

# Anterior Cruciate Ligament Reconstruction

By Jenna Hennebry

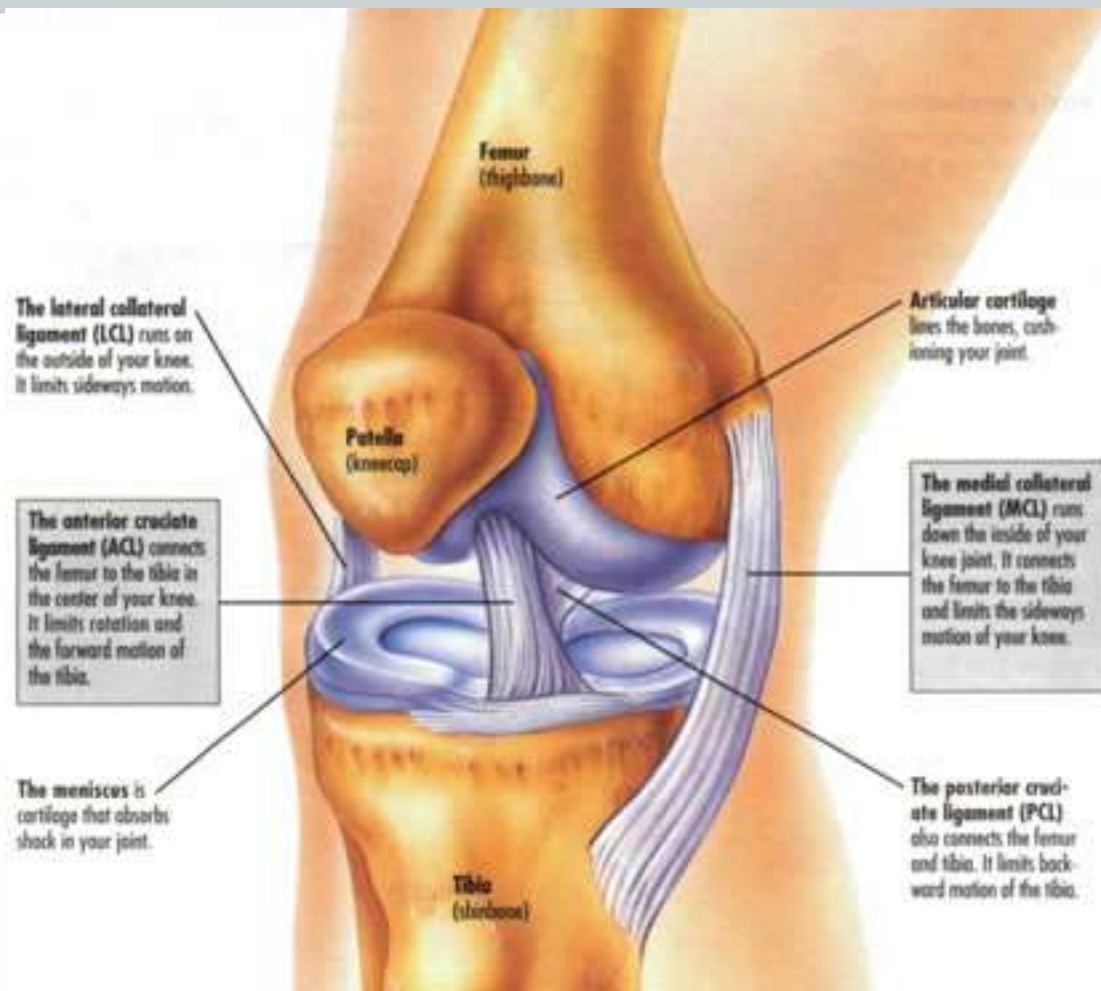
Erin Stiefel

Lauren Schmidt

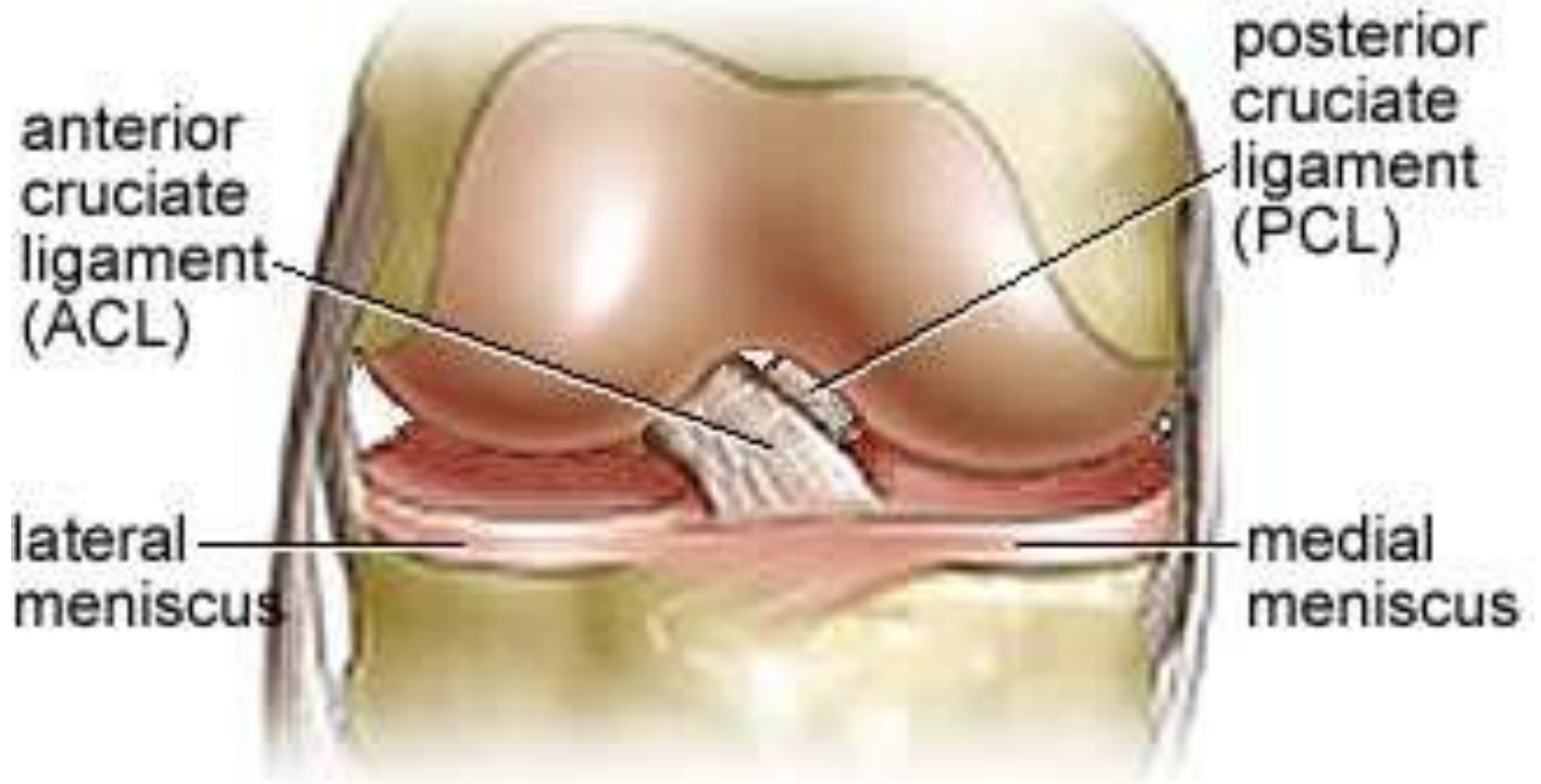
# Case Study

- 18 year old (freshman)
- Female
- Soccer Player
- No previous hx of knee injury
- Isolated ACL rupture, no meniscal involvement
- Aggressive treatment program
- B-T-B ACL reconstruction

