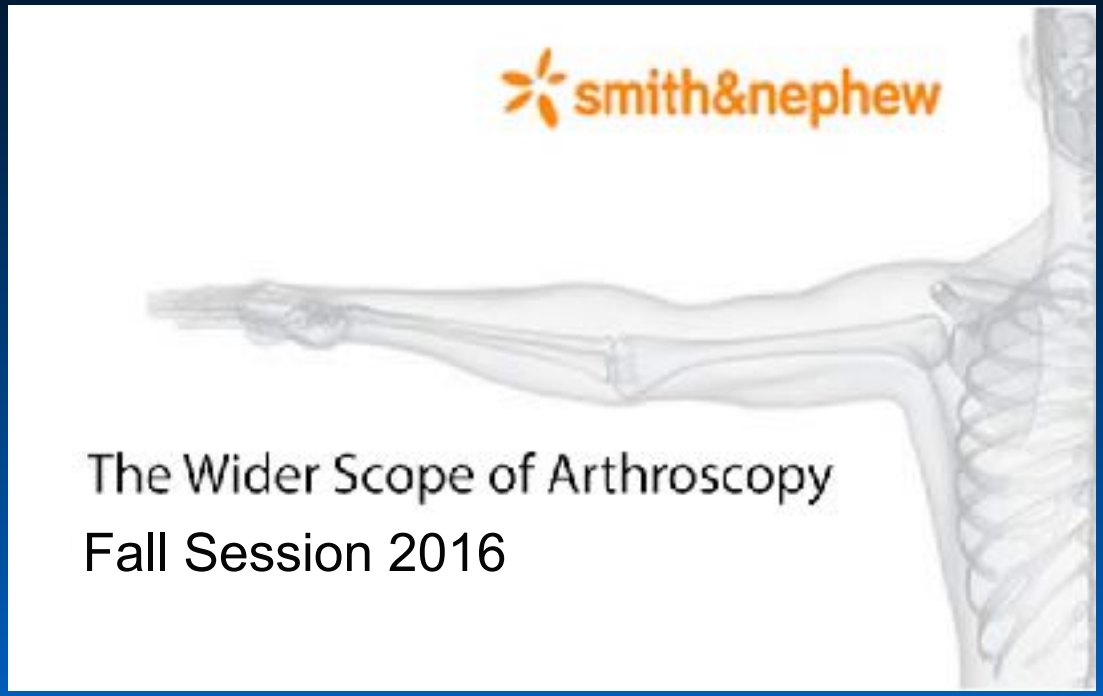
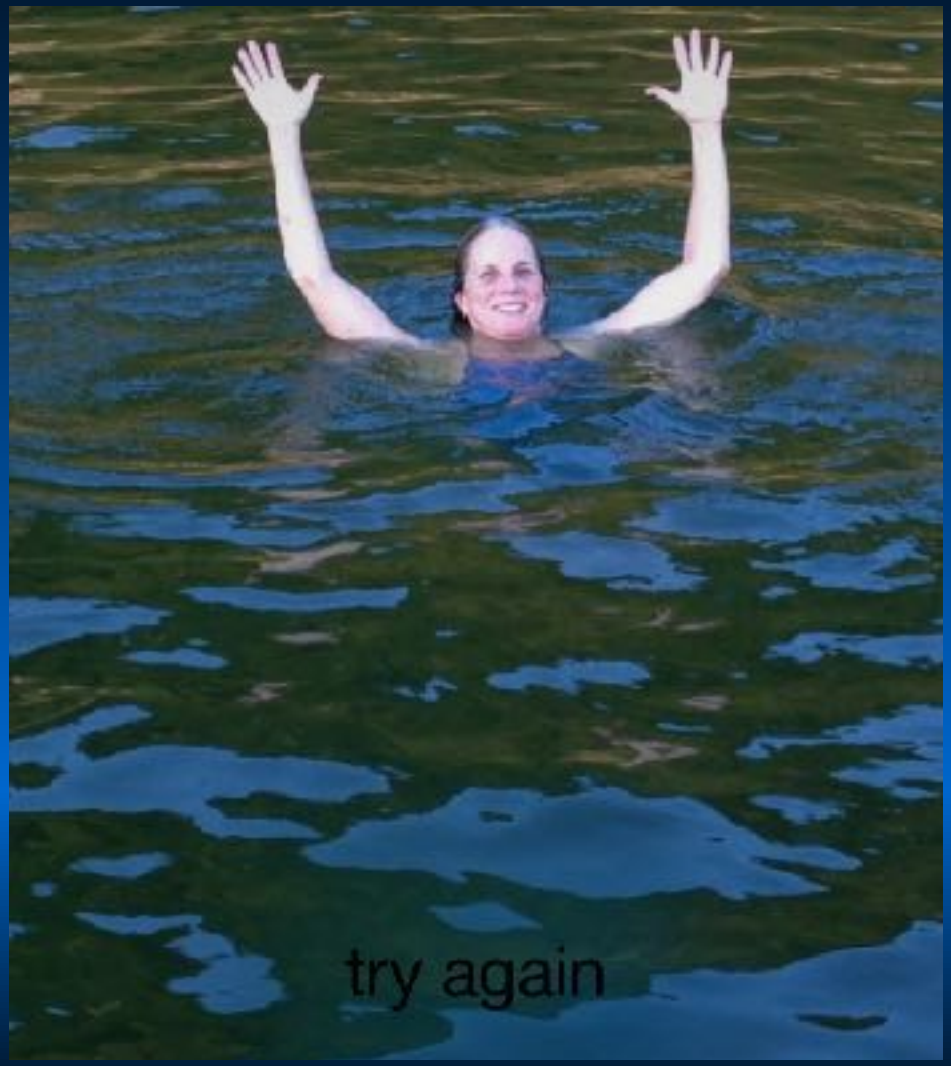
Post Operative Knee Rehab: Return to Play after ACLR

