Dr. Alison Grimaldi
PHYSIOTHERAPIST, RESEARCHER & EDUCATOR

Understanding Tendinopathies of the Hip and Pelvis

Lesson 1
Introduction

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- ➔ Goal Statement
- ➔ Overall Aims
- ➔ Is this course suitable for you?
- ➔ Learning Objectives
- ➔ Course Content

1

Goal Statement

This course aims to provide participants with guidance towards a deeper understanding of tendinopathies of the hip and pelvis, and more effective clinical management strategies based on an emerging evidence base derived from scientific studies on structure and mechanobiological mechanisms, risk factors, impairments and the available information on effects of intervention.

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Tendinopathies of the hip and pelvis
Introduction

Overall Aims

This course will:

1. Bring together the available information on tendinopathies of the hip and pelvis with a particular focus on pathoaetiological mechanisms.
2. Provide a clinical interpretation of the scientific data with direction and practical ideas for management.
3. Highlight areas where research is deficient for those interested in adding to our evidence base for contemporary clinical practice in this field.

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Tendinopathies of the hip and pelvis
Introduction

Suitability

Is this course suitable for you?

This course is suitable for anyone involved in management of tendinopathies of the hip and pelvis, or prescription of exercise in at-risk groups.

Requirements:

Basic knowledge of anatomy & muscle function in this region

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Tendinopathies of the hip and pelvis
Introduction

Learning Objectives

Upon completion of this course participants should be able to:

Describe basic tendon structure, and biological mechanisms occurring in both a homeostatic state and in a pathological tendon

Describe anatomical relationships, impairments, and postural and loading habits that may predispose to the development of each of the tendinopathies addressed

Enhance their ability to develop maximally effective intervention programmes including both load management and exercise prescription

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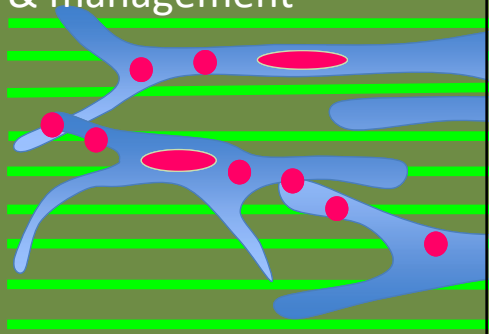
Tendinopathies of the hip and pelvis
Introduction

Course Content: Lesson 2

- Basic Tendon Structure
- Molecules maintaining homeostasis
- The influence of cytokines
- The influence of mechanical loading
- Models of tendinopathy
- Stages of tendinopathy
- Other possible factors

Mechanobiological mechanisms
Implications for understanding aetiology & management



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Tendinopathies of the hip and pelvis
Introduction

Course Content: Lessons 3-6

3: Gluteal Tendinopathy

4: Proximal Hamstring Tendinopathy

5: Iliopsoas Tendinopathy/IRGP

6: Adductor Tendinopathy/ARGP

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Tendinopathies of the hip and pelvis
Introduction

Course Content: Lessons 3-6

3: GT

4: PHT

5: IT/IRGP

6: AddT/ARGP

- Prevalence & Presentation
- Anatomy Update
- Pathology
- Patho-aetiology
- Management Overview
  - Decompression
  - Exercise

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Tendinopathies of the hip and pelvis
Introduction

Quiz & Forum

Quiz

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Understanding Tendinopathies of the Hip and Pelvis

Lesson 2
Mechanobiological mechanisms
Implications for understanding aetiology & management

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- Basic Tendon Structure
- Molecules maintaining homeostasis
- The influence of cytokines
- The influence of mechanical loading
- Models of tendinopathy
- Stages of tendinopathy
- Other possible factors

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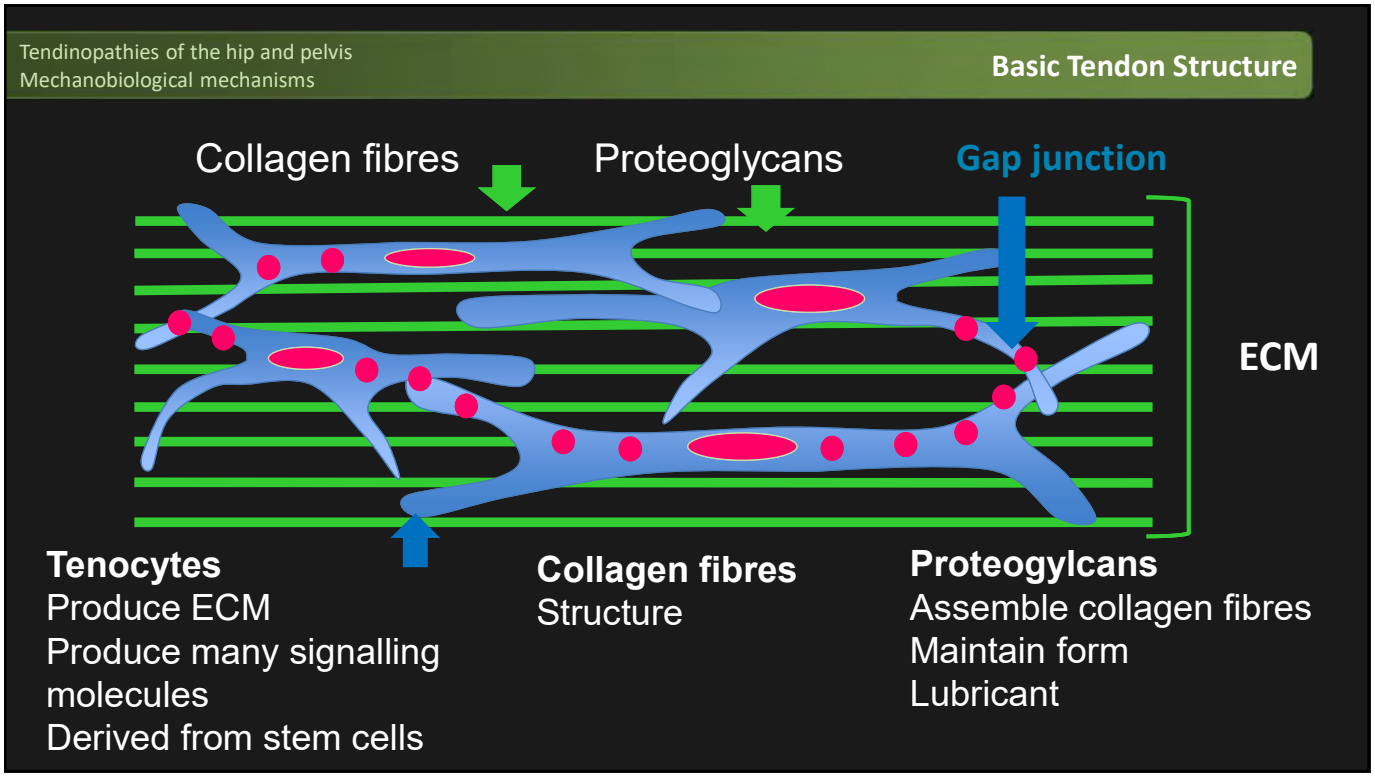

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Small Proteoglycans

- Decorin, Biglycan, Fibromodulin
- Assemble & align collagen fibres
- Provide niche for tendon stem cells

Large Proteoglycans

- Aggrecan, Versican, Lumican
- Water binding
- Maintain form
- Resist compression

