Postoperative ACL Rehab

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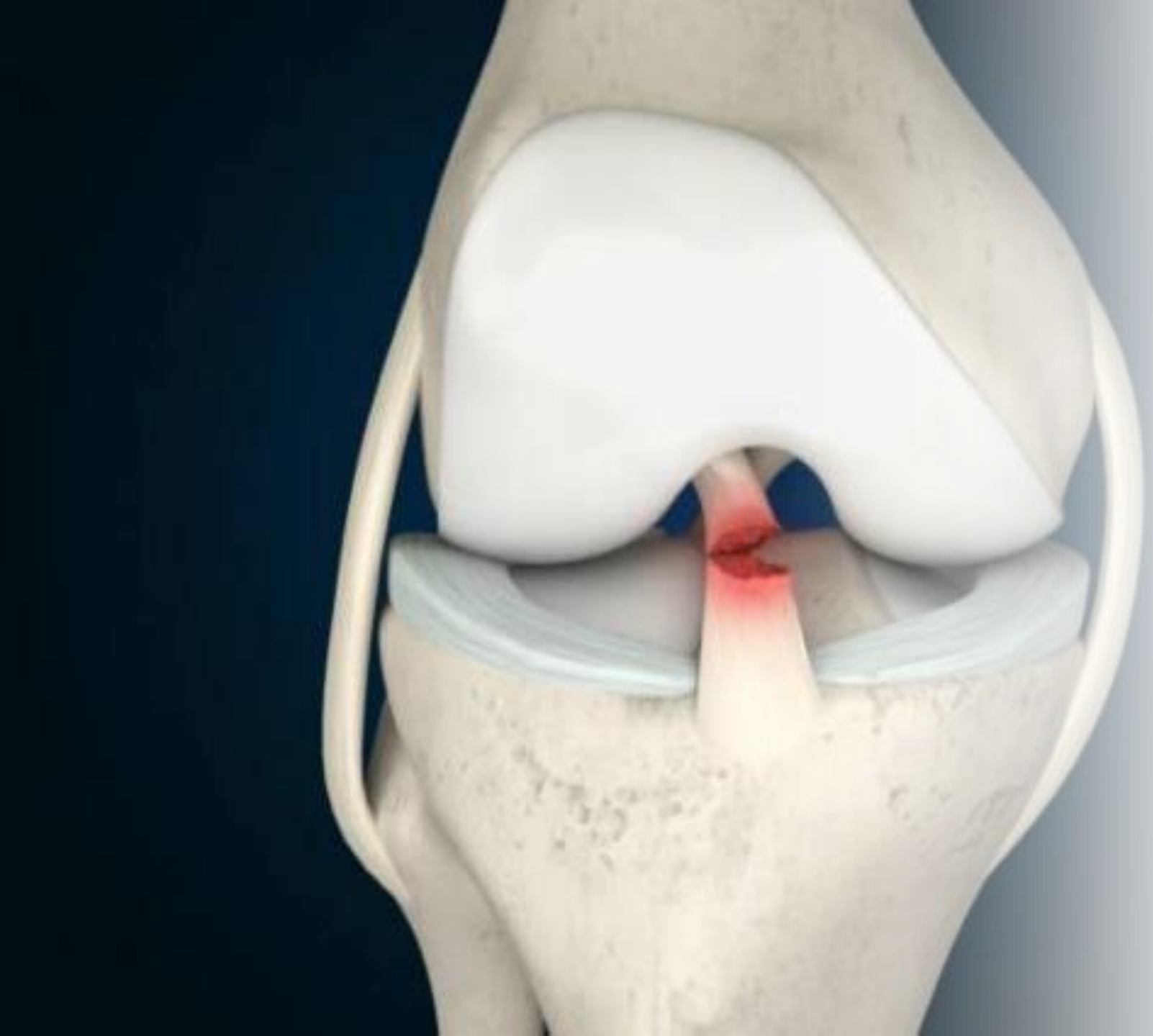