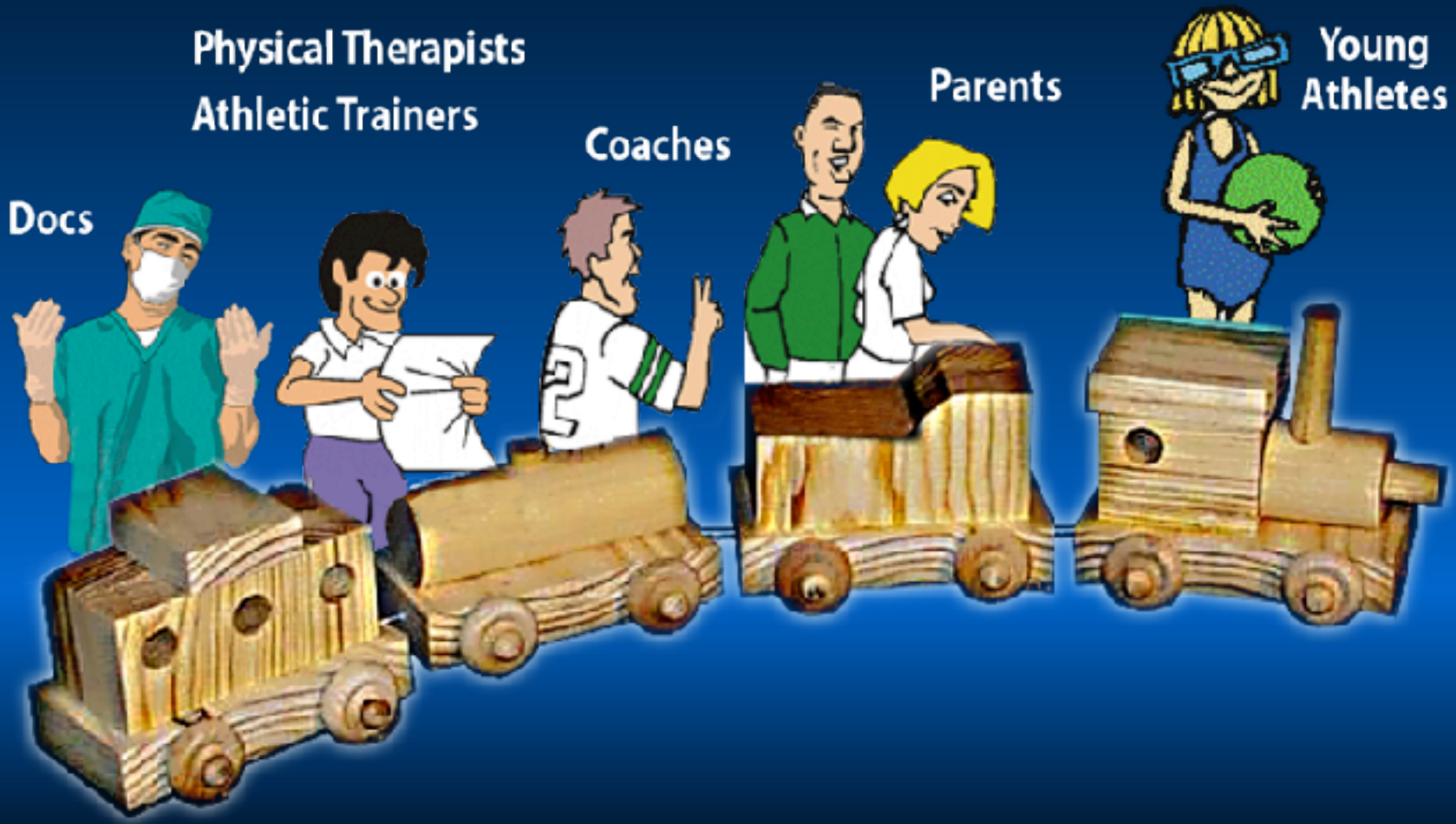


Mary Lloyd Ireland, M.D.
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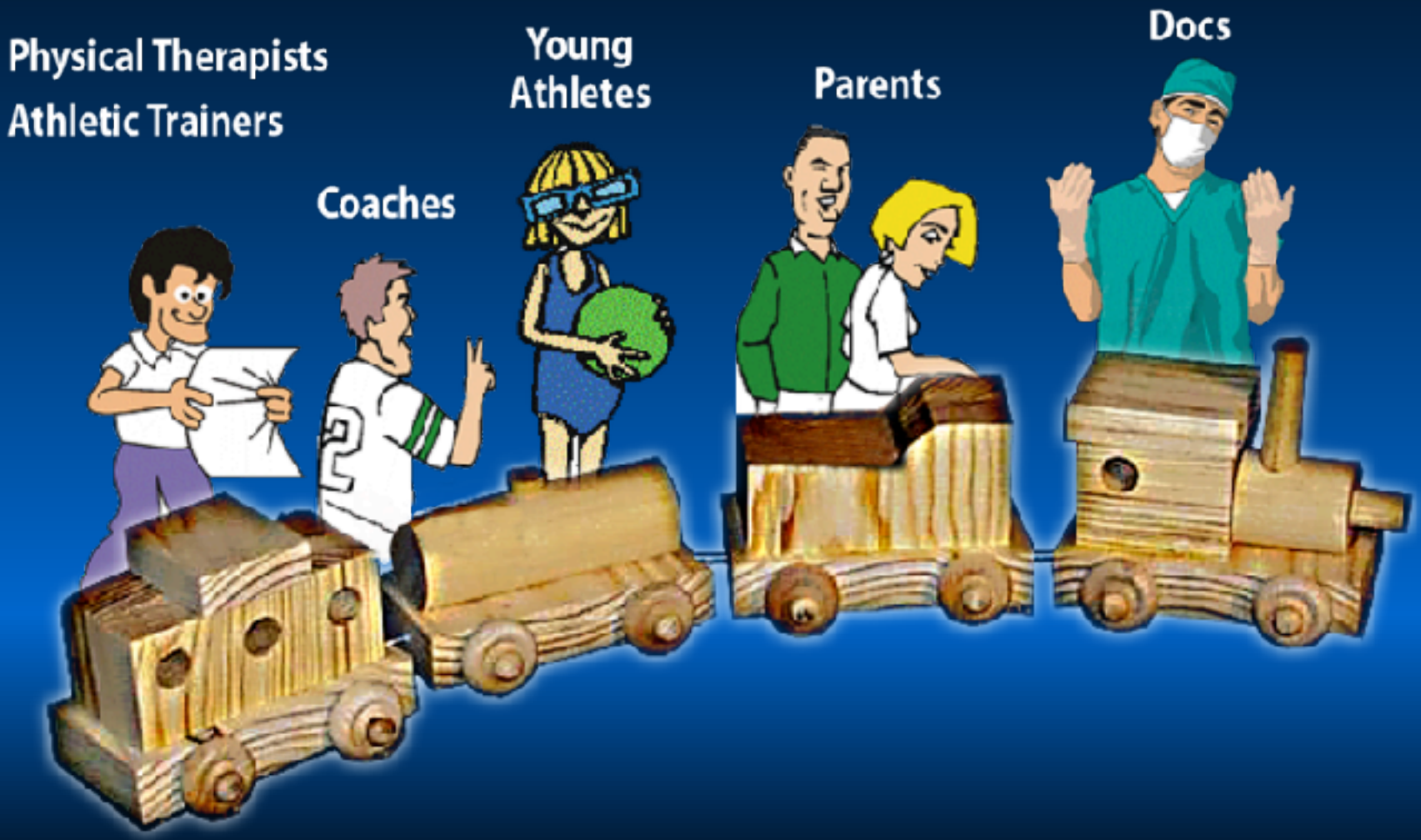
I HAVE NOTHING TO DISCLOSE.



Who is driving the ACLR RTP Train?



