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Visual estimation of ACL injury risk: Efficient assessment method, group differences, and expertise mechanisms

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Introduction

Over 2 million ACL injuries occur worldwide annually. Approximately 1 in 30 female athletes participating in landing and cutting sports (basketball, soccer) will tear their ACL within one season of play. Annual costs in U.S. likely exceed $3 billion (majority surgery). Osteoarthritis occurs at 10 times the normal rate.

Methods

1.) To create an
a.) Reduce screening time and cost
• Efficient screening method:
  • Osteoarthritis occurs at 10 times the normal rate.
  • Sports (basketball, soccer) will tear their ACL within one season of play.
  • Approximately 1 in 30 female athletes participating in landing and cutting
  • Over 2 million ACL injuries occur worldwide annually.

Potential Solutions

• Re-evaluate the individual/problem
• Identify injury mechanisms
• Re-introduce a preventative technique to "high-risk"
• Develop efficient screening method
• Biomechanical Injury Prevention
• Musculoskeletal Injury Prevention
• Develop efficient assessment method
• Group Differences

Result

Test Development

Item/Clip

Number of items = 5
Average time (min:sec) = 2:24
Test-retest (r) = .40
Score range = 0-100%
Achieved range = 26-95%

Group Differences

ExSci Student
• Physical Therapist
• Athletic Trainer
• S&C Coach
• Physcian
• ExSci Academic
• Female Athlete
• Sport Coach
• General Public
• Parent of Athlete

Skill Mechanisms

ACL Knowledge
• Cue Use
• Excessive Inward Knee Motion
• Excessive Lateral Trunk Motion

Discussion

• It will be important to target parents, athletes, coaches, and physicians for improving risk assessment performance or to adopt the ACL nomogram to aid their injury risk assessment in practice.
• The ACL-IQ is an assessment technology and feedback system for ACL injury risk prediction ability.
• Individuals can assess their ACL injury risk prediction ability with a short, free, and online (www.ACL-IQ.org) tool.

Moving Forward

• Future research will focus on developing efficient methods to improve visual risk prediction performance (e.g., see Decision Tree to the right) and establishing predictive evidence that individuals with high ACL-IQ can reduce ACL injuries.

Figure 2: Sample ACL-IQ item (snapshot of video sequence)

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