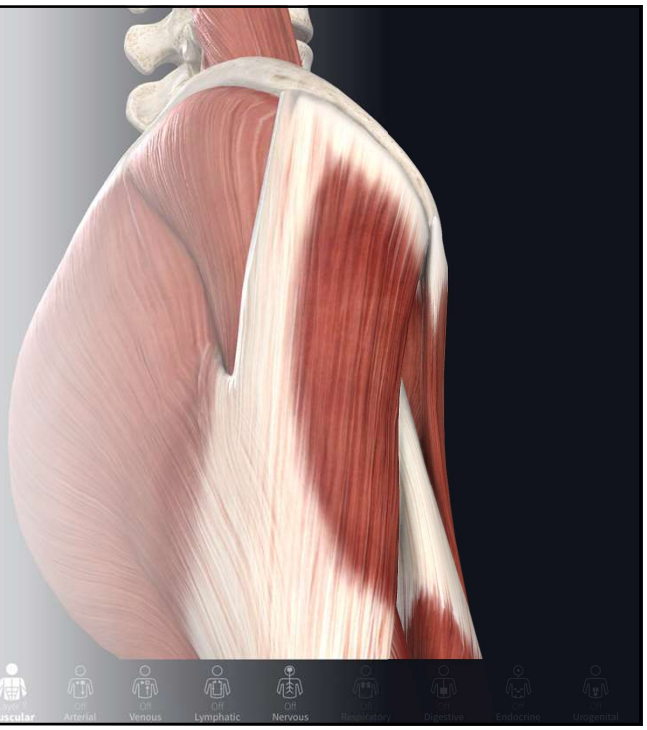
Combating Microinstability of the Hip and Shoulder

Christine Foss

MD, DC, MS,ED., ATC, DACBSP, DACBR, ICSC



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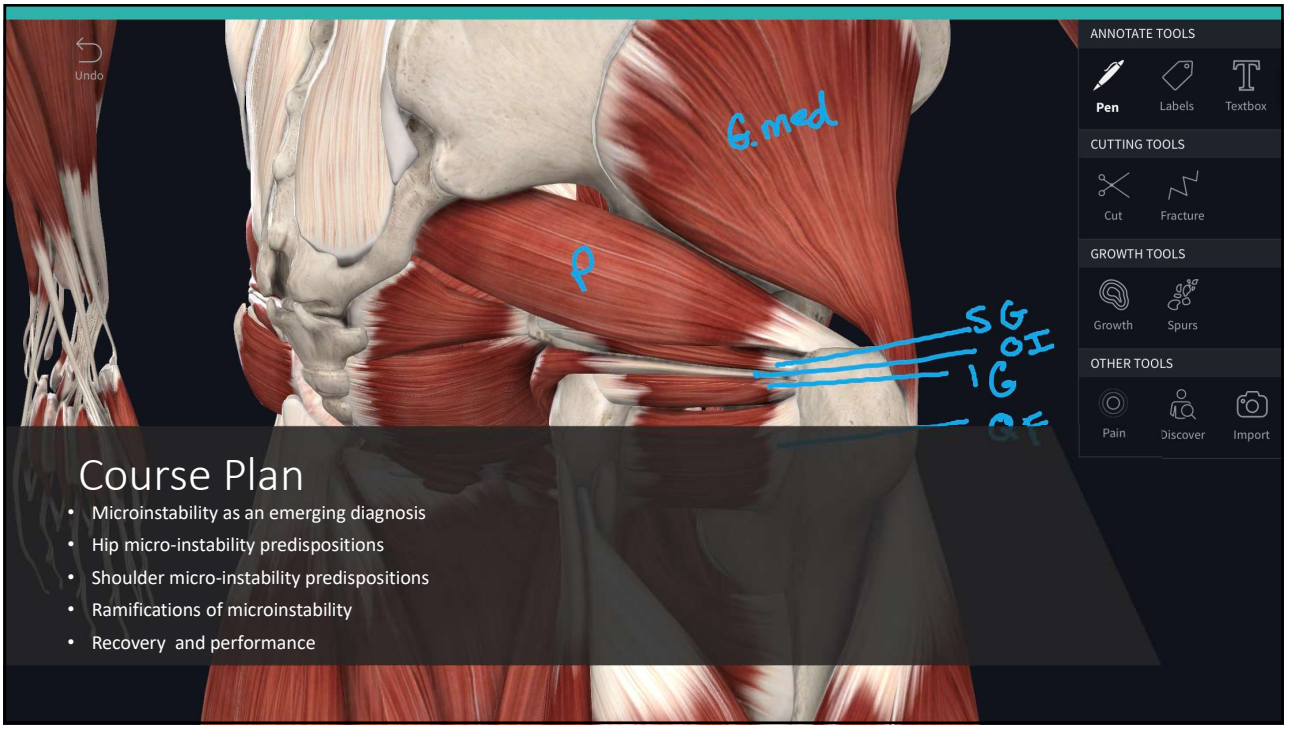


Course Plan

- Microinstability as an emerging diagnosis
- Hip micro-instability predispositions
- Shoulder micro-instability predispositions
- Ramifications of microinstability
- Recovery and performance

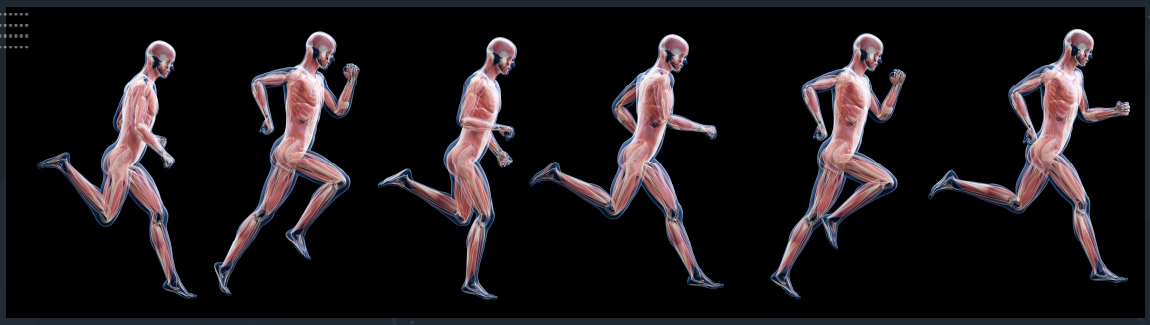
2

Surgical Interventions of the Hip

- 600% increase in surgical interventions over the last 6 years. (research)
- Why??
- The most common surgical intervention of the hip

FOOT LEVELERS

3



The Plan

- Review some relevant anatomy
- Jump into Common Sports Injuries of the hip
- *Discuss the Recovery Plan
- *Execution of the Rehabilitation Phase of Care
- *Progression of Care to Functional and Dynamic Rehabilitation
- *Return to Sport

4

Epidemiology of Hip and Groin Injuries in Collegiate Athletes in the United States

Yehuda E. Kerbel,*† MD, Christopher M. Smith,‡ MD, John P. Prodromo,† MD, Michael I. Nzeogu,† MD, and Mary K. Mulcahey,§ MD

Investigation performed at the Department of Orthopaedic Surgery, Drexel University College of Medicine, Philadelphia, Pennsylvania, USA

Background: Hip and groin pain is a common complaint among athletes. Few studies have examined the epidemiology of hip and groin injuries in collegiate athletes across multiple sports.

Purpose: To describe the rates, mechanisms, sex-based differences, and severity of hip/groin injuries across 25 collegiate sports.

Study Design: Descriptive epidemiology study.

Methods: Data from the 2009-2010 through 2013-2014 academic years were obtained from the National Collegiate Athletic Association Injury Surveillance Program (NCAA ISP). The rate of hip/groin injuries, mechanism of injury, time lost from competition, and need for surgery were calculated. Differences between sex-comparable sports were quantified using rate ratios (RRs) and injury proportion ratios (IPRs).

Results: In total, 1984 hip/groin injuries were reported, giving an overall injury rate of 53.06 per 100,000 athlete-exposures (AEs). An adductor/groin tear was the most common injury, comprising 24.5% of all injuries. The sports with the highest rates of injuries per 100,000 AEs were men's soccer (110.84), men's ice hockey (104.90), and women's ice hockey (76.88). In sex-comparable sports, men had a higher rate of injuries per 100,000 AEs compared with women (59.53 vs 42.27, respectively; RR, 1.41 [95% CI, 1.28-1.55]). The most common injury mechanisms were noncontact (48.4% of all injuries) and overuse/gradual (20.4%). In sex-comparable sports, men had a greater proportion of injuries due to player contact than women (17.0% vs 3.6%, respectively; IPR, 4.80 [95% CI, 3.10-7.42]), while women had a greater proportion of injuries due to overuse/gradual than men (29.1% vs 16.7%, respectively; IPR, 1.74 [95% CI, 1.46-2.06]). Overall, 39.3% of hip/groin injuries resulted in time lost from competition. Only 1.3% of injuries required surgery.

Conclusion: Hip/groin injuries are most common in sports that involve kicking or skating and sudden changes in direction and speed. Most hip/groin injuries in collegiate athletes are noncontact and do not result in time lost from competition, and few require surgery. This information can help guide treatment and prevention measures to limit such injuries in male and female collegiate athletes.

Keywords: hip/pelvis/thigh injuries; femoroacetabular impingement; groin pain; epidemiology

FOOT LEVELERS

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What does the Research Say…

- A Sport-specific Analysis of the Epidemiology of Hip Injuries in National Collegiate Athletic Association Athletes From 2009 to 2014
- Author links open overlay panelChristian A.CruzM.D.[a]YehudaKerbelM.D.[b]Christopher M.SmithM.D.[c]JohnProdromoM.D.[b]Jeffrey D.TrojanM.S.[d]Mary K.MulcaheyM.D.[e]

- Results
- In total, 1,984 hip injuries were reported in 25 NCAA sports, including 9 male and female sports, 3 male-only sports, and 4 female-only sports between the years 2009/10 and 2013/14, resulting in an overall hip injury rate of 53.1/100,000 athletic exposures (AEs). In sex-comparable sports, (basketball, cross-country, lacrosse, ice hockey, indoor track, outdoor track, soccer, swimming, and tennis), men were more commonly affected than women (59.53 vs 42.27 per 100,000 AEs respectively; rate ratio, 1.41; 95% confidence interval, 1.28-1.55). Subgroup analysis demonstrated that the highest rate of hip injuries per 100,000 AEs occurred in impingement sports (96.9). Endurance sports had the highest proportion of injured athletes with time lost >14 days (9.5%). For impingement-type sports, the most common mechanism of injury was no apparent contact (48.2%). The rate of athletes undergoing surgery per 100,000 AEs was highest in impingement-type sports (2.0).
- Conclusions
- We have identified that impingement-type sports are most frequently associated with hip injuries. Additionally, this study demonstrates that hip injuries sustained in athletes who played impingement-type sports had a significantly higher rate of surgical intervention than other sport classifications.