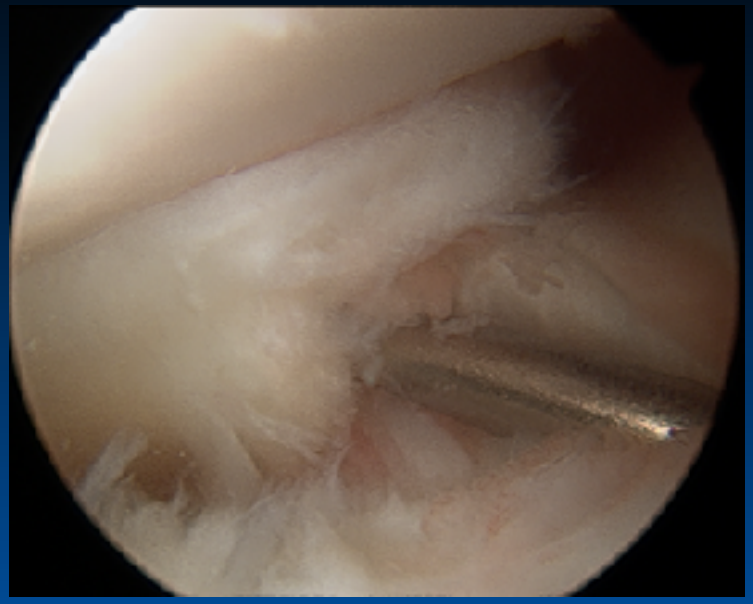
Who is driving the ACLR RTP Train?

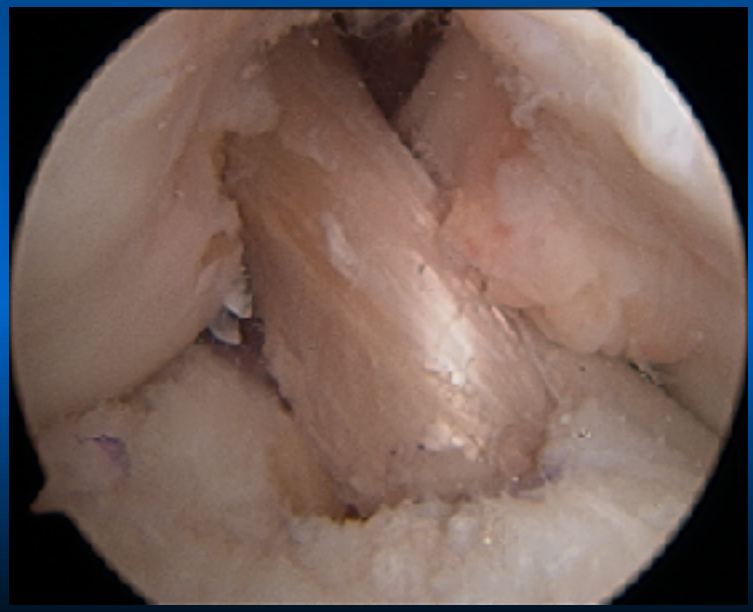


Can We Restore the Knee to Normal?

Stability: Yes...
To Pre Injury Biology
& Homeostasis: No!







Why is Rehab important to us surgeons?
Appropriate Use Criteria Adopted by AAOS October 2015


AAOS Now

NOVEMBER 2015

Two New ACL AUC, Checklists Now Available

Full scope of prevention and management of ACL injury covered

TERRY STANTON

Both prevention and treatment of anterior cruciate ligament (ACL) injuries can be confusing given the diversity of injured patients—from skeletally immature youth to older adults, low- and high-risk athletes playing a variety of sports, and patients with and without arthritis," acknowledged Robert H. Quinn, MD, Appropriate Use Criteria (AUC) Section Leader and the AAOS Committee on Evidence-Based Quality and Value.

In light of that diversity, the AAOS is making available a new suite of online resources to guide orthopaedic surgeons in the management of these injuries as well as in counseling patients about

SEE ACL AUC ON PAGE 39

The two new AUC include prevention programs geared to athletes and are accompanied by checklists for Postoperative Rehabilitation and Return to Play.

AAOS
American Academy of Orthopaedic Surgeons

American Association of Orthopaedic Surgeons

FEATURES

6 OTA Annual Meeting
Coverage begins with reports on the use of topical vancomycin, early weight bearing after intramedullary fixation, and vitamin D in trauma patients

ACL Reconstruction Surgery

-Patient Return to Play Checklist-

Clip this checklist to the patient chart and upon completion, insert in file.

Patient's Name: _____

Medical Record Number: _____

Date of Birth: ____/____/____

(Apply patient sticker over header if available)

Date of Surgery: ____/____/____

Post-operative anterior cruciate return-to-play protocol:

☐ Patient's graft incorporation and graft strength has been considered

☐ Patient's functional range of motion is restored

☐ Patient has a stable knee with no pivot

☐ Functional return of patient's core, hip, quadriceps and hamstring strength has occurred, as determined by clinician discretion (can be measured by a variety of methods)

☐ Patient's functional balance restored

☐ Patient attests or surgeon observes functional skills are performed adequately

☐ Patient is confident that they are ready to return to sport of interest

☐ Patient has been advised to participate in an ongoing ACL-prevention/ movement-retraining program

Clinician Signature: _____

Date/Time: _____

AAOS

After ACL Reconstruction:

- Goal: Safer not Faster Return to Play
- Varies with the Individual Patient
- Average RTP: Earliest 6 Months
- Know How to Work with Rehab Team
- Understand Functional Assessment Tests

What are we afraid of?

- Retear
- Athlete not performing well
- Surgeon looks bad
- Injure something else
- Angry athlete, parent, coach
- Develop OA

Quality and Variability of Physical Therapy Protocols for ACL Reconstruction
IN THE US THERE ARE NO
NO STANDARDIZED OR EVIDENCE BASED PROTOCOLS

- 155 Academic Orthopaedic Programs
- 33 Online post ACLR Protocols
- Substantial variability in types of exercises time to RTP
- Protocols not supported evidence based practices
- By Standardizing protocols might lead to improved outcomes

E. Makhni MD MBA, E. Crump MD, M. Steinhaus MD, N. Verma MD, C. Ahmad MD, B. Cole MD MBA, B. Bach Jr. MD
Rush Medical Center, Chicago IL - Presented at AAOS March 2016

Position of No Return

- Is it really knee valgus?
  - Seen from frontal plane, YES, but NOT from sagittal plane
  - Injury – Landing Pivot Shift
  - Knee: Anterior subluxation of tibia
  - Hip: Internal Rotation and Adduction
- Femoral rotation
  - First internal, then external
- Anterior tibial translation = "valgus collapse"

Ireland, ML. Anterior Cruciate Injury in Female Athletes: Epidemiology, in *J Athletic Training* 1999;34(2), 150-154.

