Avoiding Anterior Cruciate Ligament Tears; “Prehabilitation”

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Statistics

- 100,000 ACL injuries per year
- 50% in the 15-25 age group
- 2-10x more likely to occur in females
- 1 billion dollars in related ACL injury expenditure

www.sisusystems.com
Why Women?

- What makes women up to 10x more likely to tear their ACL than men?

Theories

- **Hormone cycle**
  - 2002 study published in the Journal of Physical Education, Recreation, and Dance
    - ACL injuries were most likely to occur in the first half of a woman’s menstrual cycle

http://www.aahperd.org/aahperd/template.cfm?template=johperd_main.html
Theories (cont.)

Anatomical

- **Pelvis width**
  - Places knees in a valgus or “knock-knee” alignment
  - Increased “Q” angle

- **ACL size**
  - Anatomically smaller ACL in women
Why are Women at Risk?

- Landing
  - knee moves into a “valgus” position

Why are Women at Risk?

- **Core proprioception**
  - With a lack of core proprioception, and athletes center-of-gravity (COG) become skewed
  - Landing and cutting place increased stress on the knee when the COG is out of alignment
Can ACL Injuries be Prevented

- No program can guarantee 100% effectiveness in eliminating ACL injuries
  - Adherence
  - Content
  - Athlete

- Too many variables to account
  - Intrinsic
    - Athlete and the knee itself
  - Extrinsic
    - Conditioning, playing surface, other players
Neuromuscular Training

• Neuromuscular training
  – Train the mind to know what the body is doing & where the body is at in space (*proprioception*)
  – Train the body to be more efficient
  – Neuromuscular training has shown to decrease risk of injury 2-4x in female athlete

• Most neuromuscular programs focus on:
  – Correct jump landing form
  – Pivot and cut form
  – Removing as much stress from the ACL as possible
Neuromuscular Training Studies

- Norway Women’s National Handball Team
  - 1 in 5 elite players suffered ACL tears
  - Rate was cut by 1/3rd after introduction of Neuromuscular training program

- Centers for Disease Control (Gilchrist)
  - PEP (Prevent injury, Enhance Performance) Program
    - Santa Monica, CA
    - Orthopedic surgeon Burt Mandelbaum
  - Decrease ACL injury rates by 70% in NCAA D-I female college soccer players
Results

- Overall, studies have shown that neuromuscular training programs can help to reduce ACL injuries at an 80% effectiveness.

ACL Prehab Program

Goals

1. Improve balance; single and double leg
2. Learn to avoid valgus knee position during landing, cutting, and pivoting
3. Strengthening of the core muscles of the pelvis

http://www.usatoday.com/sports/2003-06-24-acl-cover_x.htm
ACL Prehab Segments

1. Warm up
2. Stretch
3. Strength
4. Plyometrics
5. Agility

http://sportsmedicine.about.com/od/injuryprevention/a/AC prevention.htm
UK Sports Medicine Dynamic Warm-up

- University of Kentucky Orthopedic Surgery & Sports Medicine is in the process of developing an ACL “prehab” program
- Being developed by:
  - Dr. Mary Lloyd Ireland
  - Dr. Darren Johnson
  - UK Outreach Athletic Trainers
University of Kentucky Dynamic Warm-up

- **Dynamic warm-up**
  - **High Knee**
    - Performed forwards then backwards for 10yds ea way
    - Performance points: knees bent to 90 degree angle, arms bent at 90 degree angle. Arms should move with leg movements. Quick tempo.
    - Goal: as many touches as possible in 10yd distance.
University of Kentucky Dynamic Warm-up

- 180 degree vertical jumps
  - Performed for ten touches
  - Performance points: feet shoulder width apart, soft landings, emphasize core stability and core movement during jumps. Athlete should not be rotating during landing phase.
  - Goals: soft landing.
University of Kentucky Dynamic Warm-up

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Thank you!

Questions?

UK HealthCare