FOOT LEVELERS

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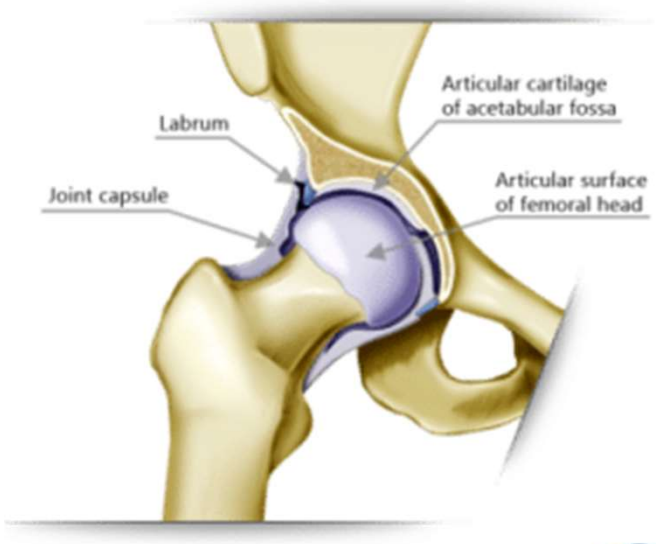
The HIP

- Understanding the anatomy of the hip
- A synovial ball joint
- The articulation of the femur with the pelvis

7

The HIP

- Basic Anatomy
- Articulation
- Multidirectional articulation
- Blood Flow
- Limitations
- Muscular Actions



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What is Micro-instability of the Hip

- Define
- Research

9

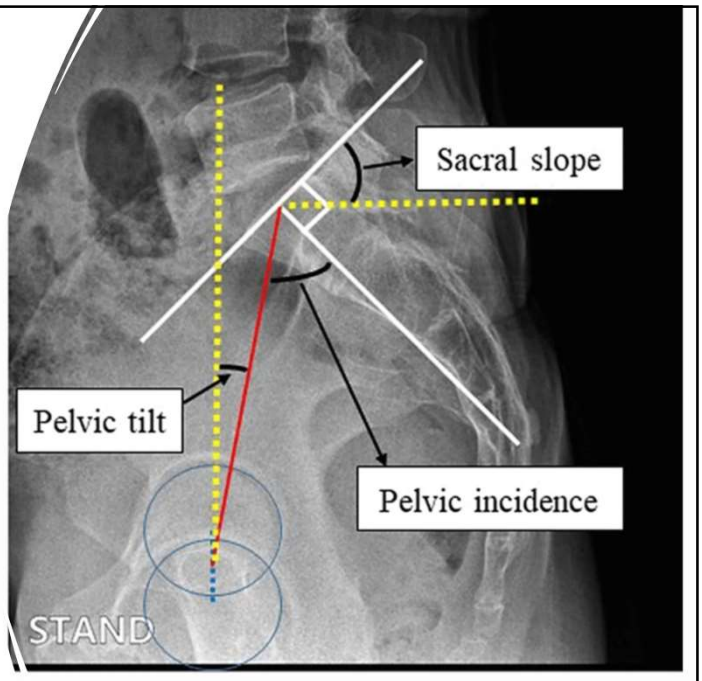
Causes of Hip Micro instability

- Structure
- Function
- Terrain
- Footwear
- Strength
- Conditioning for sport specific tasks
- Congenital issues

10

Pelvic Incidence Angle

- Ramifications
- Causes
- What is the fix?



agittal parameters based on standing plain radiography

11

Ramifications of Hip Micro-instability

- Pincer
- Cam
- Mixed FAI
- Capsular Strain
- Local muscular repetitive stress
- Regional compensatory changes
- Eary degenerative changes
- Kinetic chain compensatory injury masked as another injury

Knee Surgery, Sports Traumatology, Arthroscopy (2022) 30:3526–3534
https://doi.org/10.1007/s00167-022-06881-z

HIP

Acetabular labral tear is associated with high pelvic incidence with or without femoroacetabular impingement morphology

Hyuck Min Kwon[1] · Byung-Woo Cho[2] · Sungjun Kim[3] · Ick-Hwan Yang[2] · Kwan Kyu Park[2] · Nak-Hoon Son[4] · Woo-Suk Lee[5]

Received: 25 August 2021 / Accepted: 13 January 2022 / Published online: 31 January 2022

Abstract

Purpose The aim of this study was to investigate the association between pelvic sagittal parameters and acetabular labral tears.

Methods Three-hundred and sixty-five patients (449 hips) who underwent magnetic resonance imaging (MRI) or magnetic resonance arthrogram (MRA) for hip pain were enrolled in this study. Pelvic sagittal parameters, including the pelvic incidence, pelvic tilt, and sacral slope, were measured with a standing lumbosacral lateral radiograph. All subjects were divided into two groups according to the presence or absence of radiologic acetabular labral tears and compared. Furthermore, the two groups were divided into subgroups according to whether femoroacetabular impingement (FAI) morphology was present or not and compared.

Results Pelvic incidence was greater in the labral tear group than in the non-labral tear group (52.3° ± 8.2° versus 47.1° ± 6.8°, $p < 0.001$). After accounting for potentially confounding variables, we found that higher age (odds ratio 1.04, 95% confidence interval [CI] 1.02 to 1.06, $p = 0.001$), FAI (odds ratio 15.11, 95% CI 7.43 to 30.75, $p < 0.001$), and high pelvic incidence (odds ratio 1.13, 95% CI 1.09 to 1.17, $p < 0.001$) were independently associated with acetabular labral tear. When only the patients without FAI (308 hips) were divided into groups with and without acetabular labral tear, we found that higher age (odds ratio 1.03, 95% CI 1.01 to 1.06, $p = 0.008$) and high pelvic incidence (odds ratio 1.15, 95% CI 1.11 to 1.19, $p < 0.001$) were independently associated with acetabular labral tear.

Conclusion Acetabular labral tear is associated with high pelvic incidence with or without FAI morphology.

Level of evidence III.

Keywords Acetabular labral tear · Pelvic incidence · Femoroacetabular impingement

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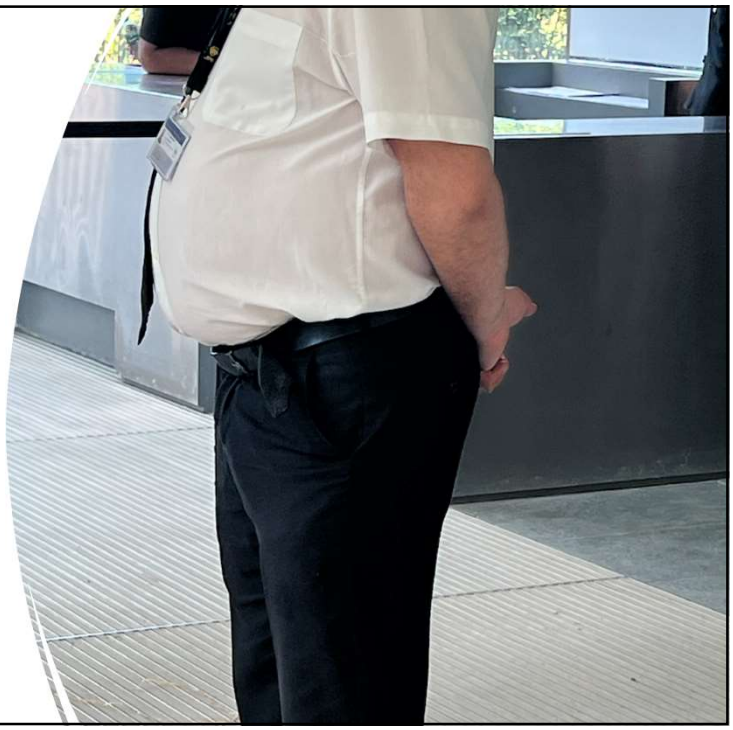
What does this look like in the general population

- Pelvic Incidence angle and micro instability of the hip



FOOT LEVELERS

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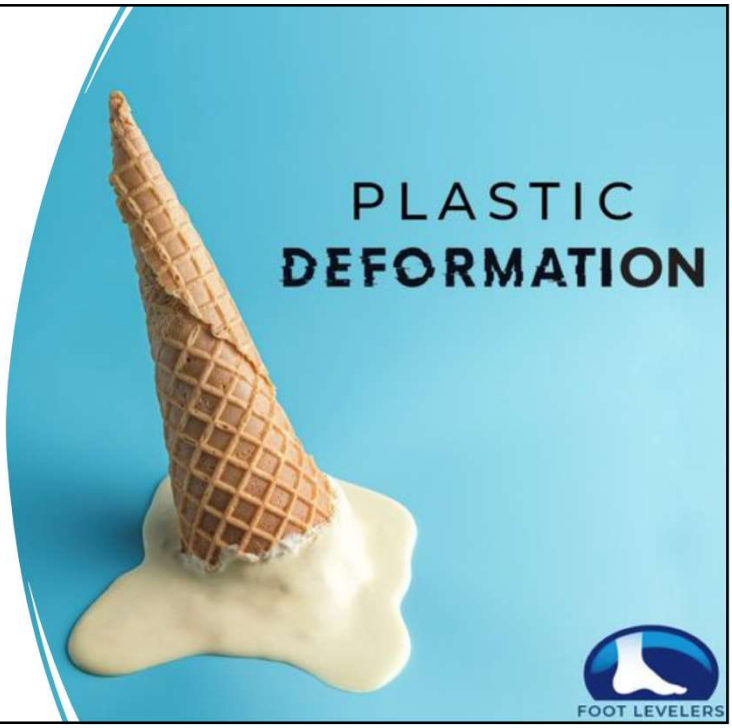
What can we fix