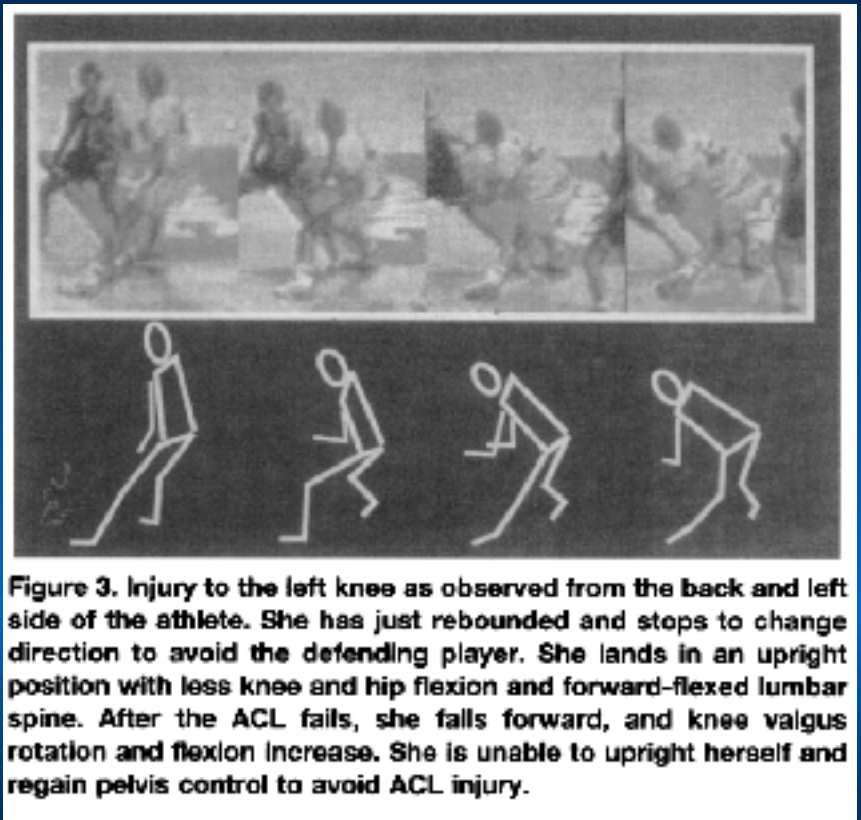
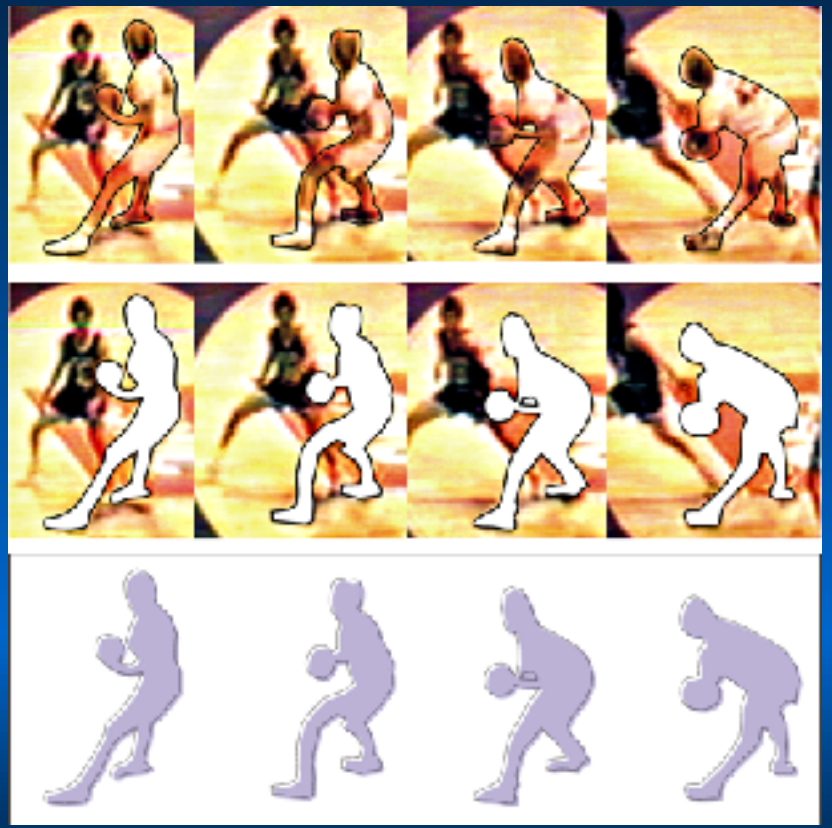


Figure 3. Injury to the left knee as observed from the back and left side of the athlete. She has just rebounded and stops to change direction to avoid the defending player. She lands in an upright position with less knee and hip flexion and forward-flexed lumbar spine. After the ACL fails, she falls forward, and knee valgus rotation and flexion increase. She is unable to upright herself and regain pelvis control to avoid ACL injury.



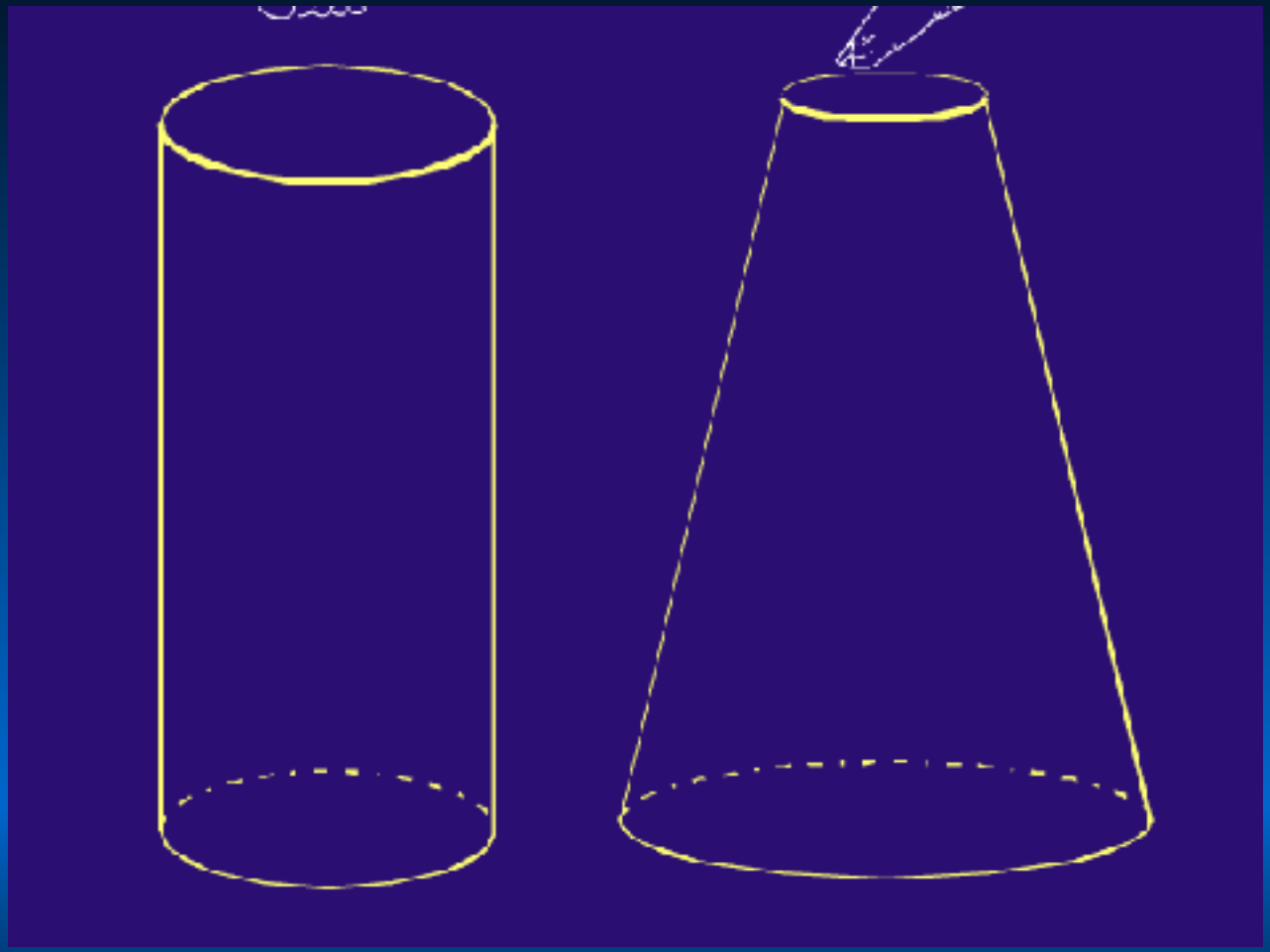
VROOM . . .