# Anatomy



# Anatomy



# Anatomical and Mechanical Factors that Lead to ACL Injury

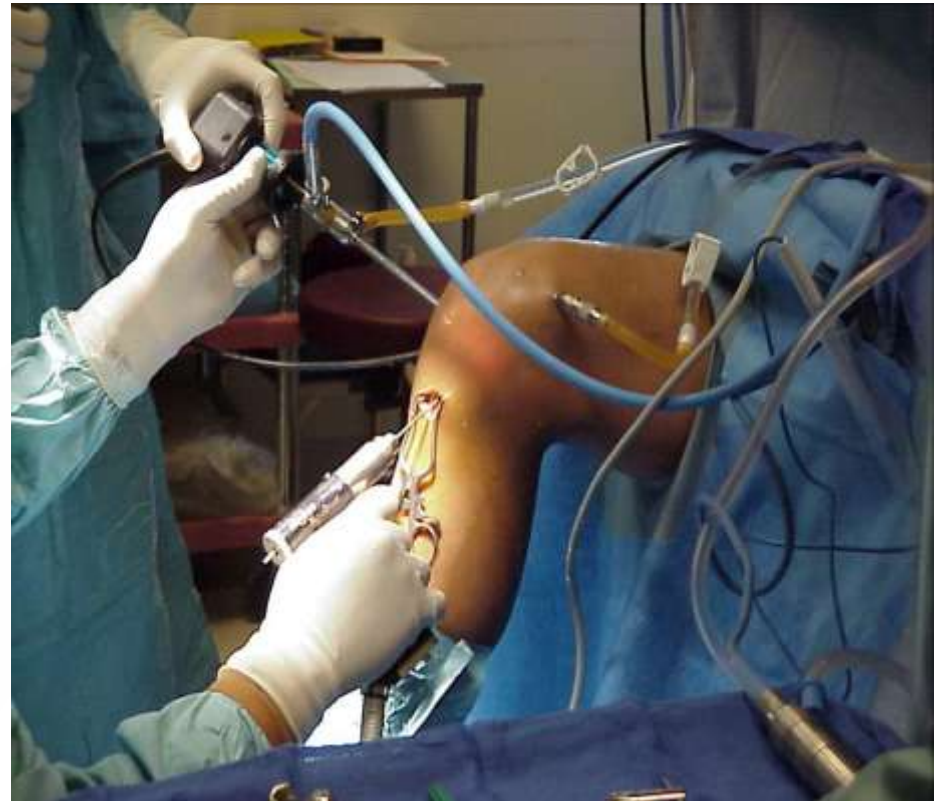
- Neuromuscular deficit
- Leg dominance
- Muscular dominance
- Q-Angle
- Hormonal differences

# Etiology

- Planted valgus force with rotation
- Contact
- Non contact

# ACL Reconstruction Procedures

- Autograft
- Allograft
- Bone-Tendon-Bone –  
\*The Gold Standard
- Hamstring
- Achilles



# Potential Issues with Reconstruction

- Scar tissue build up
- Predisposition to re-injury
- Psychological effects
- Decreased proprioception, NMC
- Decreased ranges of motion
- Allografts
- Autografts

# Short Term Goals

- Decrease edema/effusion
- Decrease their pain
- Restore knee flexion 0°-90° within one week, while keeping full knee extension
- Active quadriceps control

# Long Term Goals

- FWB and strengthening exercises by week 4
- Full ROM by week 6
- Maintain cardio
- Return to activity by week 9
- Restricted sport specific exercises by 4 months
- RTP 6 months

# Prehab 2-4 Days Pre-Op

- Decrease effusion/edema
- Manage pain
- Introduced THEREX

# Acute Phase

## Weeks 0-3

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- Goals
  - 0°-90° flexion by end of week one
  - Decrease edema/effusion
  - Increase quadriceps strength
  - Increase hamstring strength

# Acute Phase

## Weeks 0-3

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- Treatment
  - NSAIDS
  - GameReady/ESTIM
  - RICE
  - Compression Sleeve
  - Joint Mobilizations
  - Effleurage
  - U.S. Treatment