- Understanding the layers of the human frame, structurally and functionally



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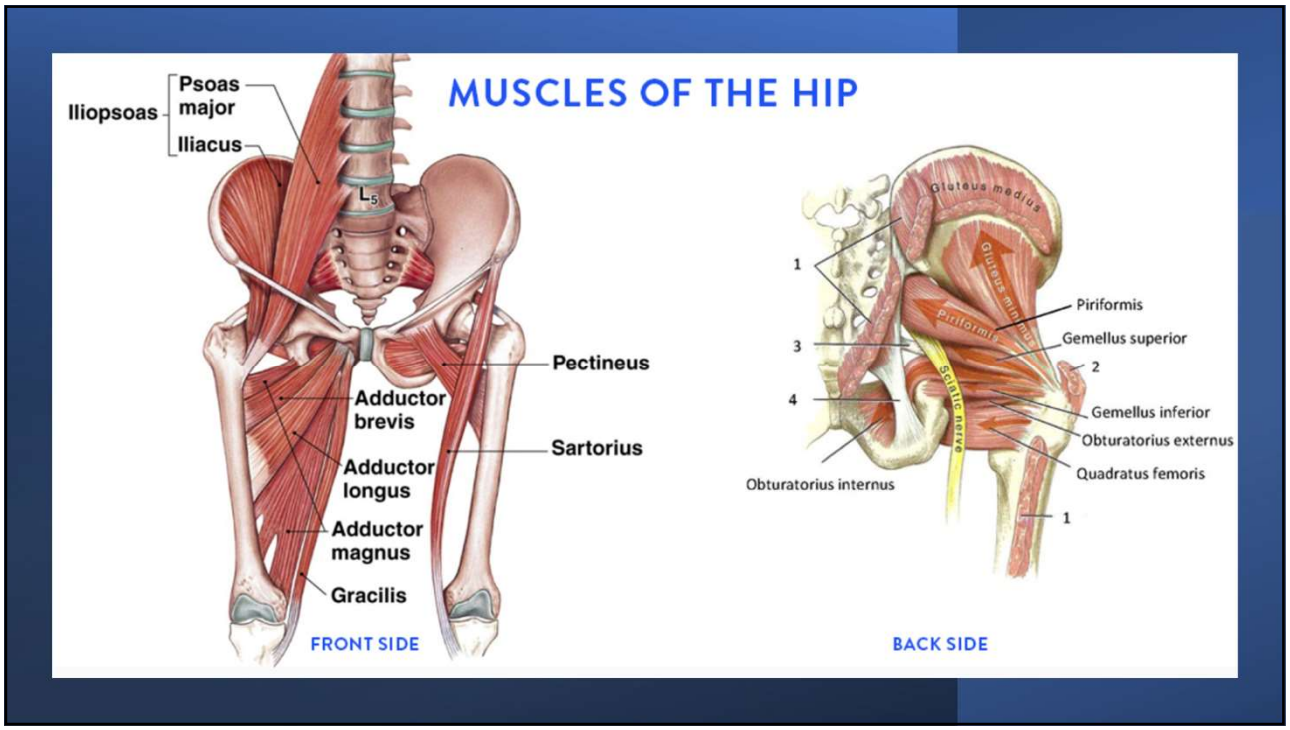
MUSCLES OF THE HIP
Iliopsoas
Psoas major
Iliacus
L5
Pectineus
Adductor brevis
Sartorius
Adductor longus
Adductor magnus
Gracilis
FRONT SIDE
Gluteus medius
Gluteus minimus
Piriformis
1
3
4
Piriformis
Gemellus superior
2
Sciatic nerve
Gemellus inferior
Obturatorius externus
Quadratus femoris
Obturatorius internus
1
BACK SIDE

15


The Kinetic Chain
• Significance of the evaluation of the kinetic chain in the instance of sports injuries

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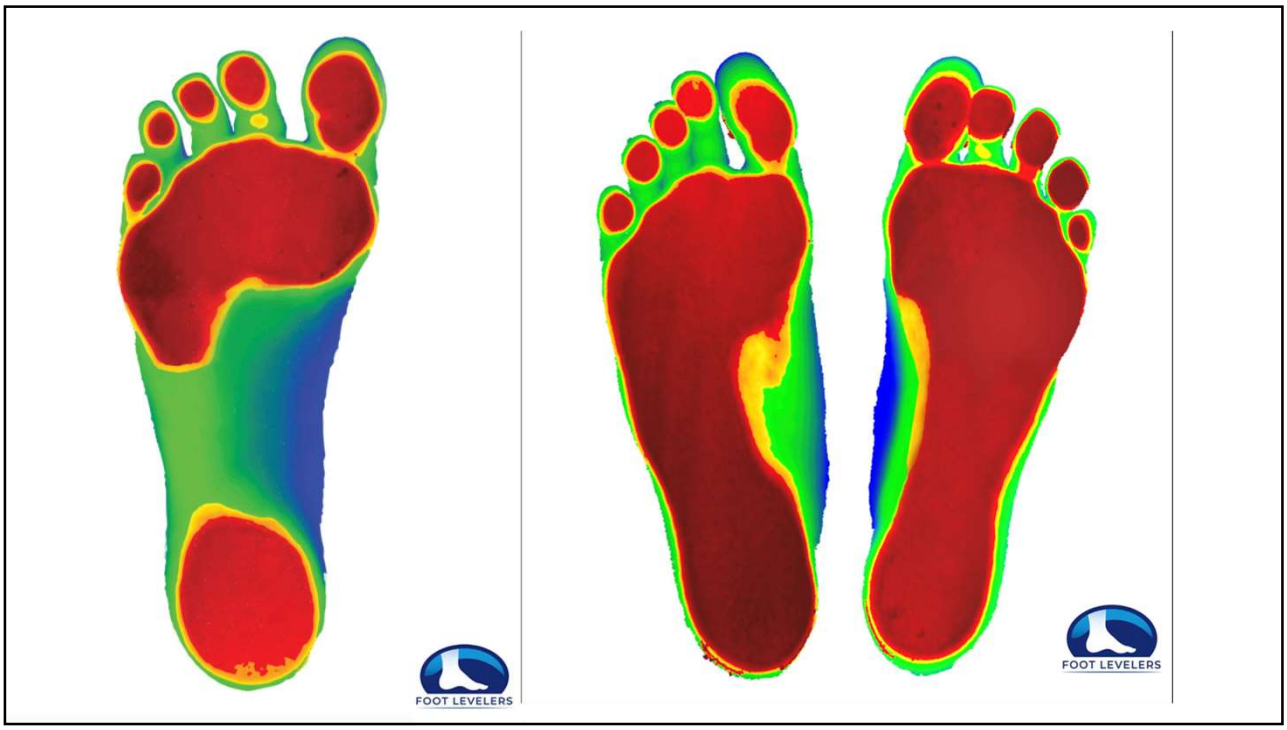

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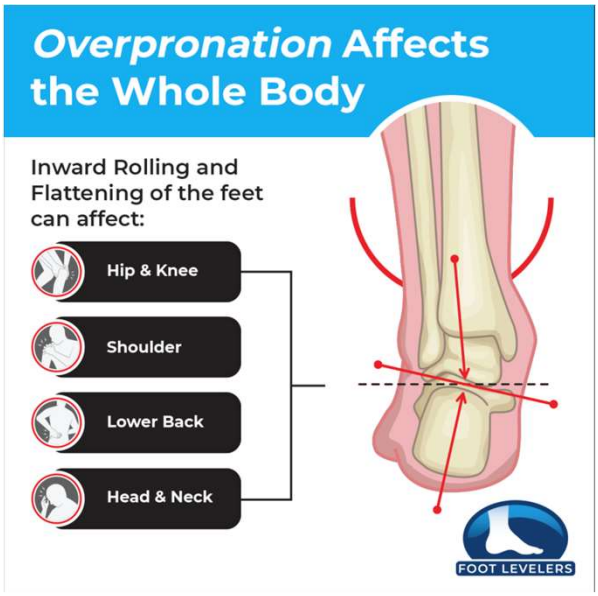
Kinetic Chain Ramifications

- Performance
- Stability
- Proprioception
- Balance



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Understanding the Kinetic Chain

- An interlinking system of joints, cartilage, muscles, tendons, ligaments and fascia
- The coupling of these anatomical structures in order to create movement

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Where to Begin

1. Understanding the action and interactions of each region in movement

FOOT LEVELERS

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Muscular Considerations in Hip Injuries

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Evaluation of the Kinetic Chain

- Temporal aspects in evaluating the kinetic chain- when is it appropriate and not

FOOT LEVELERS

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FOOT LEVELERS

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Epidemiology of Hip and Groin Injuries in Collegiate Athletes in the United States

Yehuda E. Kerbel,*† MD, Christopher M. Smith,‡ MD, John P. Prodromo,† MD, Michael I. Nzeogu,† MD, and Mary K. Mulcahey,§ MD

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Keywords: hip/pelvis/thigh injuries; femoroacetabular impingement; groin pain; epidemiology

FOOT LEVELERS

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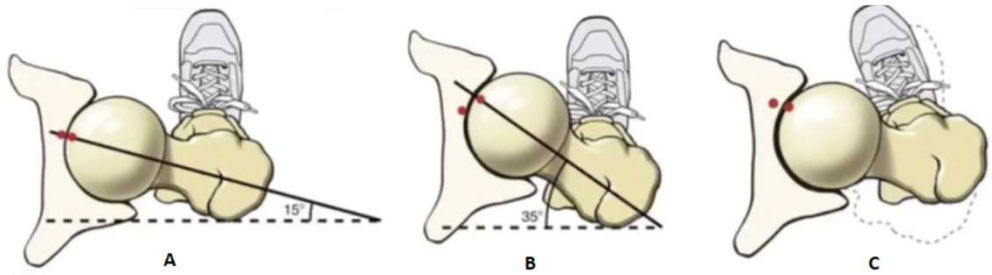
Femoral Anteversion, Age, Structure and Function



A) Normal Femoral anteversion at skeletal maturity B) Normal femoral anteversion in preschoolers 4-6 years C) Femoral anteversion and in-toeing

https://westernkidshealth.com/w-sitting-why-the-drama/

FOOT LEVELERS

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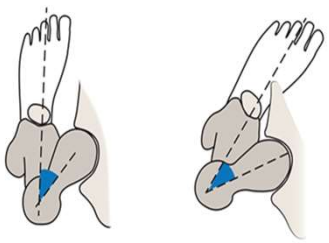
The Significance of Femoral Positioning in Sport

*Ramifications of Femoral Anteversion:

1. Overload of the anterior hip joint
2. Labrum overload
3. Anterior hip joint capsule overload

When the foot is positioned directly forward….



Top-view illustrations of excessive femoral anteversion

Left: Position of an anteverted femoral head with the foot facing straight forward. In this position, the femoral head subluxes out of the front of the hip joint.

Right: Most patients with excessive hip anteversion compensate by walking in-toed. This position keeps the femoral head within the socket, which minimizes pain.

