The Effectiveness of Certain Factors on the ACL Tear Recovery Process

By: Harrison Singer
The ACL

• The Anterior Cruciate Ligament (ACL) functions along with three other ligaments to keep the patella stabilized
  o The Posterior Cruciate Ligament (PCL)
  o Lateral Collateral Ligament (LCL)
  o Medial Collateral Ligament (MCL)

(Podraza, 2010)
Injury Occurrence

- Higher injury rate than ever before
- Suffered through non-contact mechanisms 70% of the time
  - Usually pivoting motions on a fixed foot or trauma with the knee in hyperextension
- Almost always entail surgery followed by arduous physical therapy

(Dragoo, 2013)
Injury Identification

- Magnetic Resonance Imaging (MRI)
  - Most effective method of injury identification
  - Provides a clearer and deeper examination of ligaments
  - May also reveal additional injuries
    - 73% of patients with torn ACLs suffer additional injuries (Hetta et al., 2014; Al-Jassir et al., 2012)

https://mrimaster.com/anatomy/KNEE/knee%20cor/mri%20knee%20cross%20sectional%20anatomy%20coronal%20%208.jpg
Males vs. Females

- Females suffer torn ACLs at a rate of 3.42 occurrences higher than males.

- Result of female anatomy:
  - Wider hips → awkward landing angles → excessive stress on the knee

(Thomee et al., 2013)
Rehabilitation

- Physical therapy begins immediately following surgery
  - Strengthening of surrounding muscles
  - Increasing of joint flexibility in both the knee and hip

- Prehabilitation, or “prehab”
  - Rather newly instituted method
  - Physical therapy work done prior to surgery
  - Subjects have returned to sports on an average of 8.32 weeks quicker when treated with prehab

(Camelia, 2013)

(Reis, 2016)

(Shaarani et al., 2013)
Research Question

RQ: Which specific factors contribute most significantly towards creating efficient recoveries from anterior cruciate ligament tears?
Hypotheses

H₀: No specific factors that contribute towards creating efficient recoveries from anterior cruciate ligament tears will be revealed.

H₁: Age will be the most significant factor in creating efficient recoveries from anterior cruciate ligament tears.

H₂: Prehabilitation will also contribute towards creating efficient recoveries from anterior cruciate ligament tears.
Participants

• Sample size of thirty-eight subjects
  - Patients receiving physical therapy treatment for at least a torn ACL at NY Orthopedics in Scarsdale, New York
  - Participant age range of 49 years
### Procedure

- NY Orthopedics patient record system
- Health Insurance Portability and Accountability Act (HIPAA)
  - subjects used remain anonymous

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<th>No.</th>
<th>Gender</th>
<th>Injuries Suffered</th>
<th>Visits per week (Total visits+weeks visited)</th>
<th>Date started and ended</th>
<th>Age</th>
<th>Graft used</th>
<th>Prehab</th>
<th>Sport</th>
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**Key:**
- Gender: 1-Male; 2-Female
- Injuries: 1-ACL; 2-MCL; 3-PCL; 4-LCL; 5-Meniscus; 6-Chondral Cartilage; 7-Patella
- Graft: 1-BPTB; 2-Hamstring; 3-Allograft
- Sport: 1-Football; 2-Basketball; 3-Soccer; 4-Baseball/Softball; 5-Tennis; 6-Lacrosse; 7-Skiing; 8-Other
- Prehab: 1-Yes; 2-No
Data Analysis

- Examination of chart
  - Search for trends
  - Evaluate each characteristic individually
Age Efficiency

Mean treatment time = 9.6
Prehabilitation

Mean treatment time = 9.6
Significant Factors

- **Age**
  - Less age = more efficiency

- **Prehabilitation**
  - Effectively gives patients a “head start” on rehab

- **Visits per week**
  - Subjects with a higher visits per week ratio recovered more efficiently
  - More rehab = more efficiency
Discussion

• Both $H_1$ and $H_2$ held true
  o Age proved to be most significant factor
  o Prehabilitation was effective as well

• Downside to age being most significant factor
  o Cannot turn back time
Bibliography