Site Specific Prevalence

Yoon & Halper 2005
Bi et al 2007
Cook & Purdam 2012

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Understanding Tendinopathies of the Hip and Pelvis

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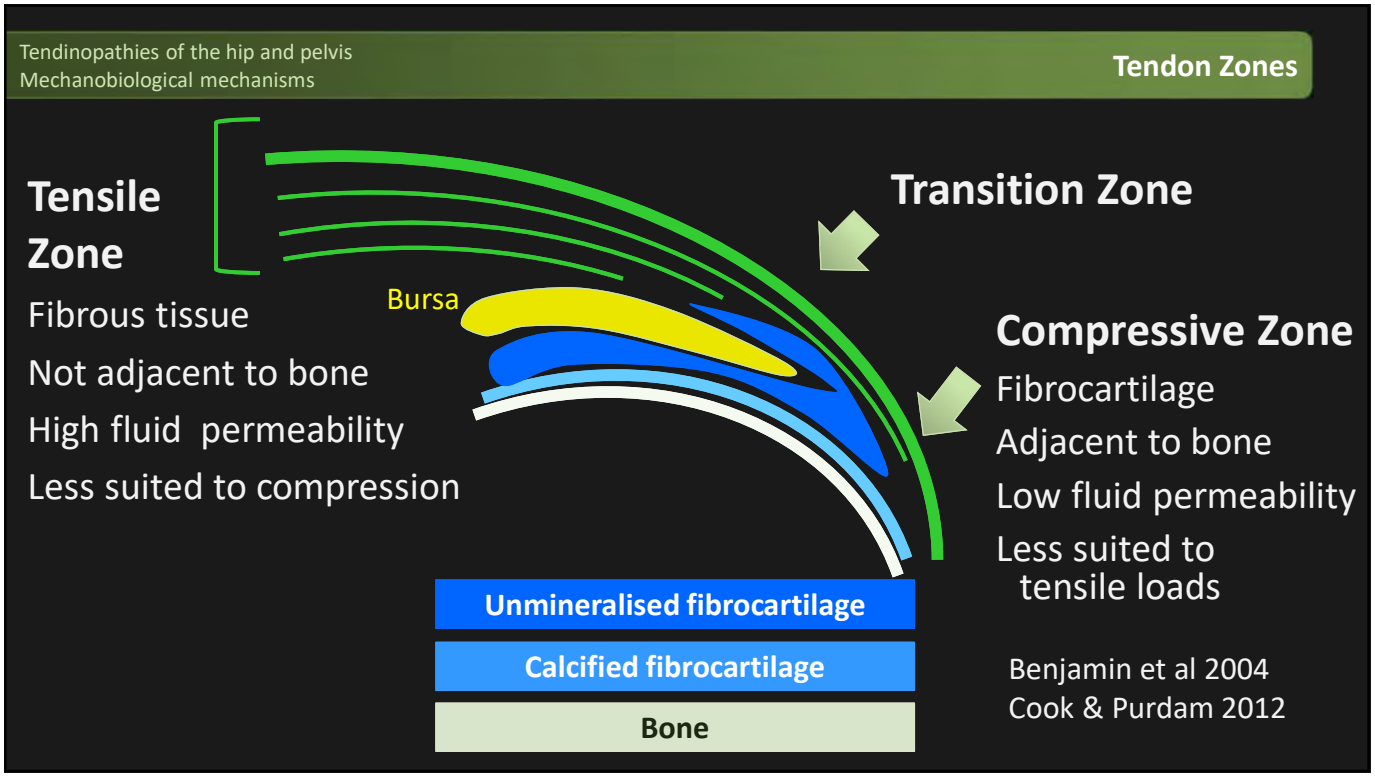

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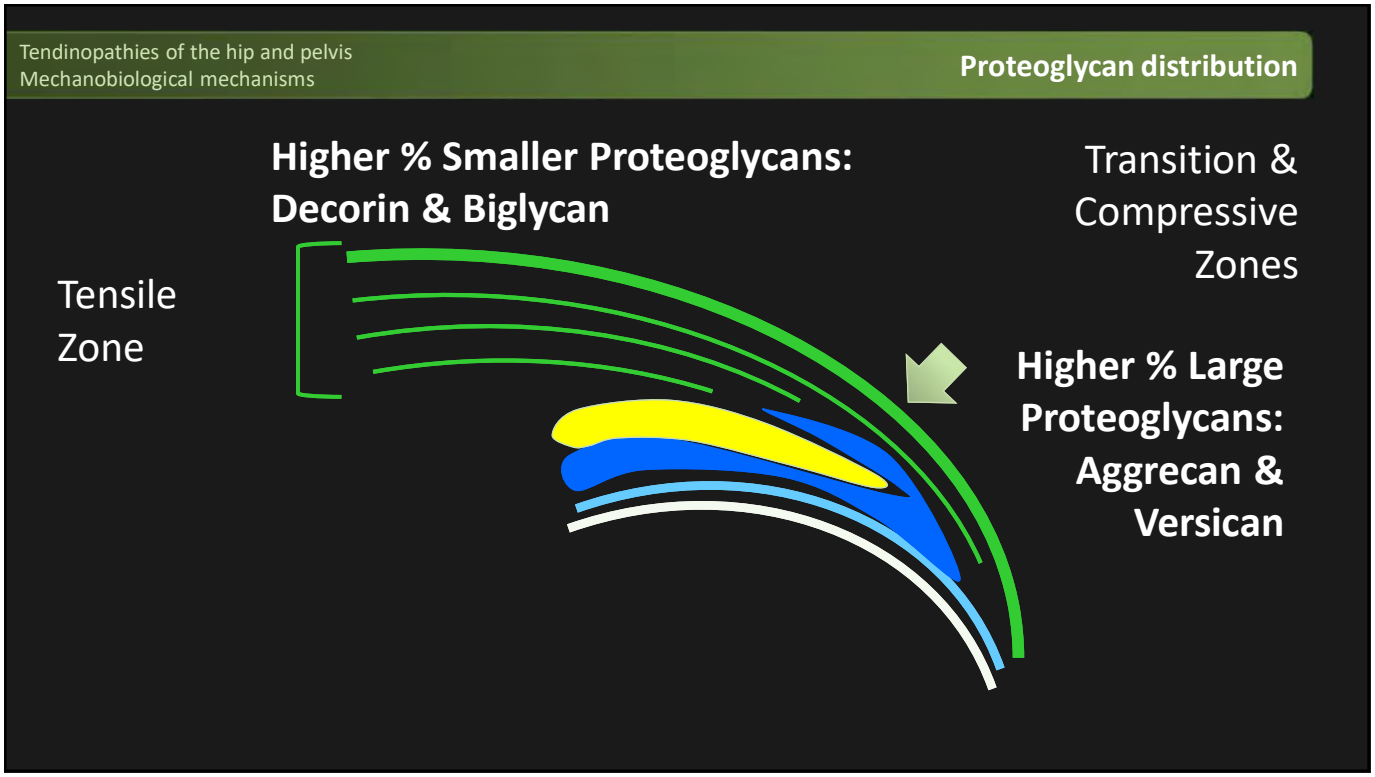