FOOT LEVELERS

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Bony and Biomechanical Considerations in Hip Injuries

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The Acetabular Labrum

- The labrum Fx
- Femoral anteversion causes hip instability and increases stress on the labrum
- Sport and labrum predisposition

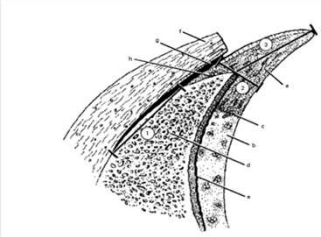

Fig. 1

Illustration of the histological appearance of the site of labral attachment: a) labrum; b) articular hyaline cartilage; c) articular cartilage–labrum transition zone; d) bony acetabulum; e) tidemark; f) hip capsule (out); g) capsular recess; h) group of vessels; 1) capsular recess; 2) thickness of labrum; 3) width of labrum. Figure reproduced with permission from **Seldes RM, Tan V, Hunt J, et al.** Anatomy, histologic features, and vascularity of the adult acetabular labrum. *Clin Orthop Relat Res* 2001;382:232-240.[16]

THE BONE & JOINT JOURNAL

■ SPECIALTY UPDATE: HIP

The acetabular labrum

A REVIEW OF ITS FUNCTION

S. Bsat,
H. Frei,
P. E. Beaulé

From University of Ottawa, Ottawa, Canada

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■ H. Frei, PhD, Professor Carleton University , 1125 Colonel By Drive, Ottawa, Canada.
■ P. E. Beaulé, MD, FRCSC, Orthopedic Surgeon, Professor, Division of Orthopaedic Surgery University of Ottawa, The Ottawa Hospital, 501 Smyth Road Suite 5004, Ottawa, Ontario, K1H 8L6, Canada.

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The acetabular labrum is a soft-tissue structure which lines the acetabular rim of the hip joint. Its role in hip joint biomechanics and joint health has been of particular interest over the past decade. In normal hip joint biomechanics, the labrum is crucial in retaining a layer of pressurised intra-articular fluid for joint lubrication and load support/distribution. Its seal around the femoral head is further regarded as a contributing to hip stability through its suction effect. The labrum itself is also important in increasing contact area thereby reducing contact stress. Given the labrum's role in normal hip joint biomechanics, surgical techniques for managing labral damage are continuously evolving as our understanding of its anatomy and function continue to progress. The current paper aims to review the anatomy and biomechanical function of the labrum and how they are affected by differing surgical techniques.

Take home message: The acetabular labrum plays a critical role in hip function and maintaining and restoring its function during surgical intervention remain an essential goal.

Cite this article: *Bone Joint J* 2016;98-B:730–5.

In recent years there has been growing interest in the role of the acetabular labrum in hip joint biomechanics and joint health.[1-3] This has been mainly driven by its role in the degenerative process of arthritis at the hip, and additional reports of improved clinical scores when the labrum is preserved during arthroscopic surgery at the hip.[6,7] Techniques for the management of labral tears used to restore or optimise hip function are constantly evolving as our understanding of the acetabular labrum anatomy and function continues to expand.[2,8,9]

The function of the acetabular labrum can be impaired as a result of deterioration caused by hip pathologies such as, femoroacetabular impingement (FAI),[10,11] dysplasia and capsular laxity or by acute trauma, degeneration and repetitive extreme ranges of movement.[12-14] This may lead to pain, a restricted range of movement and ultimately the onset of degenerative changes.[15,16] Various surgical techniques for managing labral damage exist, which affect

Anatomy of the labrum

The acetabular labrum is a soft tissue of the hip joint attached to the acetabular rim. Together with the transverse acetabular ligament, the two structures join inferiorly to form a continuous ring. The inferior region of the labrum is widest, measuring up to 6.4 mm and thickest in the superior region measuring up to 5.5 mm (Fig. 1).[17] The labrum, which is triangular in cross-section, is composed of articular and non-articular surfaces. On the articular surface, the labrum joins the hyaline acetabular cartilage averaging 1.26 mm in thickness,[18] through a 1 mm to 2 mm wide transition zone[17] and the underlying bone through a layer of calcified cartilage. Here the labrum is composed of fibrocartilage, a mixture of white fibrous and cartilaginous tissue. The orientation of collagen fibres within the transition zone have been found to differ depending on their location.[19] Posteriorly, the collagen fibres attach perpendicularly, whereas anteriorly the collagen fibres are parallel to the rim, making

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Journal of Sport Rehabilitation, 2018, 27, 380-384
https://doi.org/10.1123/jsr.2016-0109

Human Kinetics
CRITICALLY APPRAISED TOPIC

Nonsurgical Treatment of Acetabular Labral Tears

Melissa Theige and Shannon David

Clinical Scenario: Surgical treatment of acetabular labral tears has been explored in multiple studies, while there is a lack of research on the effectiveness of conservative methods. ***Focused Clinical Question:*** To what extent can nonsurgical treatment produce symptomatic or functional improvements in athletes with an acetabular labral tear? ***Summary of Search, Best Evidence Appraised, and Key Findings:*** The literature was searched for studies of patients with confirmed acetabular labral tears who participated in any level of sport. Four studies were located, all of which were included. ***Clinical Bottom Line:*** The research discussed in this review agreed that conservative management of acetabular labral tears produced measurable improvements in pain and function among the athletes studied, including their ability to participate in sport activities. Based on these findings, it appears that conservative management is effective at rehabilitating athletes with acetabular labral tears. However, this method should not be applied to every athlete based on the low strength of current research. Treatment plans should be decided upon on a case-by-case basis. ***Strength of Recommendation:*** The studies located were of low quality. The highest Oxford Center for Evidence-Based Medicine Level of Evidence achieved was 4. Higher level studies must be conducted before the conclusions of this research can be applied clinically with assertion. Strength of recommendation is level 3.

Keywords: rehabilitation, hip, acetabular labral tear, nonsurgical, conservative management

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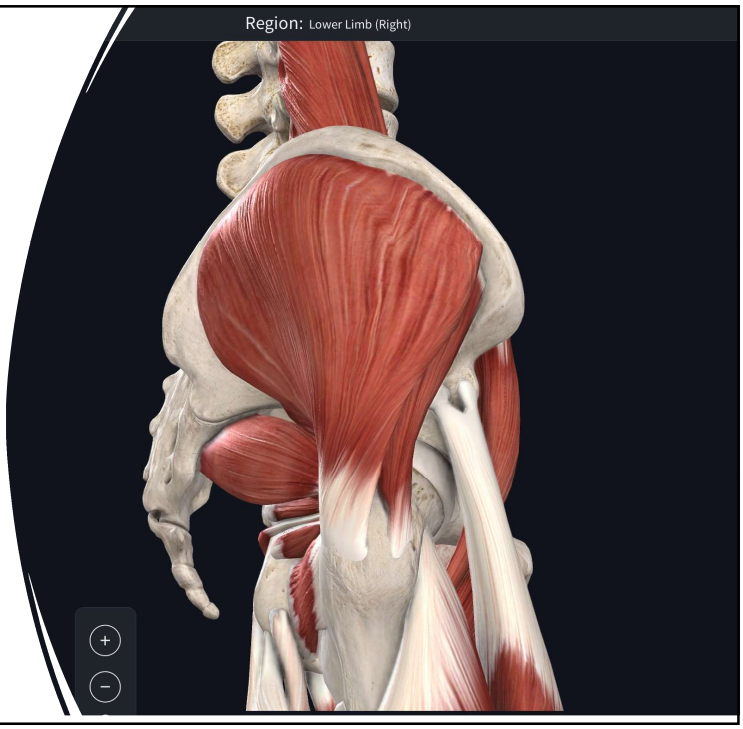
Lateral Hip



FOOT LEVELERS

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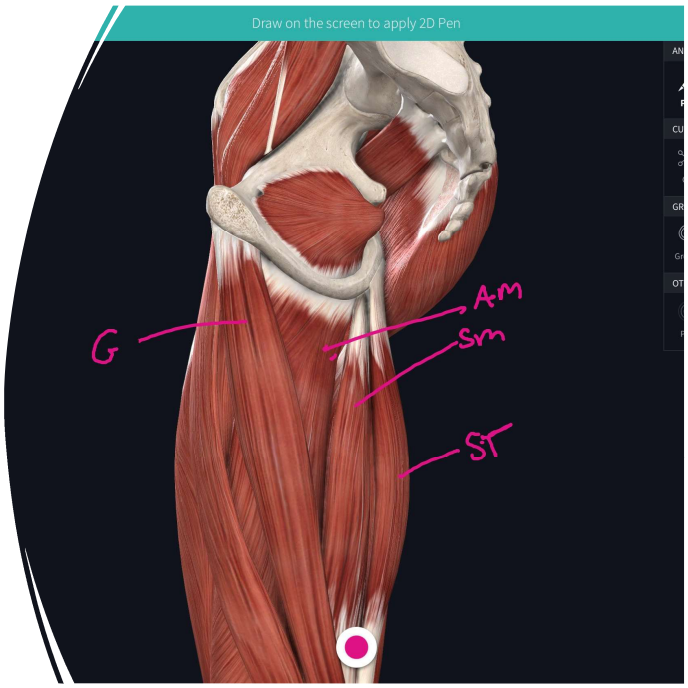
Medial Hip

- The Adductor Group
- Pelvic Floor



FOOT LEVELERS

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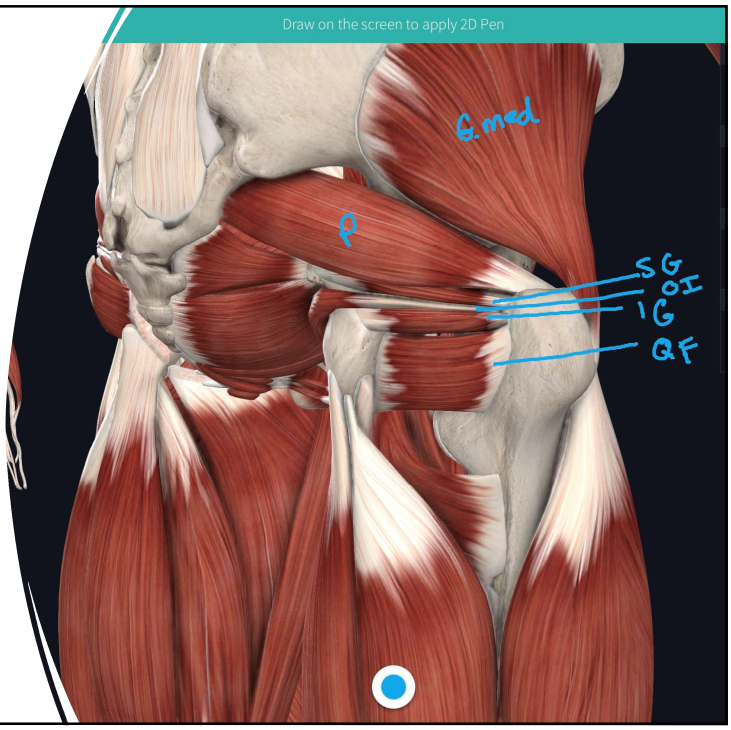
External Rotators of the Hip



FOOT LEVELERS

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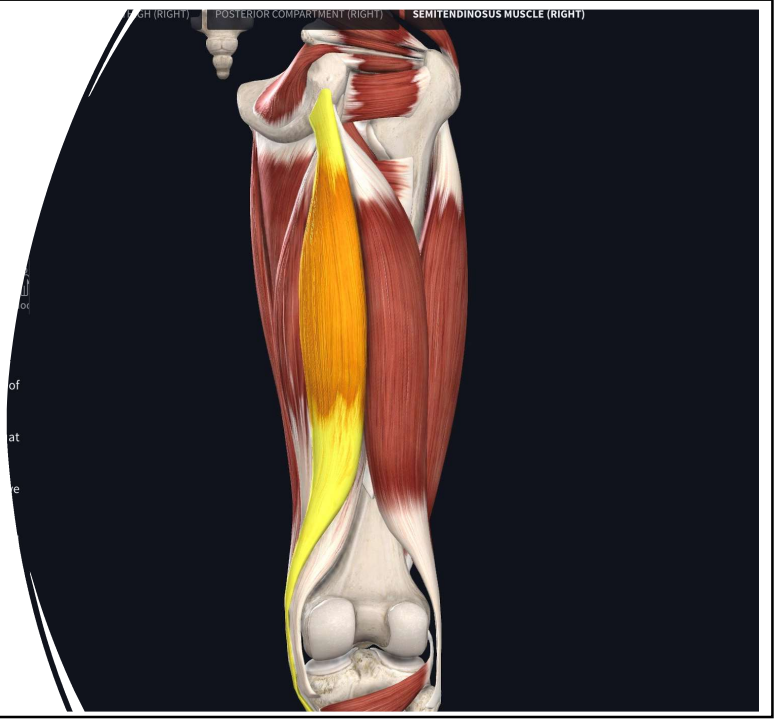
Posterior View

- Consider all the regions that may be affected by an injury to the hip



FOOT LEVELERS

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ALWAYS..