- Valgus
- Rotation
- Out
- Of control
- Movement



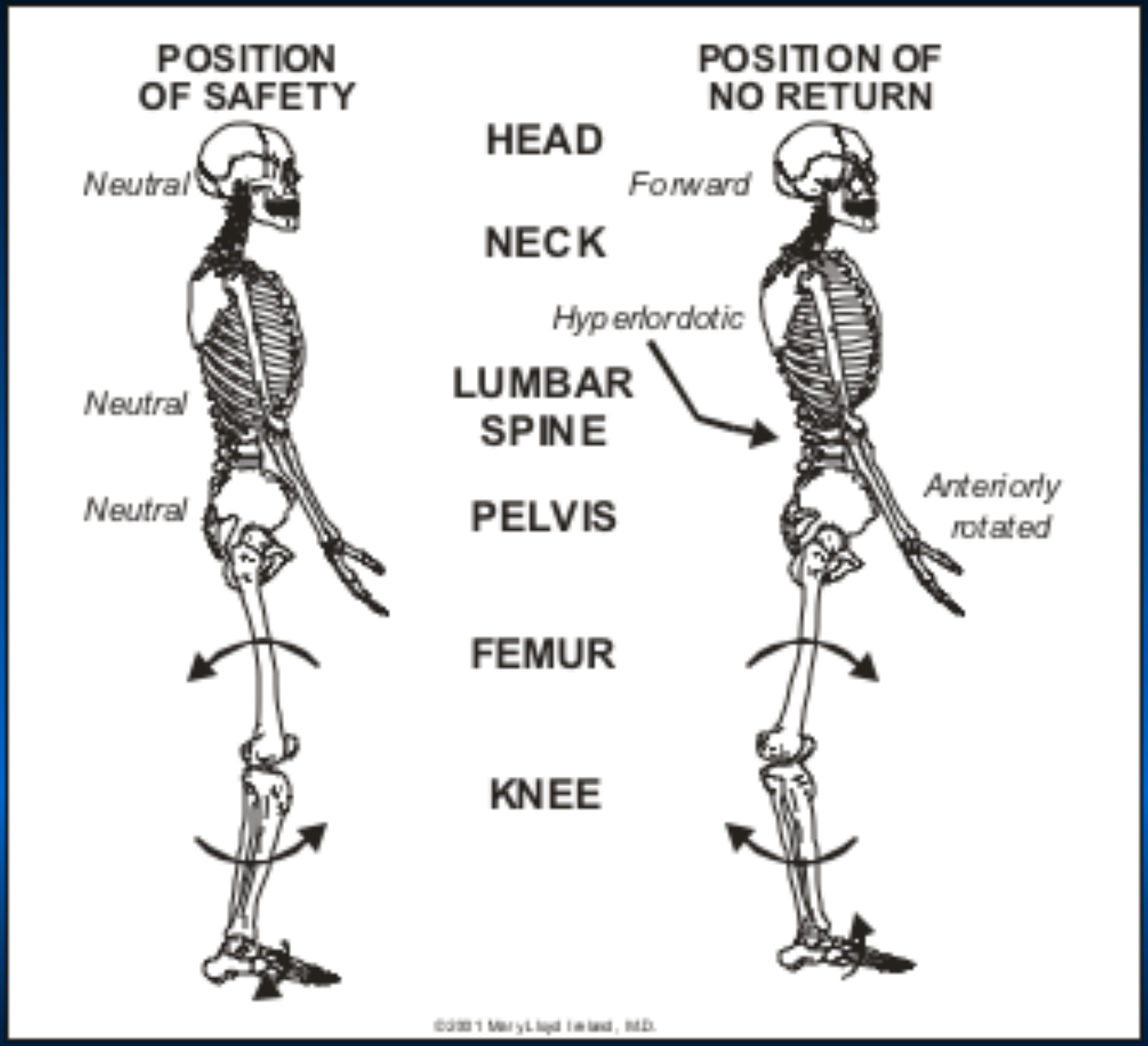
It takes 70 milliseconds to tear the ACL