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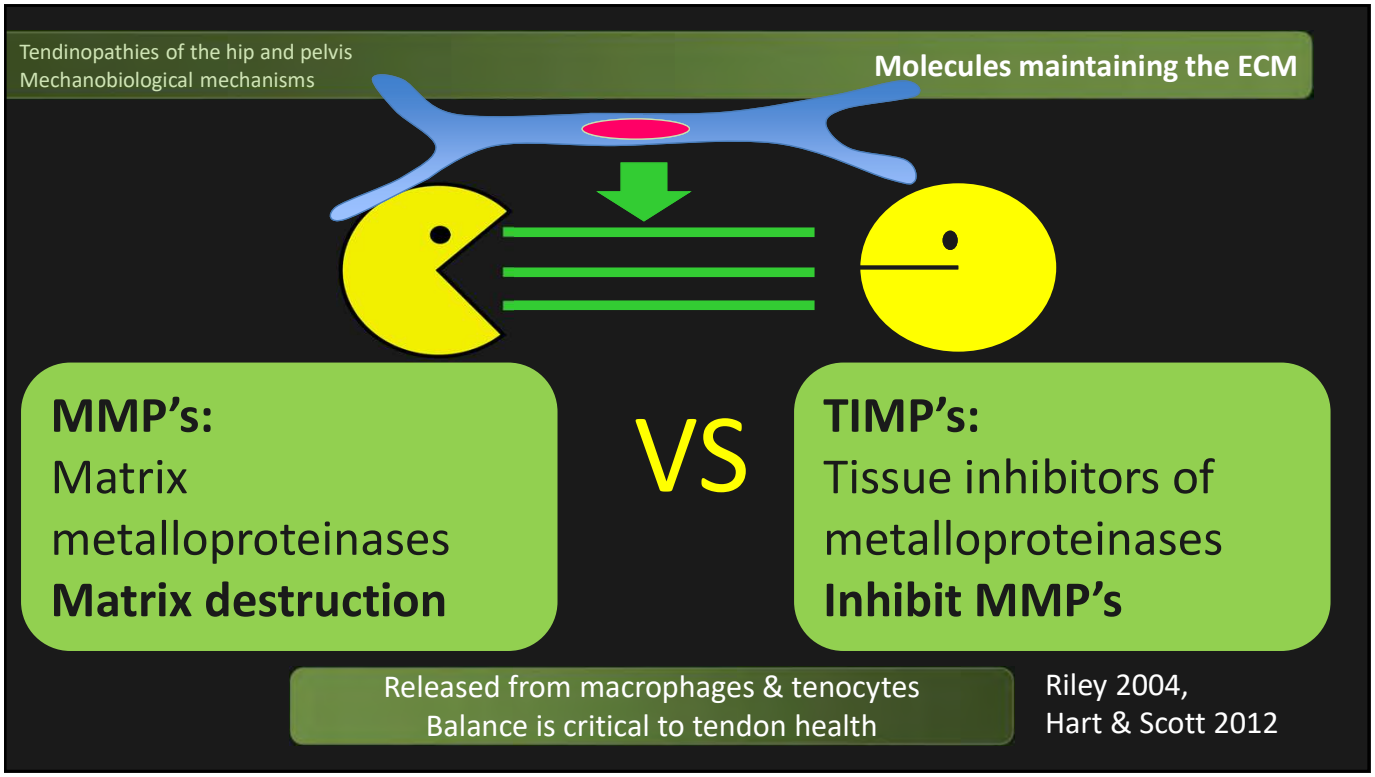

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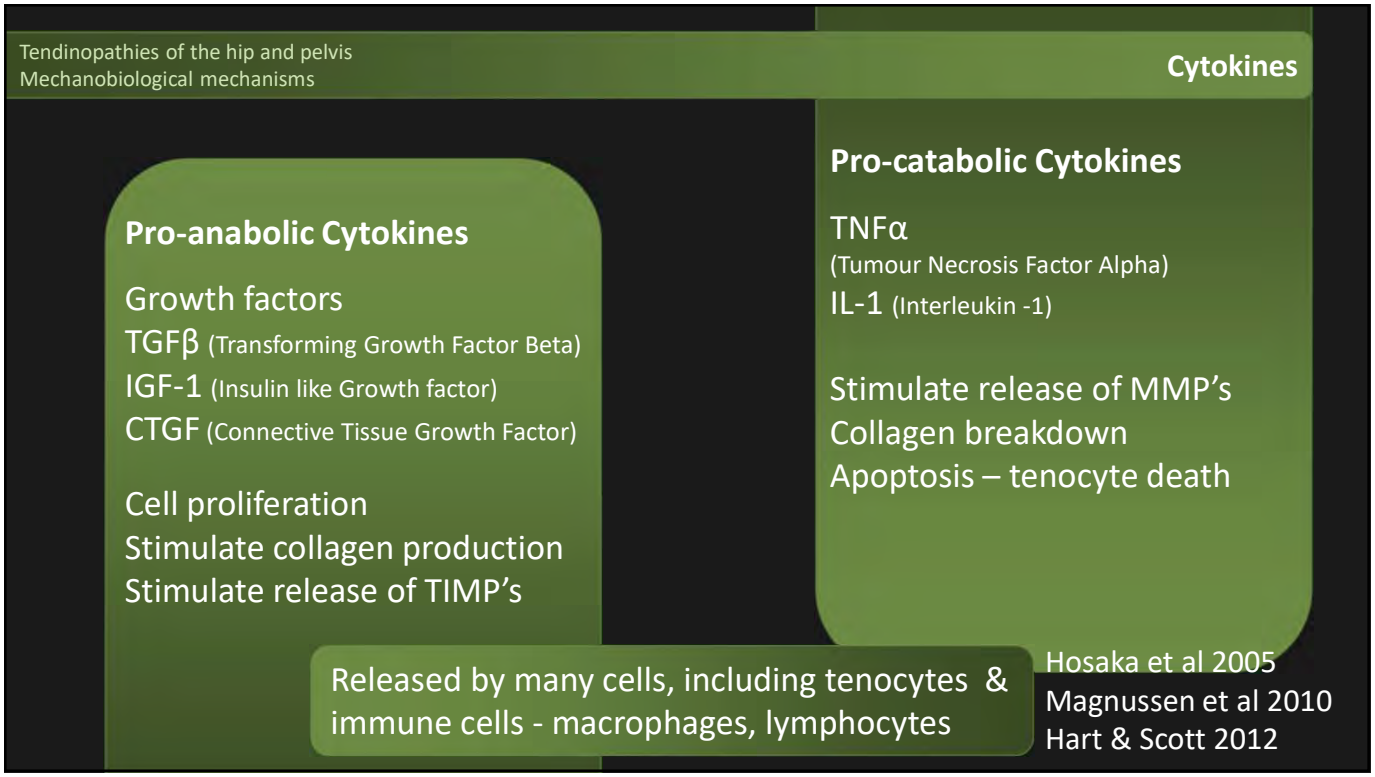

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Understanding Tendinopathies of the Hip and Pelvis

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Tendinopathies of the hip and pelvis
Mechanobiological mechanisms

The influence of mechanical loading?