- Begin with a sold history and physical exam of the hip
- Know your diagnosis before establishing the rehabilitation program

FOOT LEVELERS

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Hip Exam

- Testing for all structures in the region
- Joint
- Cartilage
- Tendons
- Muscle
- Fascia

FOOT LEVELERS

35

Inspection of the Region and the Kinetic Chain

- Inspection of the hip
- Inspection of the region
- Inspection of the Kinetic Chain
- How is this athlete using their body in sport

FOOT LEVELERS

36

ROM of the HIP

- Flexion- 120°
- Extension- 20°
- Internal Rotation- 30°
- External Rotation- 45°
- Abduction -45°
- Adduction -20°

37

ALL HUMANS ARE NOT CREATED EQUAL

- WE USE OUR BODIES DIFFERENTLY
- WE HAVE STRUCTURAL DIFFERENCES
- AMERICAN ACADEMY OF PEDIATRICS- ”NORMAL “

38

Prone Instability Test

39

Hip Abduction External Rotation Test

40

Hip EXT Ext Rotation test

41

- DUGAN, SHEILA A., AND KRISHNA P. BHAT. "BIOMECHANICS AND ANALYSIS OF RUNNING GAIT." *PHYSICAL MEDICINE AND REHABILITATION CLINICS* 16.3 (2005): 603-621.

of pronation and supination up the kinetic chain

	Pronation			Supination		
	Sagittal	Frontal	Transverse	Sagittal	Frontal	Transverse
osacral	Extension	Lat flexion same side	Protraction	Extension	Lat flexion opp side	Retraction
	Anterior rotation	Translation and elevation, same side	Forward rot same side	Anterior rotation	Translation opp side; depression same side	Rear rot same side
	Flexion	Adduction	Internal rotation	Extension	Abduction	External rotation
	Flexion	Abduction	Internal rotation	Extension	Adduction	External rotation
	PF-DF		Internal rotation	DF-PF		External rotation
	PF	Eversion	Adduction	DF	Inversion	Abduction
	DF	Inversion	Abduction	PF	Eversion	Adduction

breviations: DF, dorsiflexion; Lat, lateral; MTJ, midtalar joint; Opp, opposite; PF, rflexion; rot, rotation; STJ, subtalar joint.

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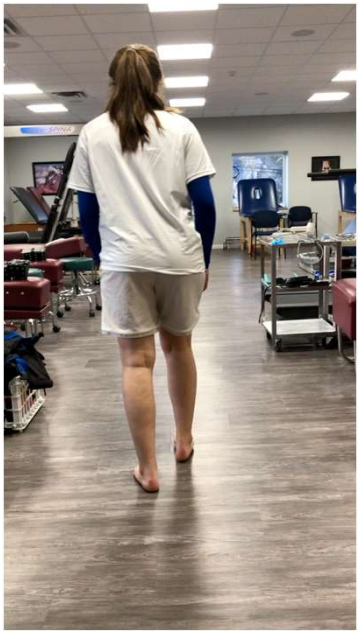

FOOT LEVELERS

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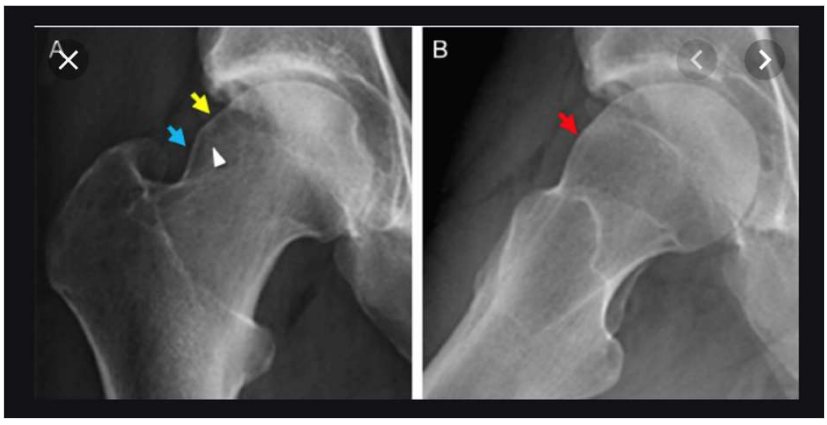
Femoral Acetabular Impingement Testing

- Cam
- Pincer
- Mixed

- Flex and watch
- Bilateral comparison



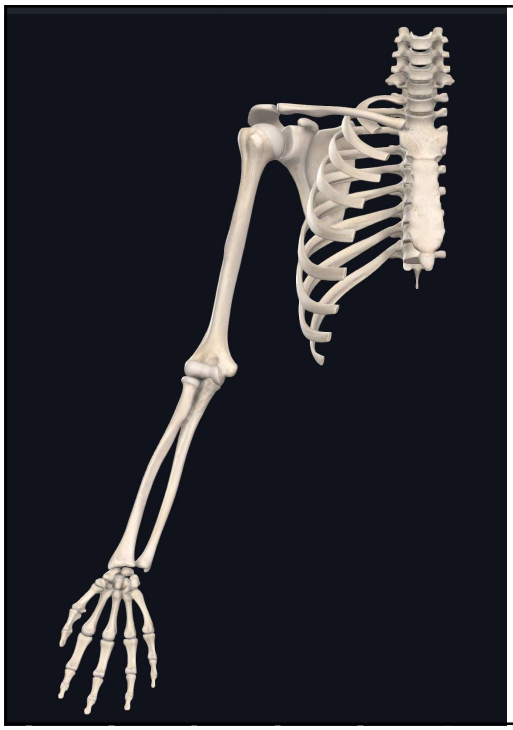
FOOT LEVELERS

44

Strategic Approach to Recovery

- 1. Flexible Orthotic that supports all three arches of the plantar vault.
-
- 2. Improve the Pelvic Incidence Angle
    - Core strength
    - Hip Flexor stretching
    - Glute activation
    - Sacral and pelvic stability
    - Address the kinetic chain

45



Understanding the Upper Limb

- The axial skeleton meets the appendicular skeleton
- The structure and function of each articulation
- The role these joints play in the mechanics of the upper extremity in sport
- Functional anatomical considerations... uses of muscle groups per sport and position

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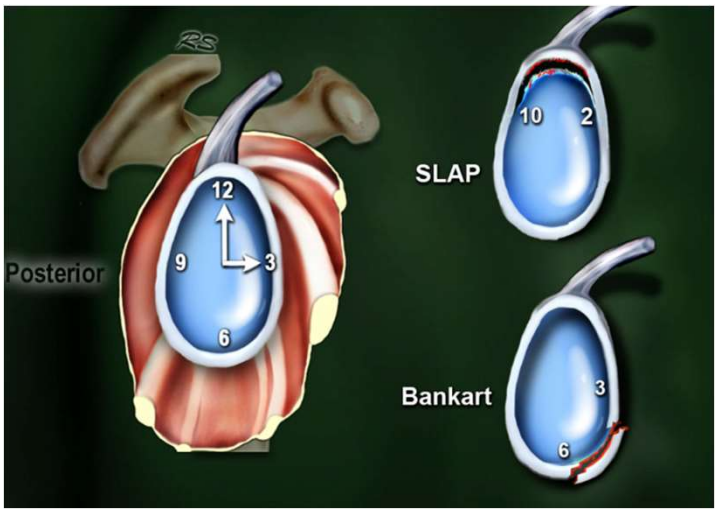
Glenoid Labrum Tears

1. **Slap Tear**
   - -Prevalence
   - -Mechanism of Injury
1. **Bankart Tear**
   Percent of injuries



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Prevalence of Shoulder Labral Injury in Collegiate Football Players at the National Football League Scouting Combine

Sandeep Mannava, MD, PhD, Salvatore J. Frangiamore, MD, MS, Colin P. Murphy, BA, ...
First Published July 9, 2018 Research Article Find in PubMed
https://doi.org/10.1177/2325967118783982

- N=2285 players
- 377 (14.9%) labral tears were present
- 115 (30%) anterior tears
- 131 (34.7%) posterior tears
- 120 (31.8%) SLAP tears

- 131 (34.7%) combined tears

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Assessment of the Glenoid Labrum

- Grind Test
- Obrien's Maneuver

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Acute and Chronic Treatment of Labral

- Acute presentation and treatment options
- Chronic presentation and treatment options