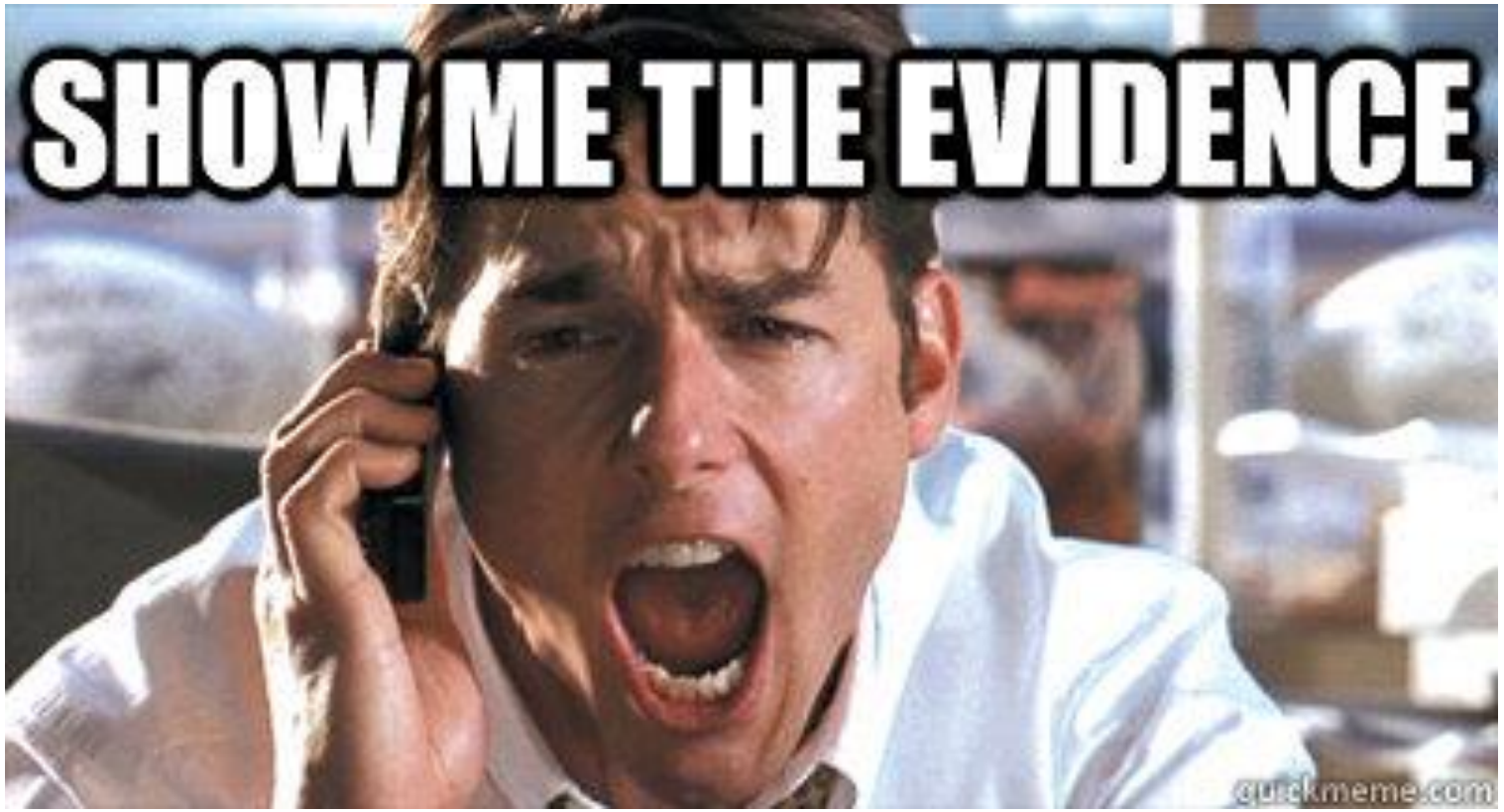
Prevalence

- Over 200,000 ACL injuries in USA annually
- More than half undergo surgical intervention

ACL Rehab Protocols

- Post-op rehab has changed dramatically
  - Time elapsed protocols vs. criteria-based guidelines
- ACL rehab protocols not standardized, despite large amount of studies

What Does The Evidence Say?!