Knee: Cone of Stability

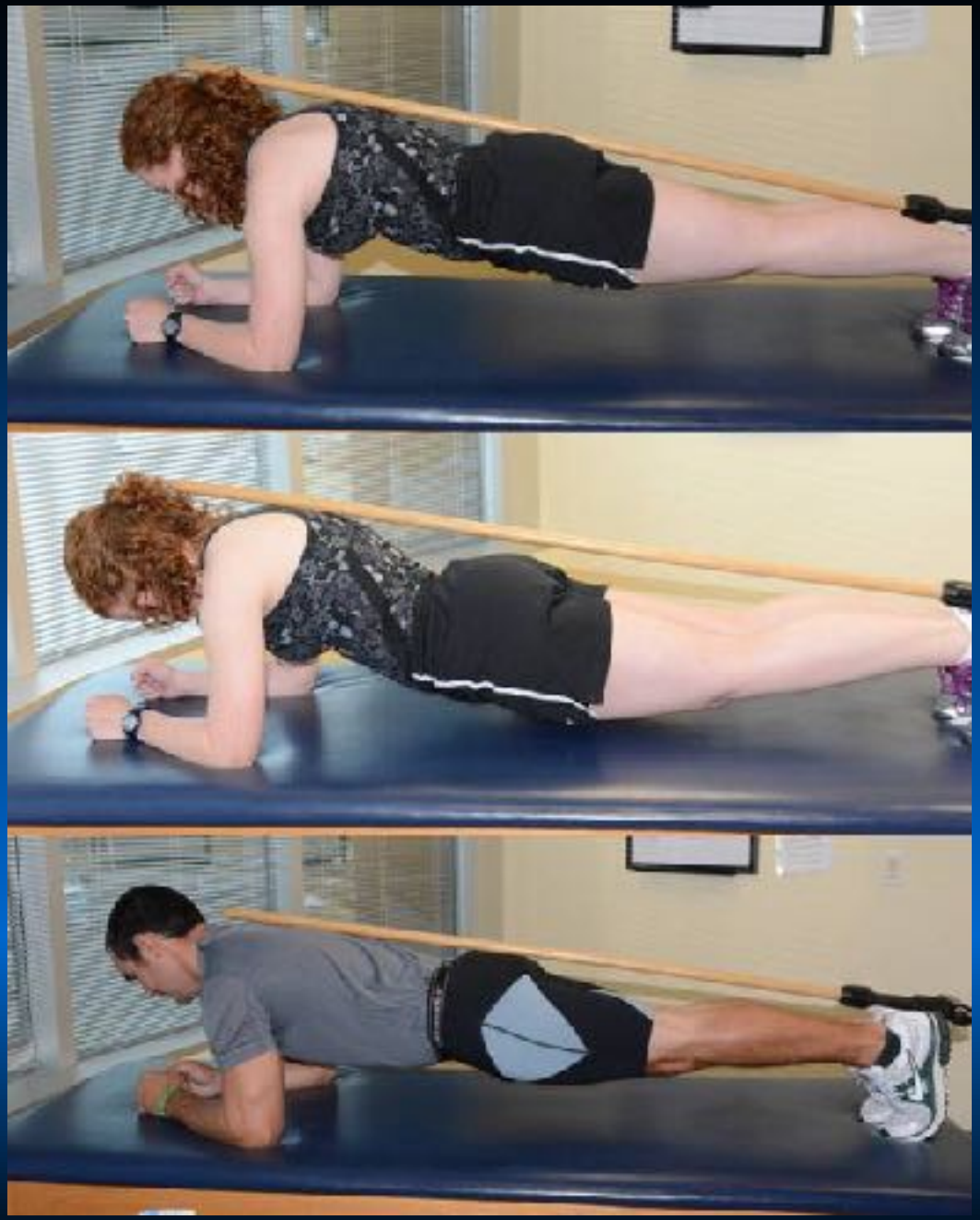




Alignment Proximal control / Core stability







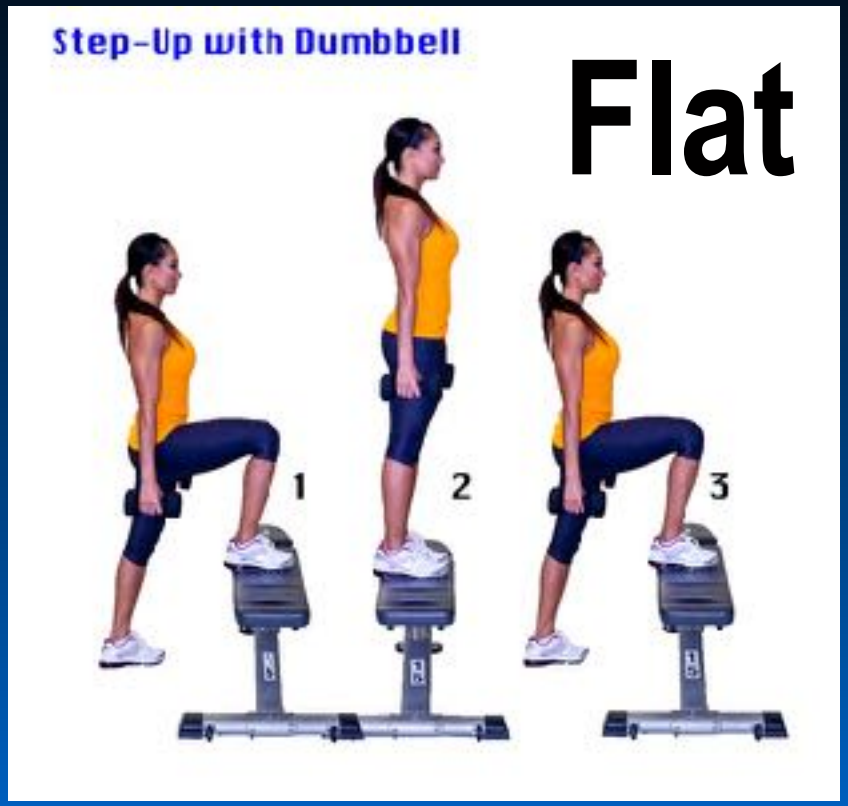
How to best get Quadriceps Back ….





- Eccentric
- Open Chain
- Safe variations of Eccentric Quad
  - Total Gym with bands early
  - Later Higher Weights

Eccentric Quad – Safe Or Sorry?



Wedge





Eccentric Quad – Safe Or Sorry?