Homeostasis: Anabolism = Catabolism

(Hart & Scott 2012)

genetics
sex
lifetime loading history
prior injury/scar tissue
systemic factors: diabetes/obesity
lifestyle factors: smoking /nutrition
local anatomy/biomechanics

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Tendinopathies of the hip and pelvis
Mechanobiological mechanisms

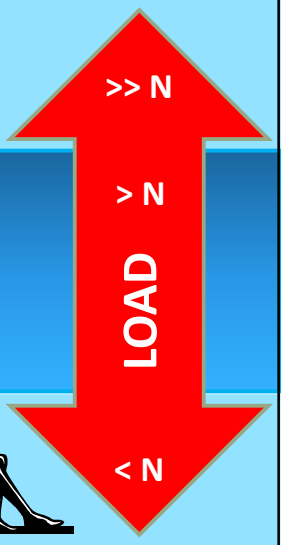
The influence of mechanical loading?

Failure to adapt: Catabolism > Anabolism
Increase in MMP's & catabolic cytokines

Positive adaptation: Anabolism > Catabolism
Increase in anabolic cytokines ,increased collagen synthesis & turnover

Homeostasis: Anabolism = Catabolism

Stress deprivation: Catabolism > Anabolism
Increase in MMP's & catabolic cytokines



Hart & Scott 2012,Magnusson et al 2010, Natsu-Ume et al 2005, Thornton et al 2010, Yamamoto et al 1999)

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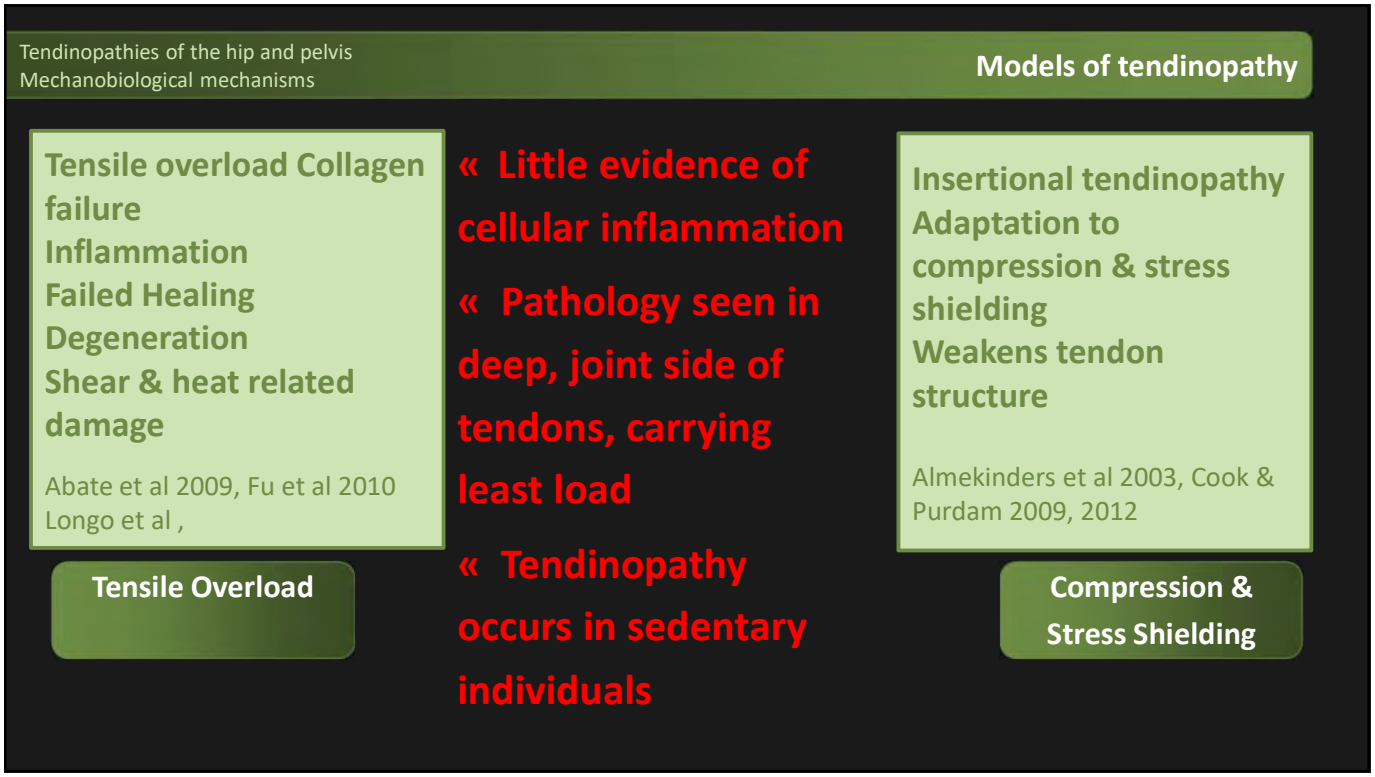

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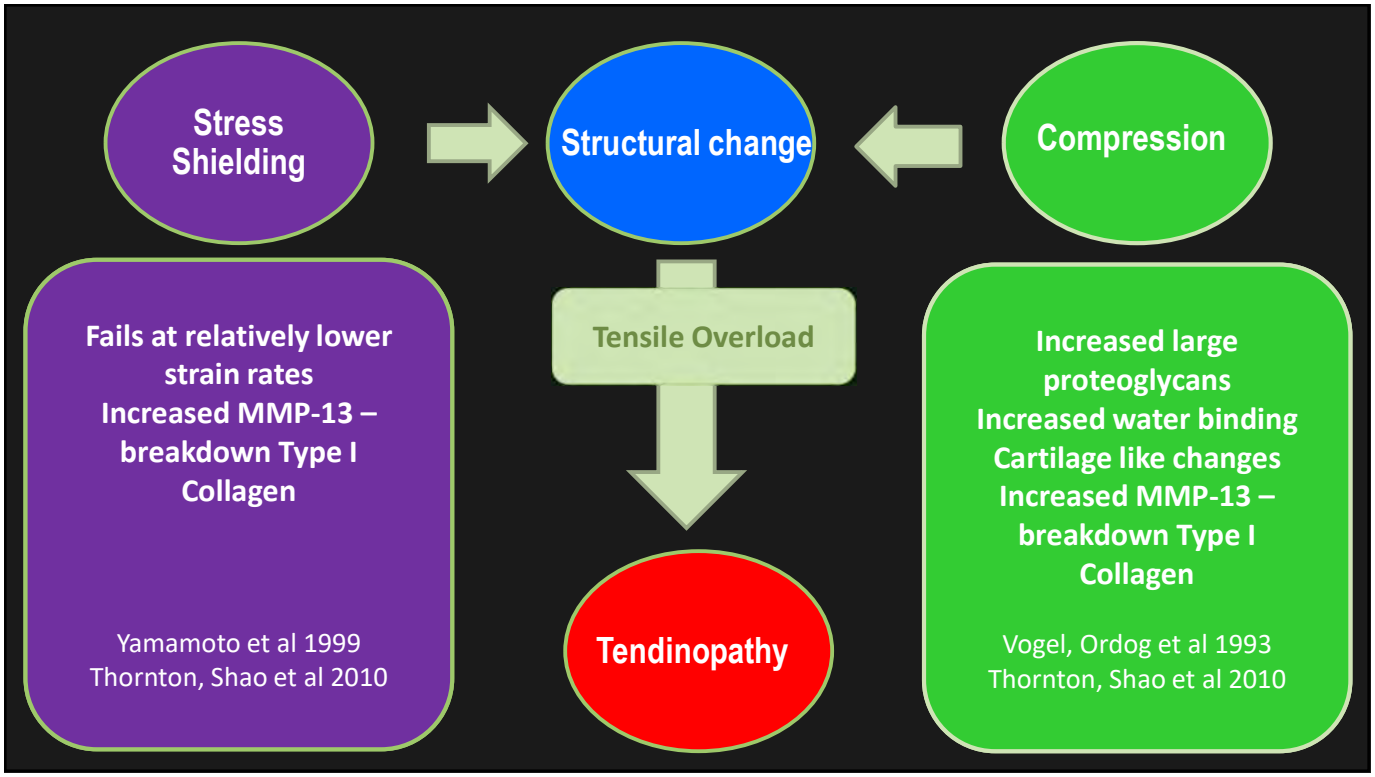