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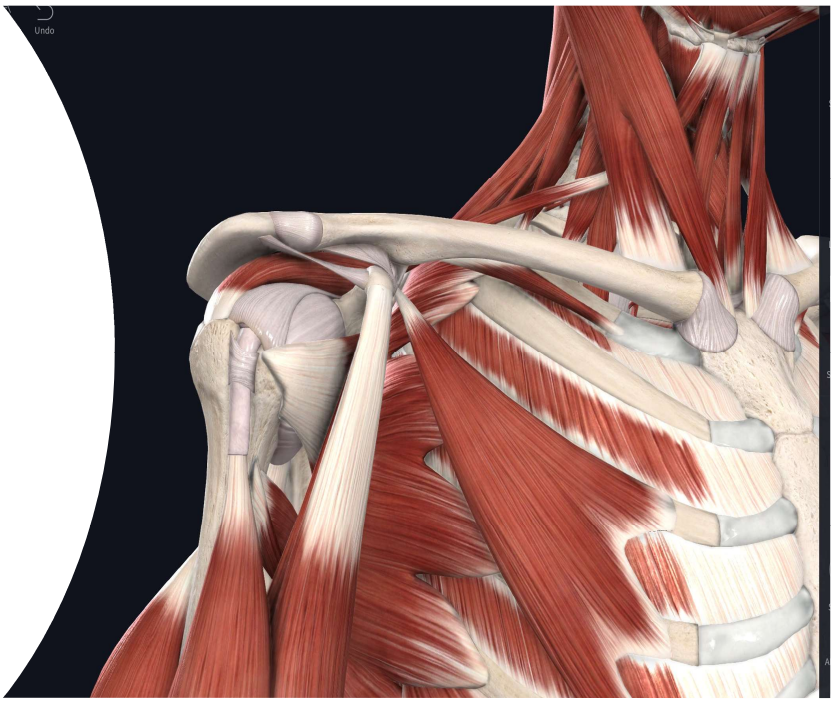
Biceps Tendinopathy

- Mechanism of injury
- Presenting symptoms
- Provocative factors



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Special Tests of the Shoulder

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53

Return to Sport Post Rotator Cuff Injury

- Consideration of load and frequency
- Graduated return to function
- Sport specific training
- Consideration of Sport and Position

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54

Correcting Movement Faults

- What is your goal
- What is your timeline
- What is the sport
- What is the overall strength status of the athlete
- Where are you in the return to play plan

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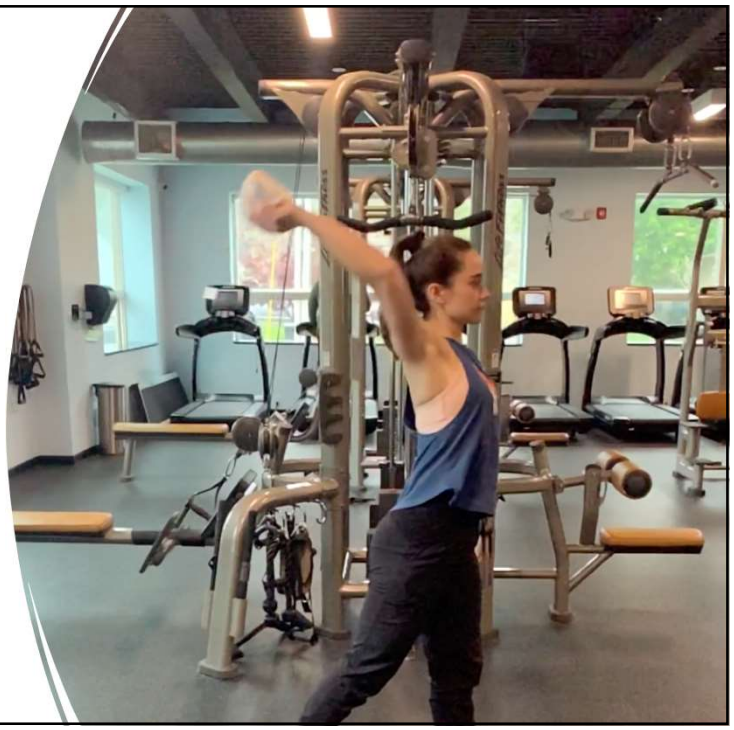
Rehabilitation Considerations

- Decrease local inflammation
- Passive ROM-
- Active ROM
- Strength - gradually increase load and reps
- Checking the foundation of the lower extremity and how it is used in sport



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When Does the Return to Sport Plan Begin

- What is your measure of readiness?
- How will you progress and return the athlete to play
- What is your timeline
- What is the level of play
- Measure injury with demand of the sport for that region

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57

CONSIDER THE SPORT YOU ARE REHABILITATING

- WHAT TYPE OF MUSCLE FIBER DOES THAT ATHLETE USE
- FAST TWITCH- GYMNAST
- SLOW TWITCH – ENDURANCE ATHLETE
- WHY IS THIS IMPORTANT?

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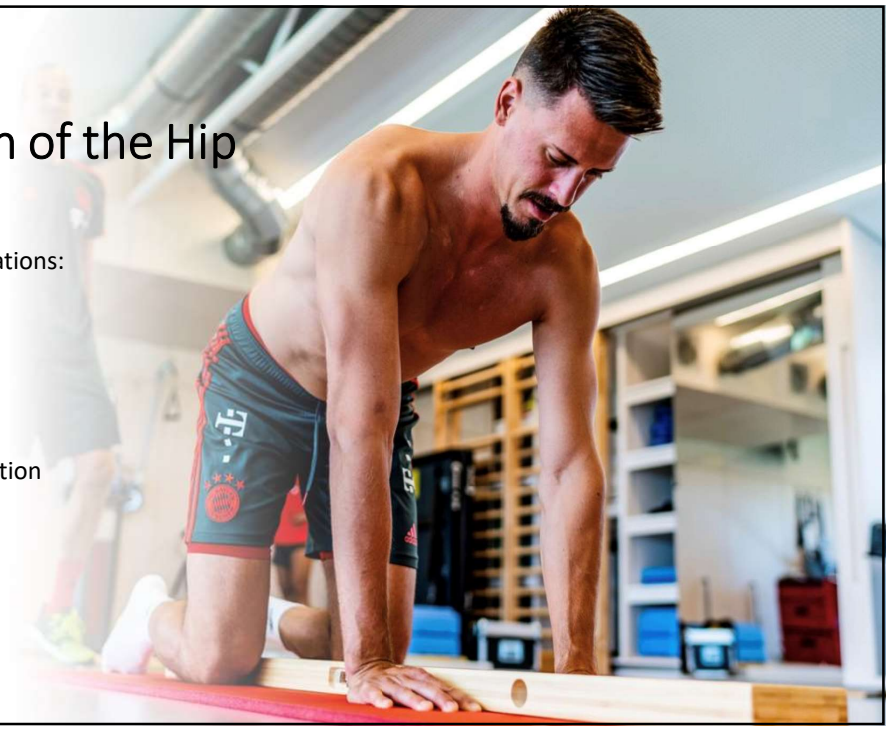
Rehabilitation of the Hip



Rehab Protocol Considerations:

- ROM
- Joint function
- Muscular Endurance
- Strength
- Sensory Motor Integration
- Stability
- Perturbations

59

Look at the Footwear that is USED for Sport AND Daily Wear

- Look at quality of the shoe
- Look at wear patterns
- Ask about orthotic use
- Ask about taping or strapping for practice
- Ask about past injuries
- Ask about pain in the feet, ankles, hips low back after practice
- Pull the Picture together and RETEST your theory

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60

RELATIVE REST

- THE TERM RELATIVE REST –THIS IS THE CONCEPT THAT YOU ALLOW THE HEALING OF THE INJURED AREA WHILE THEY CROSS TRAIN THE OTHER REGIONS.
- This is the real art of working with athletes

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THE ART OF RELATIVE REST

- DECREASE DURATION, INTENSITY, TYPE OF EXERCISES, NUMBER OF REPETITIONS ETC
- SWITCH TO NON-WEIGHT BEARING THEREX
- CROSS TRAIN
- VISUALIZATION/IMAGERY
- SOME TYPE OF SPORT PARTICIPATION WATCHING PRACTICE ETC

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What is your plan

- How do you begin?

ROM?

Strength?

Stability?

Proprioception

63

Range of Motion

The first stage of care always includes:

1. Edema Reduction
2. Restoration of ROM

- Flexion- 120°
- Extension- 20°
- Internal Rotation- 30°
- External Rotation- 45°
- Abduction -45°
- Adduction -20°

64

Restoring ROM of the Hip

- Begin with Passive Assisted
- Active Assisted
- Active
- Gradually increasing the range until full range is achieved.

65

What is Normal for YOUR patient

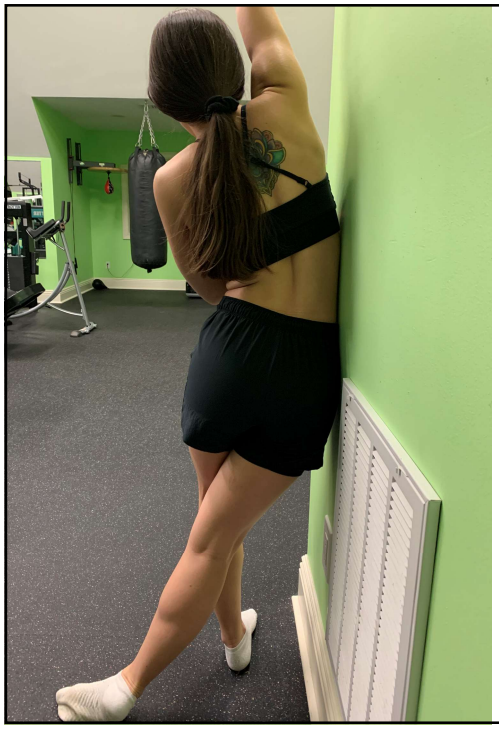
- Shades of grey of normal ROM
- What does this athlete need from the hip
- What ROM
- What type of strength
  - Fast twitch
  - Slow Twitch

66

Stretching

- Static vs dynamic stretching
- When to stretch
- How long to stretch

67



Progressions and Variations

- Stretching the same muscle group in different positions
- Mobility vs Stability
- Stretching all 4 quadrants of the hip. Is this necessary

68

History of Prior Injury

- How does this affect stretching
- Variations of stretching to compensate
- Monitor for pain
- How long to hold the stretch

69

Stretching Details

- Breathing
- Contract/Relax
- Static Stretching
- Dynamic Stretching

70

Hip IR/ER Stretching

- Quality vs. Quantity

71

Active/Functional Soft Tissue Work

- Pin and stretch
- Contract/Relax
- PNF

72

Hip Stretching

- Progressions
- History of Previous Injury

73

Stretching the Kinetic Chain

- What is your goal
- What does the athlete need
- What is the injury

74

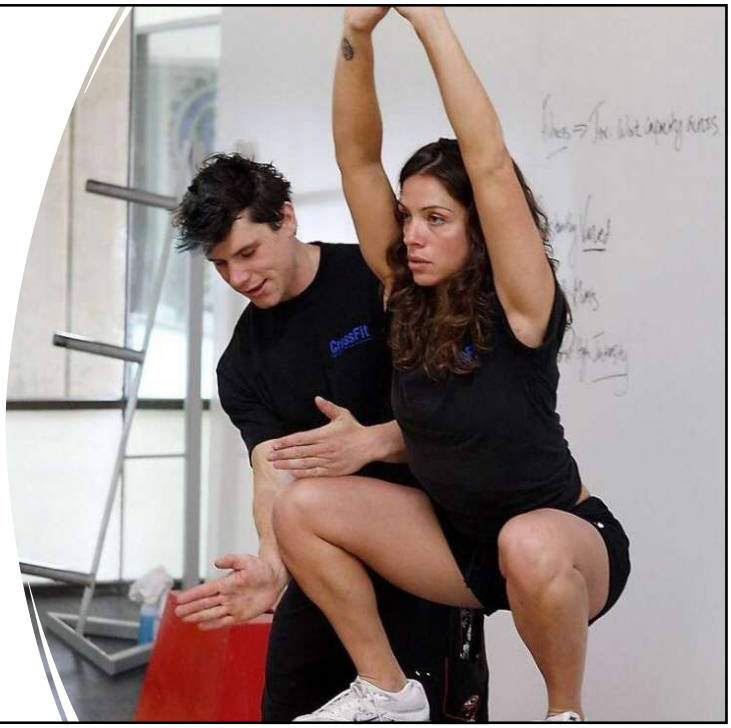
Hip Mobilization

- When is it appropriate to MOB/Adjust
- What is the direction of restriction
- What is the status of the injury