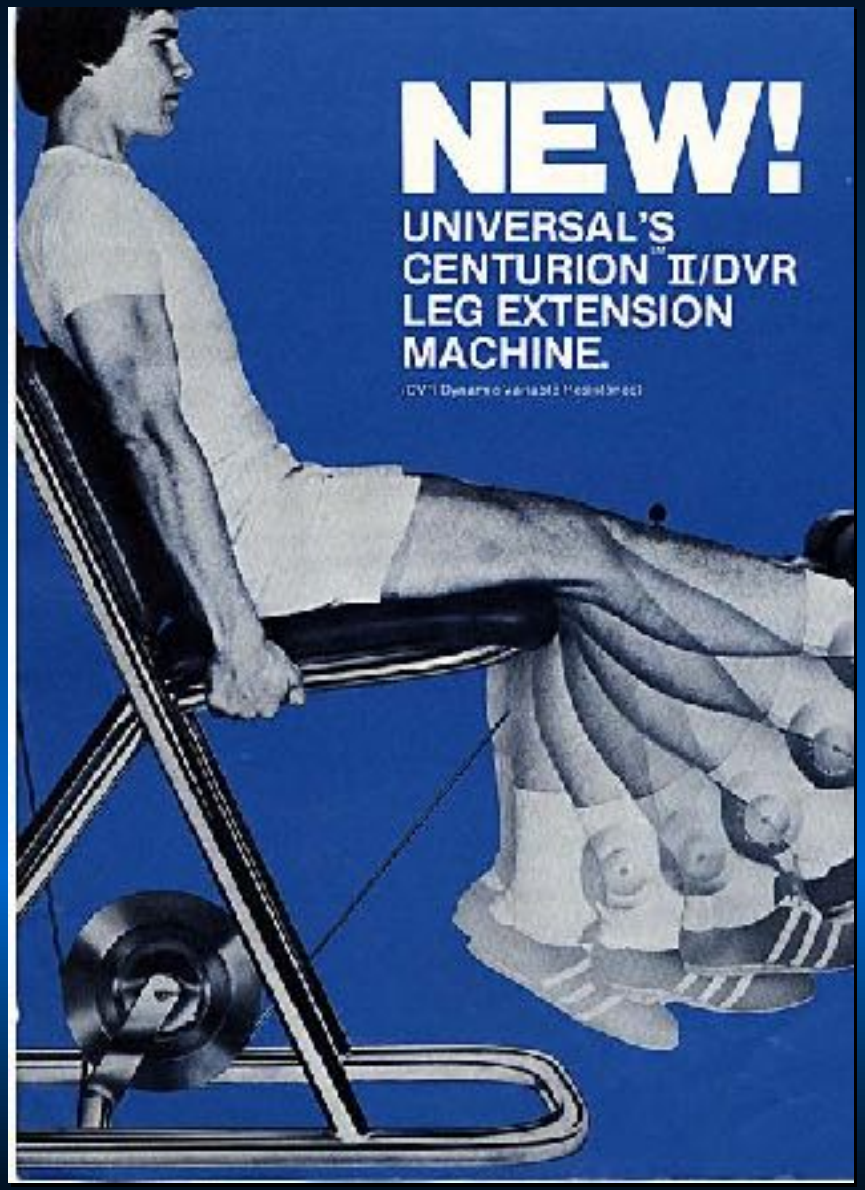
Bands

Weight



Open chain Extension Machines Safe or Sorry?

Dynamic
Variable
Resistance
1976
Dr. Gideon Ariel



Functional Assessment Tests

- Basic vs. Advanced
  - Strength – leg press
  - Balance
  - Timed agilities
  - Sport-specific dry-land testing to show athlete level of readiness to return to field of competition

What are the tests done to determine readiness for return to play?

Functional Assessment Level 1

- Gait assessment
- Single leg step and hold ×10
- Y Balance
- Strength testing
- Knee extension isometric 90°
- Hip abduction and seated external rotation
- One leg at bridges to fatigue
- Plank

Functional Assessment Level 2: Return to play

- Hop testing in inches
- Vertical hop
- Single-leg brought jump
- Timed 6 m hop
- Single-leg triple jump
- Single-leg crossover jump
- Hop testing quality assessment
- Good trunk control sufficient knee flexion avoid valgus

Grading scale

- 3 equals normal
- To equals minimal deviation
- One equals moderate deviation
- Zero equals marked deviation
- Assessment
- Passes all phases did not pass all phases because of the following deficiencies
- Pain
- Decreased eccentric knee control neuromuscular strength proximal strength

Functional Assessment



Functional Assessment



Limb Symmetry Index Goal 90%

- Single Leg Hop
- 6 Meter Timed Hop
- Triple Single Leg Hop
- Crossover Singe Leg Hop
- Single Leg Vertical Hop
- Strength
- Dynamometer Hip ER/ABD
- Leg Press
- # Step Downs in 1 minute
- Plank for Core

Functional Tests: Triple Jump



Trunk Control R ACLR





Trunk Control Test Errors:

p = 0.001

ACL = 7.1 Control = 3.4 ACL Opposite = 5.8

Level to clearance for sports

- Drop-off box to squat jump plyometric repeat 3-5 times graded on 0-3
- Feet symmetrical and hit together
- Symmetric insufficient knee flexion
- Landing is soft
- Avoid valgus
- Landing is balanced

Gait Analysis, Balance, and Strength

What do we compare?

Normal vs Post ACLR vs Uninjured Leg

What are the objective measurements of?

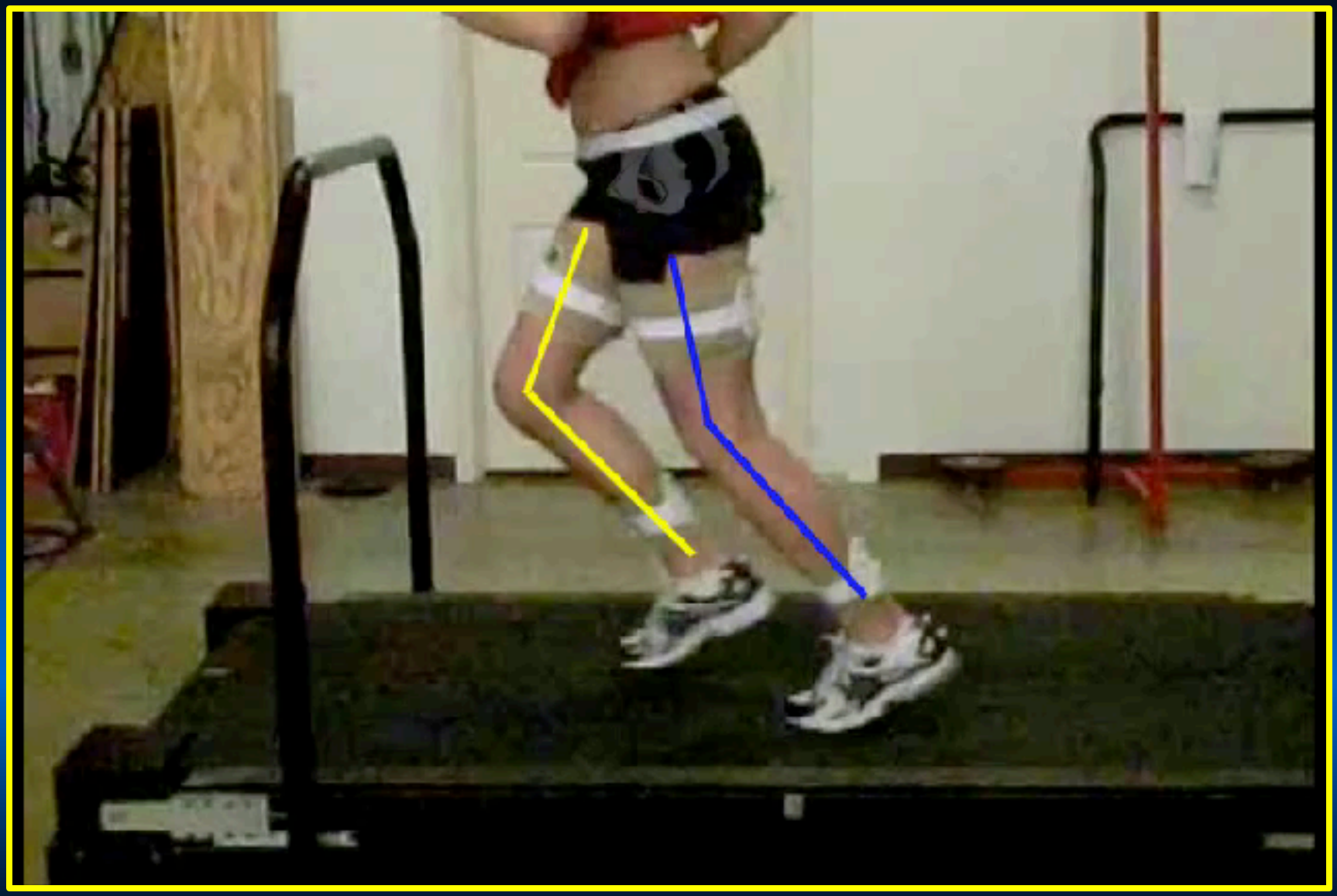
Hip, Trunk, Balance, Gait

What do the functional tests we do really tell us?