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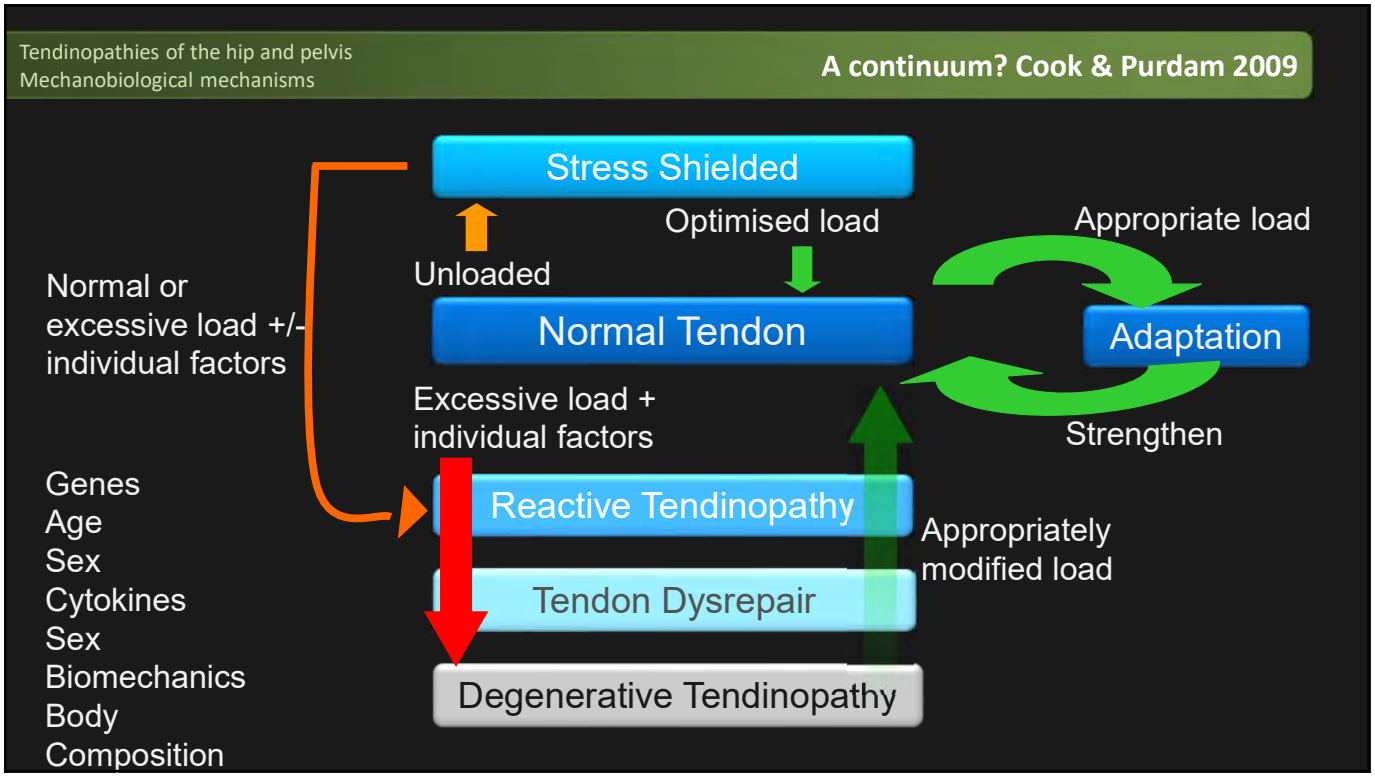

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Stages of Tendinopathy	Tenocytes	Matrix	Reversibility
Stage 1 Reactive Tendinopathy	Non-inflammatory cell response Proliferation Spindle shape	Large proteoglycans produced (aggrecan) Collagen remains organised Type I & II collagen	Reversible with optimised loading ✓

Cook & Purdam 2009

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Understanding Tendinopathies of the Hip and Pelvis

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Stages of Tendinopathy	Tenocytes	Matrix	Reversibility
Stage 1 Reactive Tendinopathy	Non-inflammatory cell response Proliferation Spindle shape	Large proteoglycans produced (aggrecan) Collagen remains organised Type I & II collagen	Reversible with optimised loading ✓
Stage 2 Tendon Dysrepair	↓	Marked increase in large proteoglycans Collagen fibres cleaved apart Focal areas of matrix disorganisation	Some reversibility with optimised load, & specific loading with exercise

Cook & Purdam 2009

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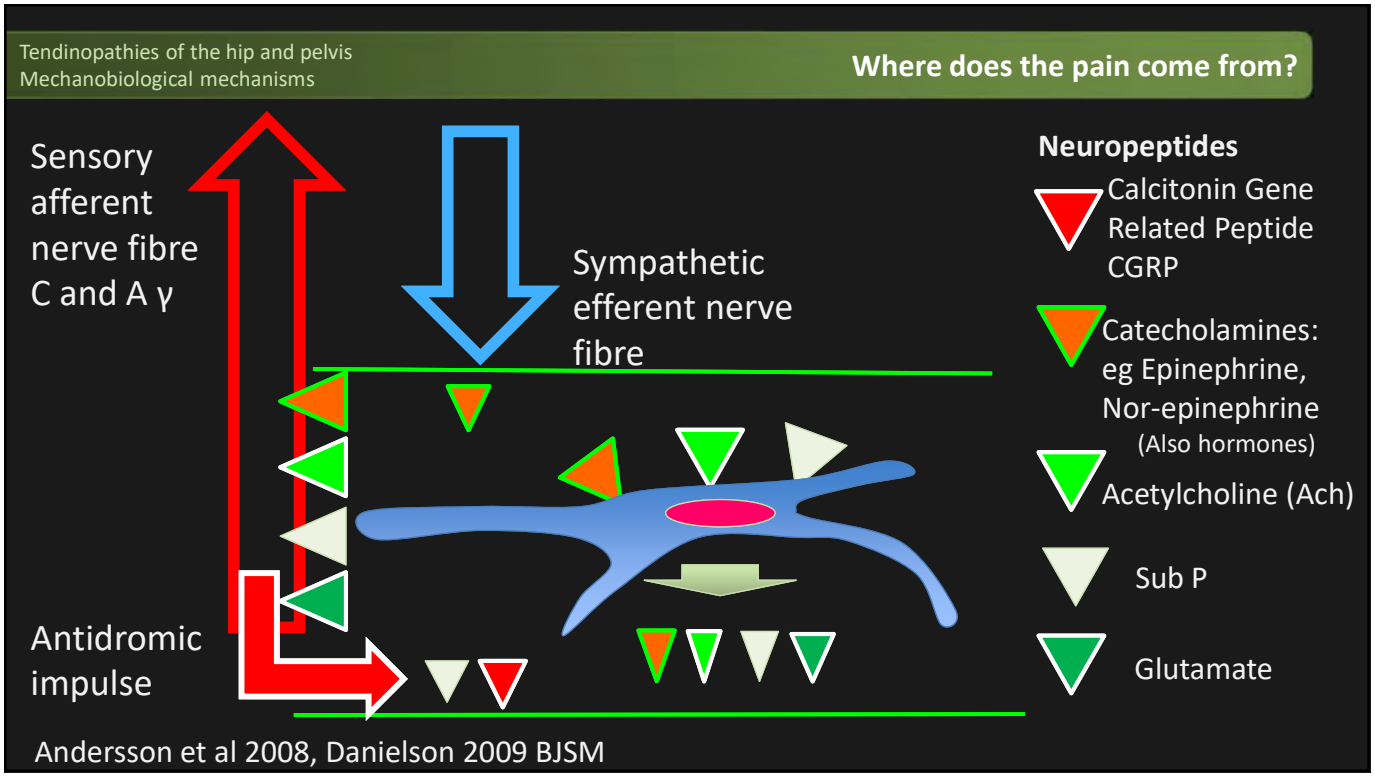