75

Late Subacute Phase of Care

- Full ROM
- Strength
- Proprioception
- Stability
- Safety
- Progression off crutches or out of sling



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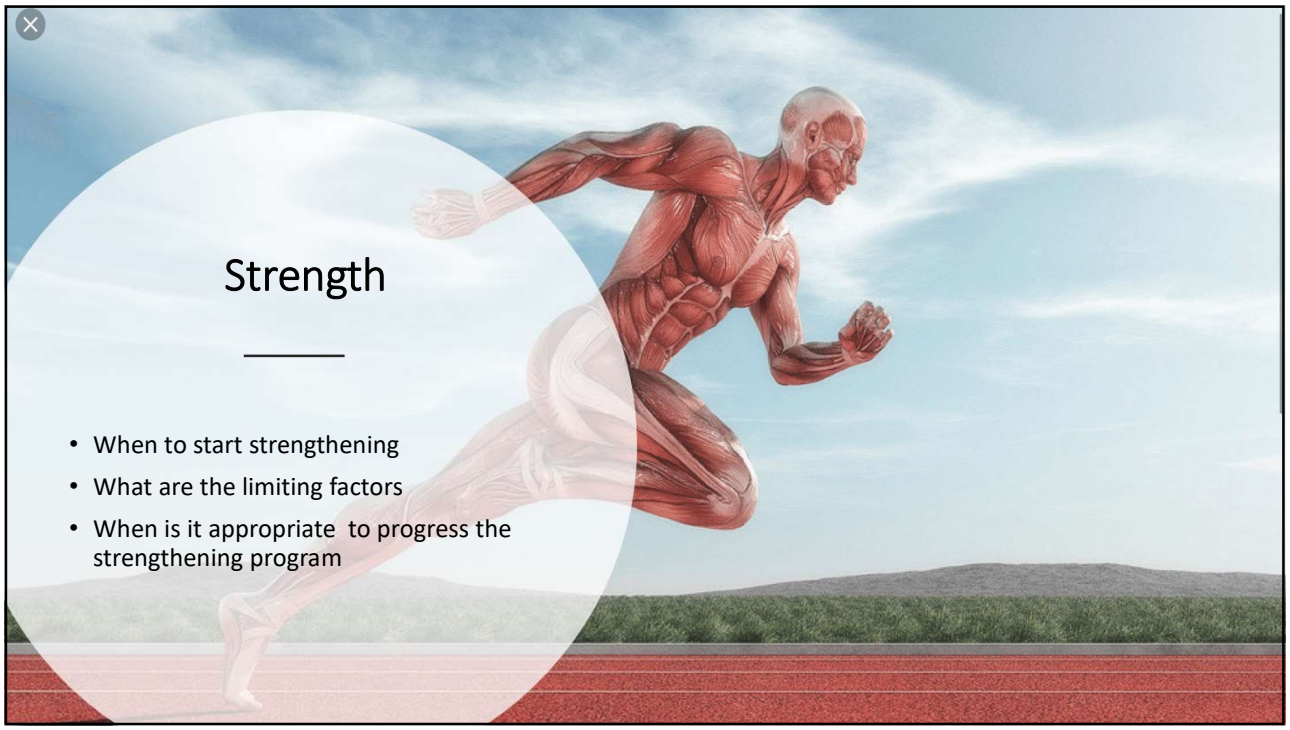
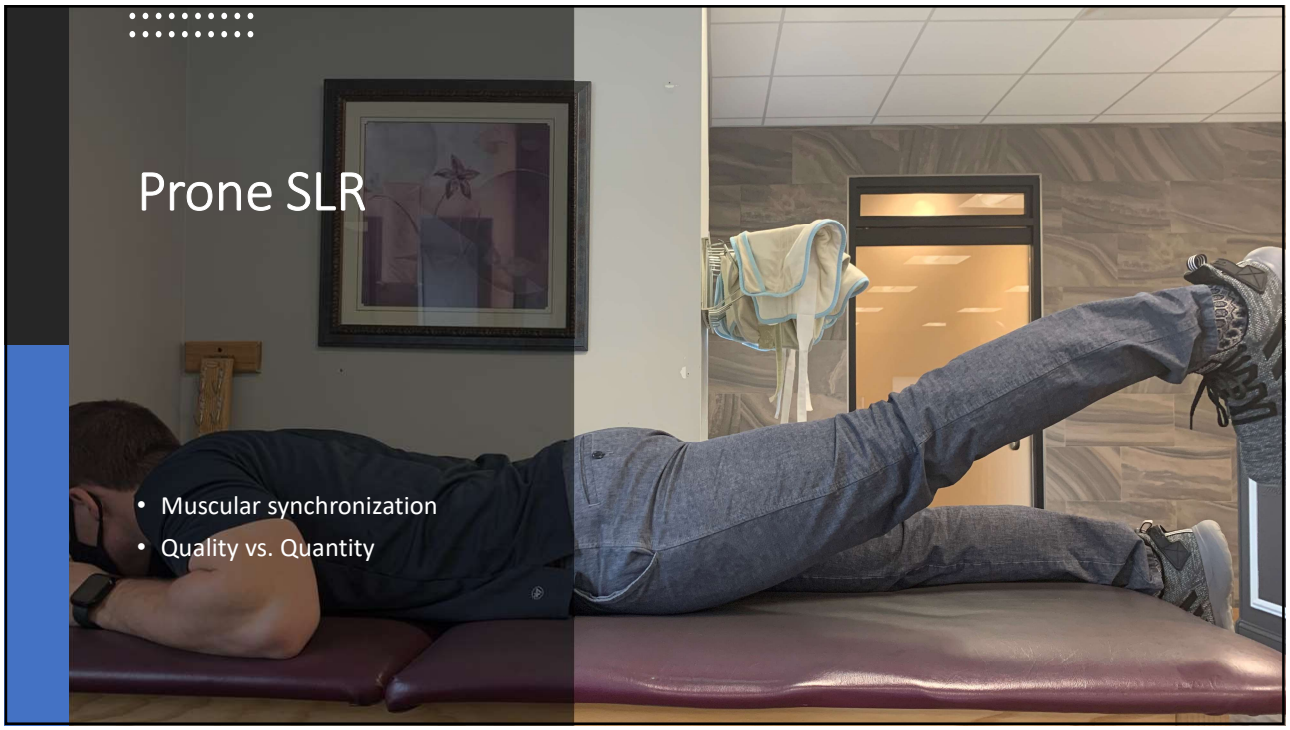

Strength
When to start strengthening
What are the limiting factors
When is it appropriate to progress the strengthening program

77


Prone SLR
Muscular synchronization
Quality vs. Quantity

78

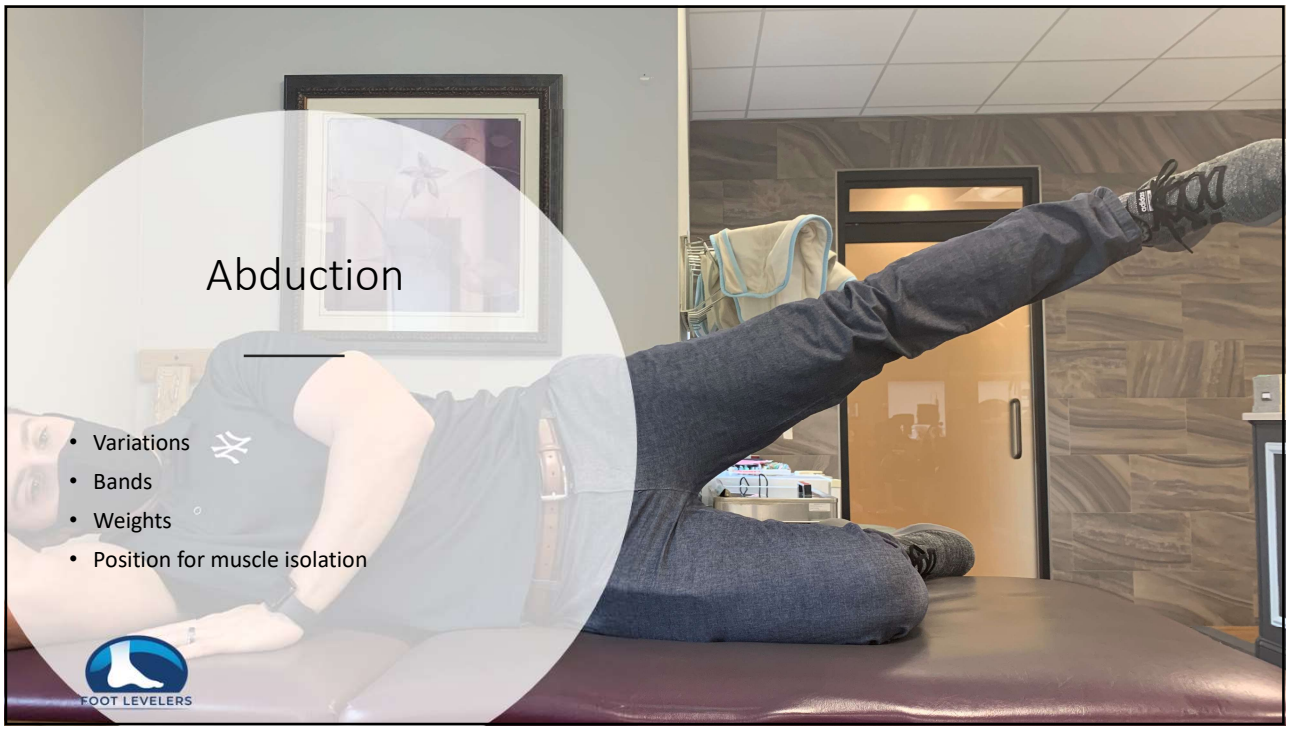
Hip Strengthening

- Progression
- Keep in mind the sport you are working with
- Being supine if needed