Systematic Review

- Wright, Rick W., et al. "A systematic review of anterior cruciate ligament reconstruction rehabilitation–part II: open versus closed kinetic chain exercises, neuromuscular electrical stimulation, accelerated rehabilitation, and miscellaneous topics." The journal of knee surgery 21.03 (2008): 225-234.
  - 2-part systematic review
  - 54 Randomized controlled trials of ACL rehab
  - Looked at CPM, early WB, Bracing, Home-based rehab, e-stim
  - Goal to develop evidence-based protocols

Results

- Continuous Passive Motion (CPM)
  - No substantial advantage for CPM use other than possible decrease in pain
- Early Weightbearing
  - No harmful effects of early WB on stability or function
  - Anterior knee pain may be decreased by earlier recruitment of the VMO

Results Cont.

- Range of Motion
  - Early ROM vs. restricted- No difference in knee laxity in KT-1000 testing
  - Currently, most ACL rehab protocols institute early ROM

- Postoperative Bracing
  - No increase in injuries, pain, joint laxity found in control groups that were not braced after surgery
  - Postoperative bracing deemed not necessary following ACL reconstruction

Results Cont.

- Home-Based Rehab
  - Minimally supervised PT program can result in successful ACL rehab
  - All studies had some form of bias (lacked blinding, independent observation, or measure of compliance)
- Neuromuscular Electrical Stimulation
  - Must be applied at high intensity setting early in rehab process
  - May help achieve improved quad strength, but not necessary for successful rehab

RECAP

- Early WB appears beneficial and may decrease PF pain
- Early motion is safe and may help to avoid problems with later arthrofibrosis
- CPM usage is not warranted to improve outcomes
- Minimally supervised PT in selected motivated patients appears safe without significant risk of complications
- Bracing in extension or with hinges open does not offer significant advantages over no bracing
- NMES if deemed necessary for the patient should be instituted early in the postoperative timeframe and should be of high intensity to achieve meaningful results

Just show us your protocol!

Overview

- Don’t use strict timelines or protocols following ACLr
- Guidelines should be followed that allow rehab specialists to progress the patient
- Programs are individual, some patients advance sooner than others
- Objective quantitative and qualitative criteria should be met prior to RTS
- Time from surgery should not be the only consideration!

Range of Motion

- Extension
  - Full extension ASAP post-op!!
  - Ideally achieved before surgery
  - Brace locked at 0 to encourage extension at night

- Flexion
  - Immediately after surgery
  - Flexion to 120 by 4-6 weeks, full symmetrical by 10-12 weeks
  - AA over edge of bed, progress to wall slides, biking, etc.

Weight Bearing

- Partial WB at first using crutches, then WBAT based on quad control
- Allow knee joint to acclimate to increased loads
- Brace initially locked at 0, opened when demonstrating adequate quad control
- Crutches d/c when non-antalgic gait achieved
- WB may be delayed with other procedures (Osteotomy, meniscus repair, cartilage, etc.)

Phase 0 (Prehab)

- Pre-operative or patient education phase
- Discuss anatomy, bracing, typical post-op progressions
- Instruct in post-op exercise program (quad set, SLR, etc.)
- Immediate post-op instructions: Ice, elevate, crutches, etc.
- Goals before surgery
  - Reduce fear and anxiety about surgery and rehab process
  - Regain normal gait and ROM
  - No pain or swelling
  - Excellent quad activation

Post-op Phase 1 (Weeks 0-2)

- Goals
  - Full passive extension!
  - Passive flexion to 90
  - Control post-op pain/swelling
  - Early progressive WB (brace locked at 0)
  - Independent in HEP 3-5x day
- Precautions
  - Avoid prolonged standing/walking
  - Avoid active knee extension 40 → 0
  - Avoid heat application

Post-op Phase 1 (Weeks 0-2) Cont.