Tell the Patient if they are ready or not.

What are the Best Tests to Do?

10 Months R ACLR



Voluntary tibial translation: A good habit?



Functional Testing



How Many Step Downs in 60 sec?

- ACLR Side
- “Normal Side”
- Normal Control

Does Position of the Arms Matter?

- On Hips
- Overhead
- At Side
- On Chest



How Many Step Downs in 60 sec?

ACLR Side	31.8	
		p=.008
“Normal Side”	36	
		p=.026
Normal Control	40	

Noehren B. et al work in progress

Successful ACLR:

Short term: safer not faster return to play
Long term: prevention of osteoarthritis

- Average return to play 6 months
- Varies with each individual patient age and sport
- Many factors the athlete must overcome prior to return:
- Fear of reinjury
- Reestablishing strength balance hip and knee control

K. Donald Shelbourne MD
RTP after ACLR

- RTP Average 5 months range 2-18 months
- Learn from your own results
- You can't make decisions based off others data
- 34 years dedicated to my data collection
- Goal ACLR patient
- Make the Knee Symmetrical
  - Stable Clinical Exam and KT
  - Full Symmetrical ROM
  - Normal Appearance/Strength



147 Football Players – MOON Cohort Study

- 68 high school
- 26 collegiate
  - Return to play rates –
    - High school (63%)
    - College (69%)
- 70% Return to Play
- 50% Fearful of Reinjury

McCullough KA et al. Return to high school-and college-level football after anterior cruciate ligament reconstruction: a Multicenter Orthopaedic Outcomes Network (MOON) cohort study. *Am J Sports Med* 2012;40(11): 2523-2529.

There remains a paucity of objective criteria and consensus guidelines to facilitate the decision of RTP after ACLR

More emphasis on Psychological state Kinesiophobia or Fear of Reinjury”Need reliable consensus guidelines with objective and subjective criteria prior to RTP

Return to Play Following Anterior Cruciate Ligament Reconstruction

Michael B. Ellman, MD, Seth L. Sherman, MD, Brian Forsythe, MD, Robert F. LaPrade, MD, PhD Brian J. Cole, MD, MBA Bernard R. Bach, Jr, MD

J Am Acad Orthop Surg 2015;23: 283-296

"The Uneven Playing Field"

- By Michael Sokolov
  New York Times, May 11, 2008

- Janelle Pierson
  - High school soccer player
  - Multiple ACL injuries, both knees
  - Mindset: after surgeries, multiple knee injuries
    - Rehab hard
    - Get back on the field
    - Compete fiercely
    - Hope not to be injured

2 years after ACLR

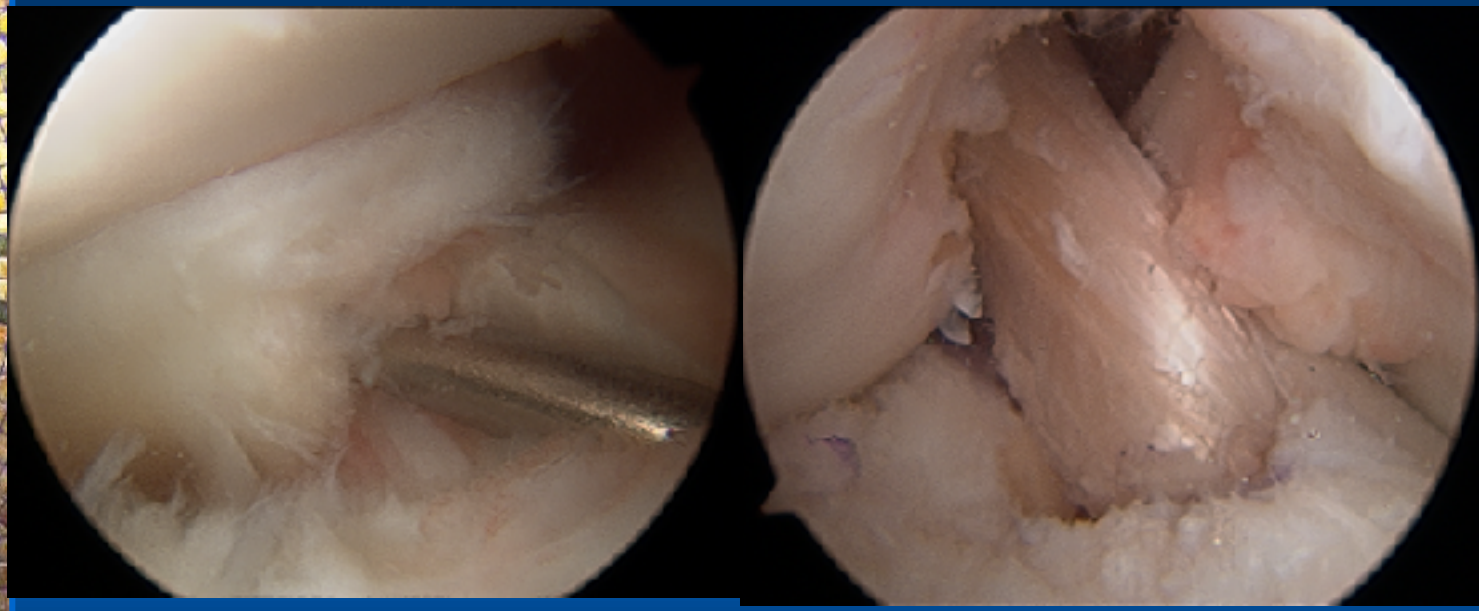
Young active athletes returning to high level sports

- **Less likely for second ACL injury**
- **More likely regain knee joint biological health and function**
- **? Delay development of OA**

Should Return to Sports be Delayed until 2 Years after ACLR? Biological and Functional Considerations, Nagelli C, Hewett T, *Sports Med.* July 2016

Orthopaedic Surgeons Can Stabilize the Knee, but not restore it to pre injury state.
Rethink Biologic Healing and Timing of Return to Play…
Variable due to Multiple Factors…





Pay attention!
Do the right thing for your patient.







Should We Be On Team Accelerate??



OR Team Slow Boat to Return to Play??





How Are Our Patients Doing After ACLR
Not as well as we orthopaedists think!

Most important factors:

- Strength
- Balance
- Confidence
- Sport
- Surgeon

We Are So Fortunate. Enjoy the Ride



Thank you



www.MaryLloydIreland.com