injury sport levels and comparison to the non operative side are not reliable markers for RTS  
• We need to concern ourselves with the fact the there are continued risk factors that need to be addressed. We need to enhance the higher level of physical function and performance of our rehabilitating athletes.
New Rehabilitation Thinking

• **Our new way of thinking**: make our athletes better and more sound than they were before injury and at decreased risk for re injury to same side, opposite side or other body part.

• **Goals:**
  – Higher level of function
  – Minimize 2nd injury risk
  – Maximize safety
  – Minimize health costs

“We should do better, we can do better, we must do better”  
Kevin Wilk DPT

Works Cited


Works Cited


Works Cited

Wilk KE. We can do better. J Orthop Sports Phys Ther 2014; 44(9):634-635

This presentation is the intellectual property of the author. Contact them for permission to reprint and/or distribute.