79

Variations and Progressions

80


Abduction
• Variations
• Bands
• Weights
• Position for muscle isolation
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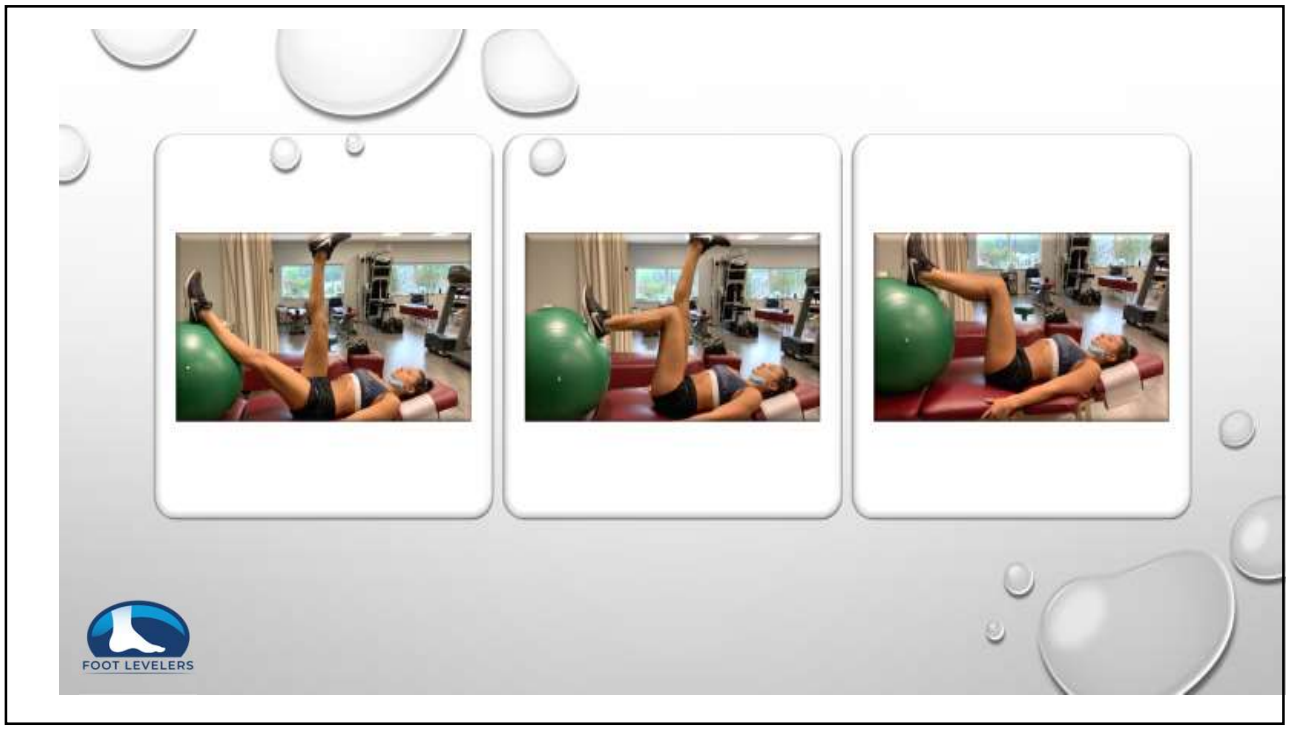
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82

Progress to Standing Exercises

- Are you accomplishing your goal
- Stability vs Mobility

83

Hip Standing Progressions

- Hip Extension
- Hip Adduction
- Hip Flexion

- Sets and Reps…. What is your Goal?

84

Standing Abduction

- Body position
- Standing leg
- Add in Proprioception

85

Standing Hip Flexion

Consider progressions

86

Progression

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87

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88

Squat Progression

- Correcting movement faults from the start of movement
- Assisted, queuing
- Non assisted
- Weighted

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Plyometrics

- Plyometrics
- When is this added to the program
- What is the progression protocols

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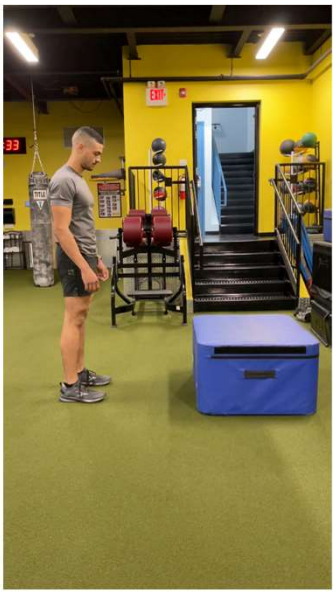

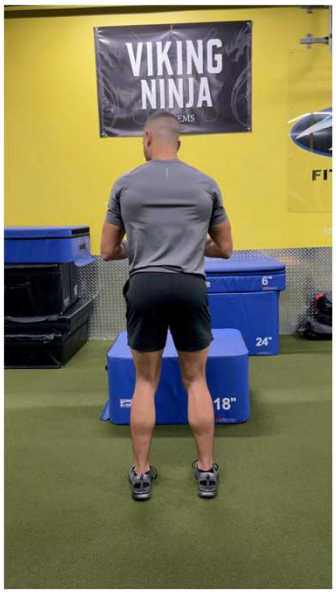

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The law of reciprocal inhibition

IF A MUSCLE IS FACILITATED, THE ANTAGONISTIC MUSCLE GROUP IS MOST TIMES INHIBITED

EXPERIMENT – BICEP/TRICEP

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Finding the Inhibited Muscle

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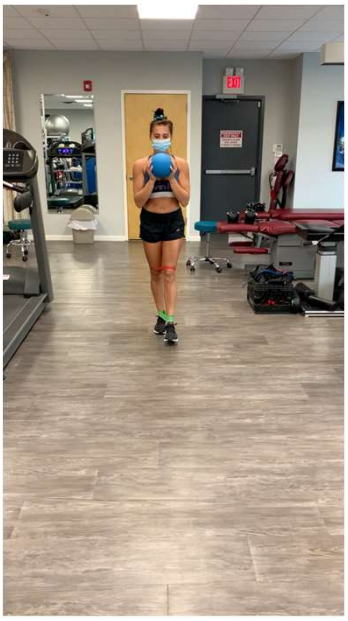
Protocol to fix an inhibited muscle

Stretch	Stretch the facilitated MUSCLE
ACTIVATE	ACTIVATE THE INHIBITED MUSCLE AFTER THE STRETCH
HOLD OFF	HOLD OFF ON STRENGTHENING THE FACILITATED MUSCLE UNTIL YOU HAVE CORRECTED THE INHIBITION.

95

Strengthening the Hip



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Passive to Active

- Table to floor
- Weights
- Function!

97

OUT-TRAIING THE ATHLETE FROM SPORT

- REHAB PROTOCOLS THAT CEMENT IN A CONDITION I.E STRENGTHENING THE FACILATATED MUSCLE
- What Therex is appropriate for this athlete
- THE CONVERSION OF MUSCLE FIBER TYPE 1 TO TYPE 2

98

Correcting Movement Faults

- What is your goal
- What is your timeline
- What is the sport
- What is the overall strength status of the athlete
- Where are you in the return to play plan

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99

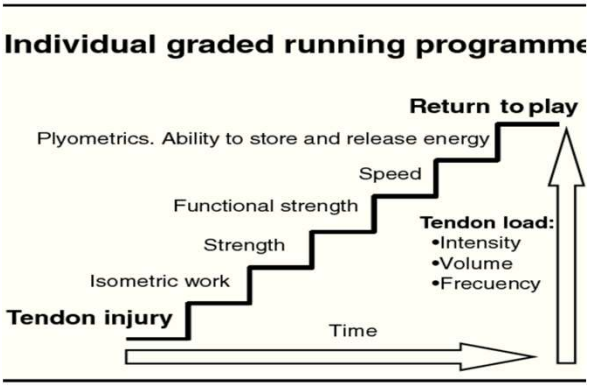
- With excessive pronation also promotes excessive internal rotation of the tibia and femur. This is a precursor to patellofemoral maltracking.

100

Introducing Sport Specific Drills

- Do this as early as you can, safely.
- Build on the foundational movement with sport specific drills
- Timing, reaction, anticipation
- Cross train to gain core control of needed movements

- Graphic from Jill Cook



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Return to Sport

- CAN THEY WALK WITHOUT A LIMP- ok to start progression in walking therex
- CAN THEY RUN WITHOUT A LIMP- OK TO BEGIN SHORT DISTANCE RUNNING TYPE THEREX
- SPORTS SPECIFIC THEREX AS YOU INCREASE FUNCTION
- Begin with straight movements
- Proprioception
- Strength in the region and globally
- Add in time and intensity
- Continued strengthening plan

102

Achieving Optimal Performance

- Looking at faults that may need correction
- Catching injuries BEFORE they happen with good screening tools
- Use preseason to strengthen, rehab and correct technique issues
- Stay ahead of breaks in patterns due to overuse, injury or dysfunction

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MUSCLE SYNERGY RESTORATION

- HIP ACTIVATION

- 1. GLUTEI
- 2. TFL
- 3. QL

- YOU MAY FIND
- 1. QL
- 2. GLUTEI
- 3. TFL

104

Looking at the athlete during movement

- FMS
- Gait
- Hopping
- Treadmill walk, jog, run
- Video of skills
- * Injuries to muscles are most common During Eccentric contraction
- * Muscles that cross two joints are more prone to injury
- * Research demonstrates that most muscle injury occurs at the muscle-tendon junction or tendon-bone junction
- *Hyde

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106

Functional Anatomy

- Understanding what needs to happen for normal motion to occur.
- This could be in gait or for a particular skill or series of skills.

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107

Steps in Assessing the Kinetic Chain

- 1. AN ACCURATE DIAGNOSIS OF THE PRIMARY COMPLAINT
- 2. ASSESS THE FUNCTIONAL DEFICITS/COMPENSATIONS THAT COULD HAVE CONTRIBUTED TO THAT COMPLAINT
- 3. FIX THE PRIMARY COMPLAINT
- 4. FIX THE KINETIC CHAIN

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Efficiency of the Kinetic Chains

Efficient kinetic chains demonstrate decreased joint loads, maximum velocity, and maximal force production during throwing.

Dysfunction of kinetic chain during throwing increases stress placed on distal segments and can result in shoulder and elbow pathologies.

109

THE QUESTION IS WHAT THEN.. WHY

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110

Why is this Important

111

112

Return to Sport to Achieve Optimal Performance

- The breaks in the kinetic chain will be fixed during the rehabilitation phase.
- Corrective exercises will include repair of faults.
- Reassess as progression to sport is started
- Gradual reintroduction of sport specific exercises
- Gradual introduction to load and intensity
- Modify return with time and intensity and omitting noxious movements
- (0-10 rule)

113

114

Thank You

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