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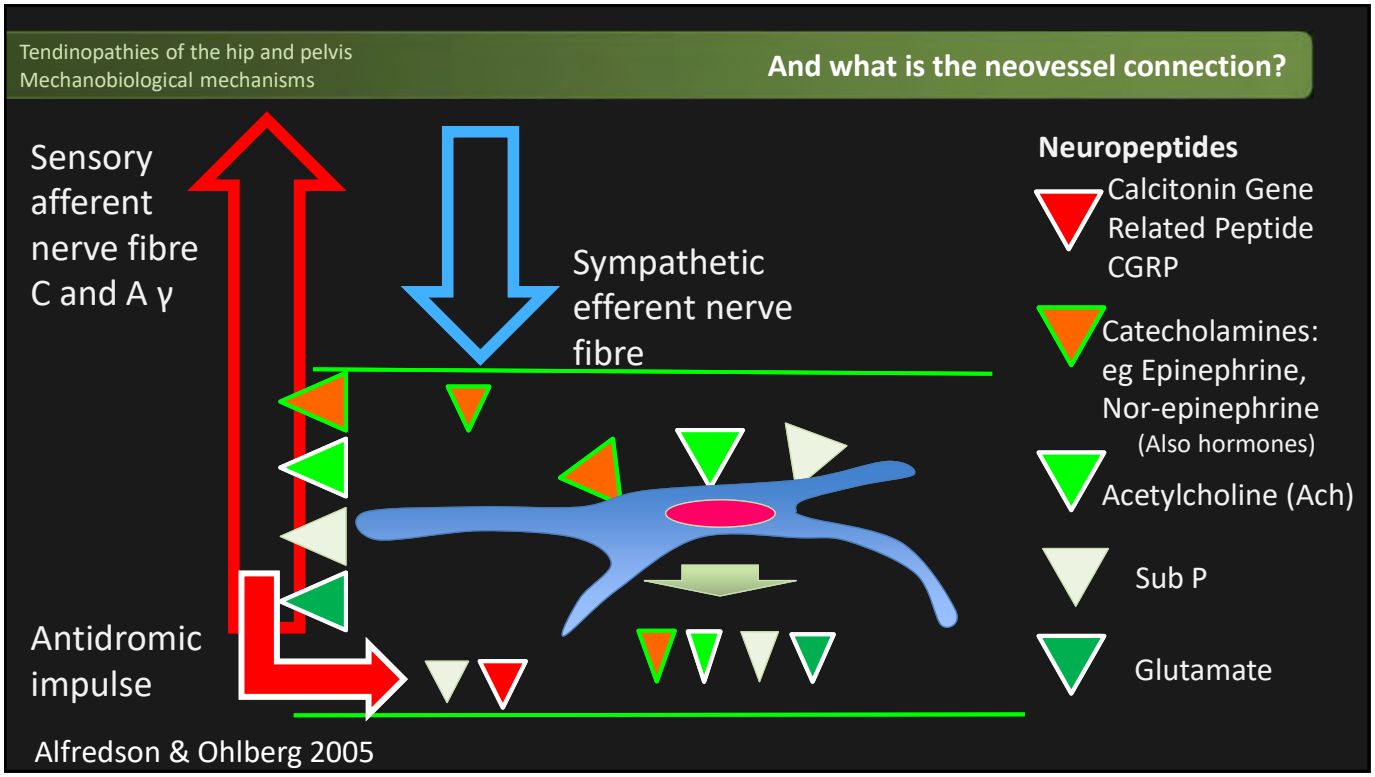

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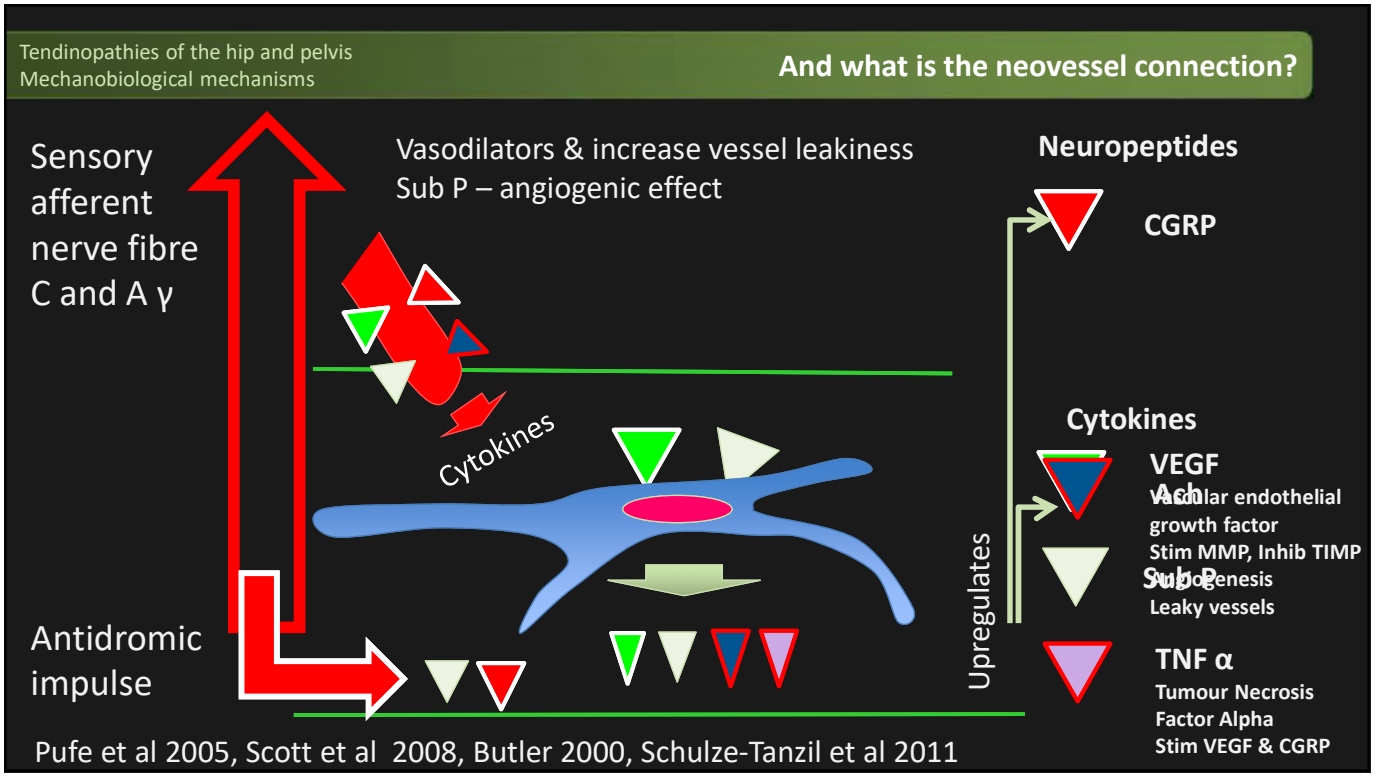