# Acute Phase

## Weeks 0-3

- Quad sets
  - 2x10
- SLR
  - 2x10
- Towel slides
  - 2x10'
- Lunge Matrix
  - 2x5
- Prone knee hangs
  - 2x4'

# Signs for Progression

- No edema/effusion
- Reduced pain
- FWB
- Full extension, 0°-120° of flexion

# Repair Phase

## Weeks 4-6

- Goals
  - Full ROM
  - Increase hamstring/quad flexibility
  - WB exercises
  - Maintain cardio
  - Increase muscular endurance
  - Begin re-establishment of NMC
  - Gait control

# Repair Phase

## Weeks 4-6

- Treatment
  - Continue U.S.
  - GameReady/ESTIM
  - Joint Mobilizations/Patellar Tendon Mobilizations
  - Pain and Inflammation management as needed
  - Medium to deep massage

# Repair Phase

## Weeks 4-6

- Wall Squats
  - 2x1'
- Hamstring Curls on Ball
  - 3x5
- Step Ups
  - 3x1'
- Stool Walks
  - 5 laps
- SL Balance
  - 3x 45"
- BIODEX – LOS
  - x2

# Signs for Progression

- Restoration of strength, flexibility and ROM
- Athlete confidence to progress
- Pain free with exercises
- Normal gait

# Conservative Phase

## Weeks 7-8

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- Goals
  - Avoid re-injury; avascular necrosis
  - Increase balance, NMC, flexibility
  - Return to activity by week 9
  - Maintain cardio

# Conservative Phase

## Weeks 7-8

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- Treatment
  - Medium to deep tissue massage
  - ICE/ESTIM
  - Joint Mobilizations
  - Continue maintaining cardio
  - Introduce PNF patterns

# Conservative Phase

## Weeks 7-8

- Sun Salutation
  - x5
- Warrior/Reverse Warrior
  - x5
- Triangle
  - x5
- Heel/Toe Walks on Airex Balance Beam
- 3 laps
- BIODEX-LOS
  - x2
- DL Airex Balance (Eyes Closed)
  - 2x30'

# Signs for Progression

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- Return to normal progression of rehabilitation

# Remodeling Phase

## Weeks 9-16

- Goals
  - Leg strength within 85% of contralateral leg
  - Maintain cardio
  - Begin eccentric loading and plyometrics exercises
  - Restore athlete's confidence

# Remodeling Phase

## Weeks 9-16

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- Treatment
  - ICE/ESTIM
  - Foam Roller
  - True Stretch
  - Massage if needed

# Remodeling Phase

## Weeks 9-16

- Bosu Lateral Hops,  
Bowler Squat
  - 2x20
- Jump Rope
  - 2x2'
- Ladders
  - X2'
- Box Jumps
  - 2x15
- DL Squat on Bosu
  - 2x15

# Signs for Progression

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- Functional testing without pain

# Final Phase

## Months 5-6

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- Goals
  - Sport specific exercises done without pain
  - Regain strength/coordination
  - Sport specific skills at pre-injury level
  - RTP

# Final Phase

## Months 5-6

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- Treatment
  - ICE/ESTIM
  - Foam Roller
  - True Stretch
  - Massage if needed

# Final Phase

## Months 5-6

- “V”-Run with Pass
  - x5
- Box Run
  - x5
- Resistance Cord
  - 3 laps
- Hurdles with Header
  - x3
- “W”- Run with Dribble
  - x5
- Give-N-Go/Crossing Drill
  - X10

# Exercises

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# RTP Criteria

- No joint effusion
- Full ROM
- 85-100% strength compared to contralateral leg
- Ligament Stability (KT2000 if available)
- Functional Testing

# Sources

- <http://www.aclsolutions.com/anatomy.php>
- [http://www.kneeclinicindia.com/knee\\_anatomy.php](http://www.kneeclinicindia.com/knee_anatomy.php)
- Real Time Assessment and Neuromuscular Training Feedback Techniques....
- Rationale and Clinical Techniques....
- Jeff's Slides
- Article for allograft achilles