- Treatment Strategies
  - Extension! (Towel heel prop, prone hang, etc.)
  - Passive flexion (edge of table)
  - Quadriceps re-education: Quad set, SLR
  - Patellar mobilizations
  - Hip strengthening – Clamshells, abduction, etc.
  - Cryotherapy- Ice, Game Ready, etc.
  - Calf stretching & ankle pumps

Post-op Phase 2 (Weeks 2-6)

- Goals
  - ROM 0-120+
  - Minimal swelling
  - Normal non-antalgic gait
  - Good patellar mobility
  - Protect the graft
- Precautions
  - Avoid pain with exercises and functional activities
  - No impact loading (running, jumping)

Post-op Phase 2 (Weeks 2-6) Cont.

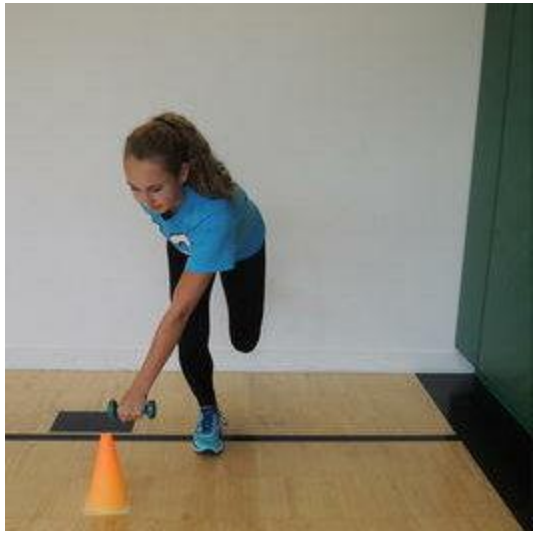
- Treatment Strategies
  - Stationary bike
  - Squat progressions (mini squat, body weight, goblet)
  - Core stabilization exercises
  - Proprioception and balance training
  - Step-ups
  - Active knee extension 90 to 40
  - Monster walks

Post-op Phase 3 (Weeks 6-14)

- Goals
  - Full symmetrical ROM
  - Improve confidence in limb
  - Improve muscular strength and endurance
  - Promote proper movement patterns
- Precautions
  - Avoid post-exercise pain/swelling
  - Avoid activities that produce pain at graft site
  - Avoid running and sport activity until adequate strength and physician clearance

Post-op Phase 3 (Weeks 6-14)

- Treatment Strategies
  - Elliptical
  - Progress squat program (Single leg sit to stand, Pistol, etc.)
  - Leg press (Double leg and single leg)
  - Lunge progressions (forward and lateral, weighted, BOSU [balance ball], etc.)
  - Advanced proprioception training (Single limb with perturbations)
  - Retrograde treadmill ambulation
  - Begin bilateral plyo program ~12 weeks



Post-op Phase 4 (Weeks 14-22)

- Goals
  - Pain free running
  - Maximize strength and flexibility
  - Reduce fear and improve confidence in limb
  - Improve cardiovascular endurance/conditioning
  - Good stability with Lachman’s exam or KT-1000 if ordered by MD

- Precautions
  - Avoid pain with therapeutic exercise and functional activities
  - Avoid sport activity until adequate strength, functional movement and MD clearance

Post-op Phase 4 (Weeks 14-22)

- Treatment strategies
  - Begin forward running program
  - Continue single leg strengthening
  - Advance agility and plyometric programs
    - Double leg jumps → Single leg
    - Single plane → Multiple planes
    - Stable surface → Unstable surface
    - Controlled → Uncontrolled situations

Post-op Phase 5 (RTS Weeks 22+)

- Goals
  - No apprehension with sport specific movements
  - Meet demands of individual's sport or activity
  - Isokinetic testing 85-90% limb symmetry
  - Hop testing >90% limb symmetry
  - Acceptable quality movement assessment

- Precautions
  - Avoid pain with therapeutic exercise and functional activities
  - Avoid sport activity until adequate strength, functional movement and MD clearance

Summary

- Progressions based on objective criteria vs. time frames
- Assess the patient and select exercises to properly challenge patient
- Consider forces placed on healing graft and PFJ during specific exercises/activities
- Early phase: FULL EXTENSION, decrease edema, quad recruitment
- Strengthening should progress in difficulty in variety of positions and settings
- Neuromuscular training implemented as early as appropriate
- RTS: Objective criteria need to be met, usually > 6 months

THANK YOU!!

50 YEARS

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