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Tendinopathies of the hip and pelvis
Mechanobiological mechanisms

Abdominal adiposity & tendinopathy

- Higher serum levels of TNFα demonstrated in those with abdominal adiposity (Park et al 2005)
- Greater waist girth in male volleyballers with patellar tendinopathy (Malliaris et al 2007)
- Waist girth recommendations for general health:
  - Males: <94cm
  - Females: <80cm

Gaida et al 2008

Large waist girth may be a risk factor for tendinopathy

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Tendinopathies of the hip and pelvis
Mechanobiological mechanisms

Medications & tendinopathy

- Fluoroquinolones (Ciprofloxacin)
  - Broad spectrum antibiotics
  - Listed side-effects include: Tendon toxicity, tendon rupture
  - Enhances cytokine mediated upregulation of MMP's and therefore matrix destruction (Corps et al 2002)
- Statins - Atorvastatin (Lipitor)
  - Statin induced tendinopathy
  - Mechanisms still unclear
  - Thought to effect MMP/TIMP balance (Marie et al 2008)

Some medications may effect tendon health

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Understanding Tendinopathies of the Hip and Pelvis

Lesson 3-1
Gluteal Tendinopathy

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- ➔ Prevalence & Presentation
- ➔ Anatomy Update
- ➔ Pathology
- ➔ Patho-aetiology
- ➔ Management Overview
  - ➔ Decompression
  - ➔ Exercise

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PREVALENCE & PRESENTATION

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Understanding Tendinopathies of the Hip and Pelvis

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Tendinopathies of the Hip and Pelvis
Gluteal Tendinopathy

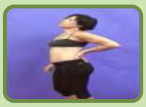
Prevalence

Female 3-4:1 F:23.5%;M:8.5% Segal et al 2007

Peri/post menopausal

Runners / steppers

OA – 20% GMTears Howell et al 2001



LBP – 20-35% GMT Collee et al 1991
Tortolani et al 2002

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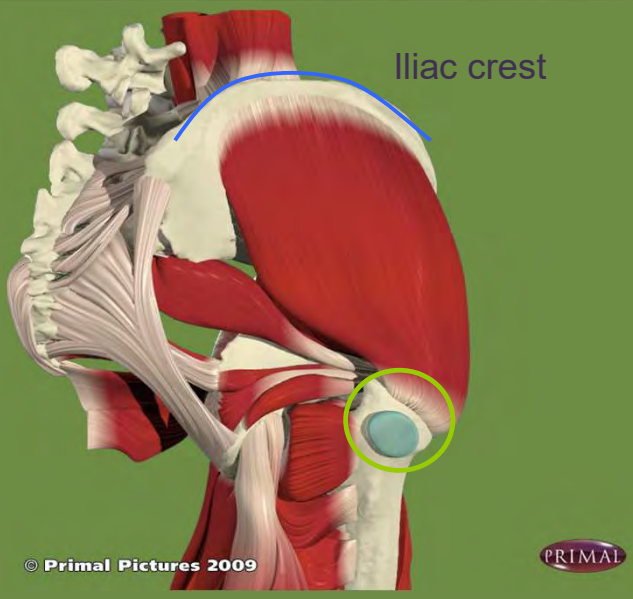
Tendinopathies of the Hip and Pelvis
Gluteal Tendinopathy

Presentation



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Understanding Tendinopathies of the Hip and Pelvis

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Tendinopathies of the Hip and Pelvis
Gluteal Tendinopathy

Presentation

Often worst at night

Other aggravating activities:

- walking
- stair climbing
- standing on 1 leg
- prolonged sitting
- rising to stand

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Tendinopathies of the Hip and Pelvis
Gluteal Tendinopathy

Presentation

Sudden increase in load on the weakened tendon

- Sudden increase in activity
- Slip or fall

OR

Gradual tendon change over time

Finally, everyday loads become painful for the tendon

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ANATOMY UPDATE

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Tendinopathies of the Hip and Pelvis
Gluteal Tendinopathy

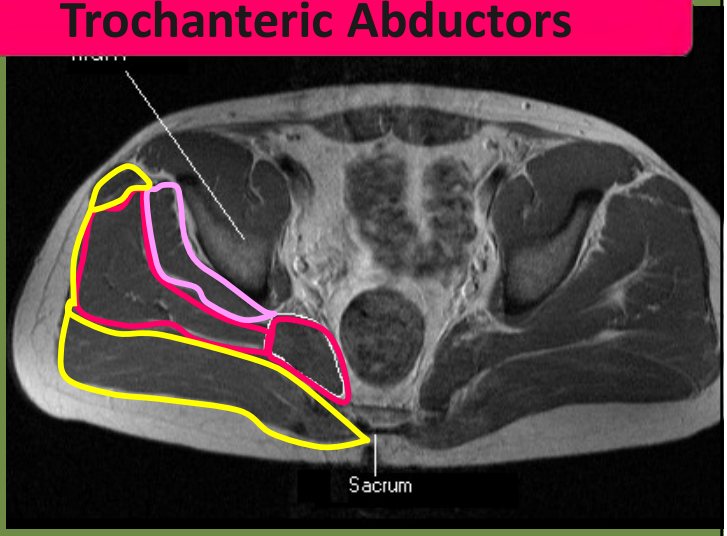
Patho-aetiology

Deep Layer: GMin
Joint protection/stability
Inhibited by unloading & pain

Intermediate Layer: GMed/Piri
Torque production – abd
Pelvic control
Assists in joint protection
Initiates under low load

Superficial Layer: UGMax/TFL (VL)
Torque production & pelvic control
High load recruitment
Exert effect via ITB
Increased lever arm in add
Not easily inhibited

Trochanteric Abductors



ITB Tensioners

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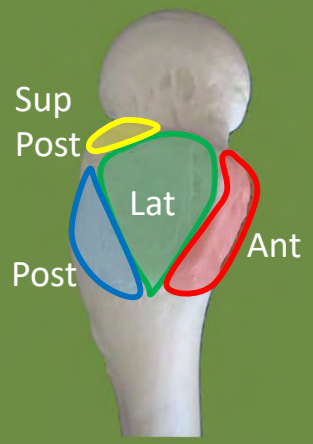
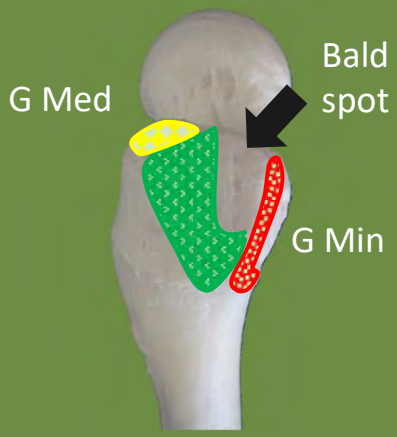
Anatomy Update

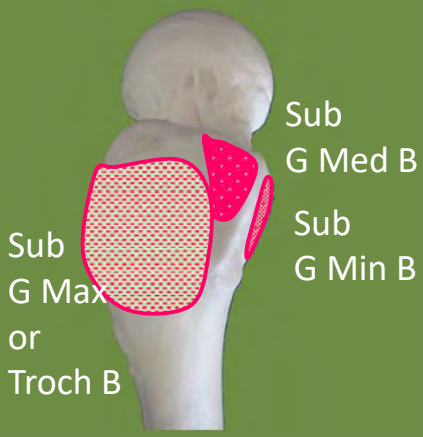
Facets



Tendon Insertions



Bursae



Pfirrmann et al 2001, Robertson et al 2008

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PATHOLOGY & TERMINOLOGY

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Tendinopathies of the Hip and Pelvis
Gluteal Tendinopathy

Pathology & Terminology

- **Bursal distension is inconsistently evident**
  Connell et al. 2003-15%
  Bird et al. 2001 - 8%
  Fearon et al 2010 ~ 50% - severe pathology
- **No histological signs of inflammation**
  Silva et al 2008
  Fearon et al 2010

Trochanteric Bursitis

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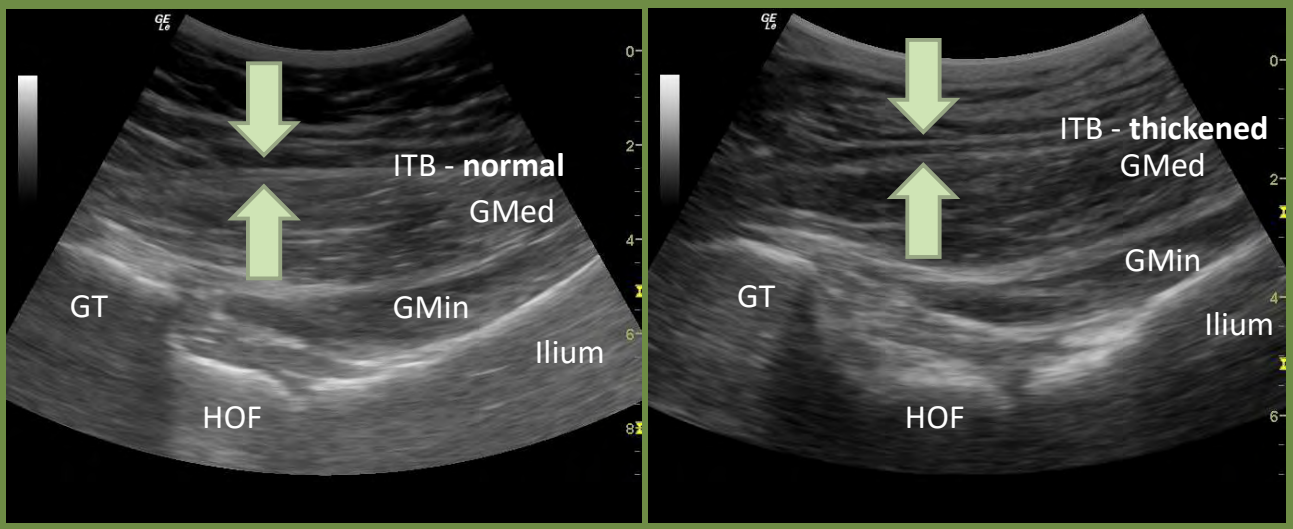
Tendinopathies of the Hip and Pelvis
Gluteal Tendinopathy

Pathology



ITB - Fascial thickening

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Understanding Tendinopathies of the Hip and Pelvis

Lesson 3-2
Gluteal Tendinopathy

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- Patho-aetiology
- Management Overview
  - Decompression
  - Exercise

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PATHO-AETIOLOGY

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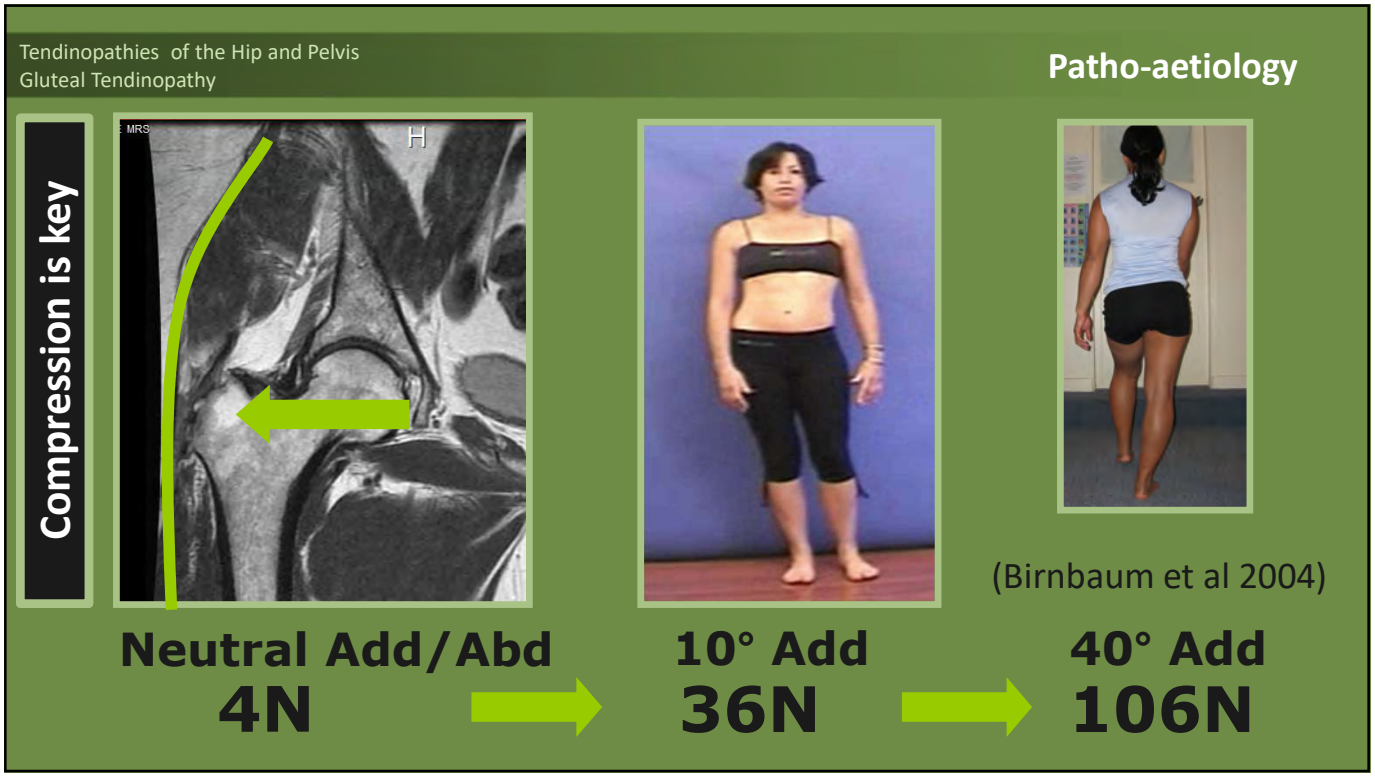

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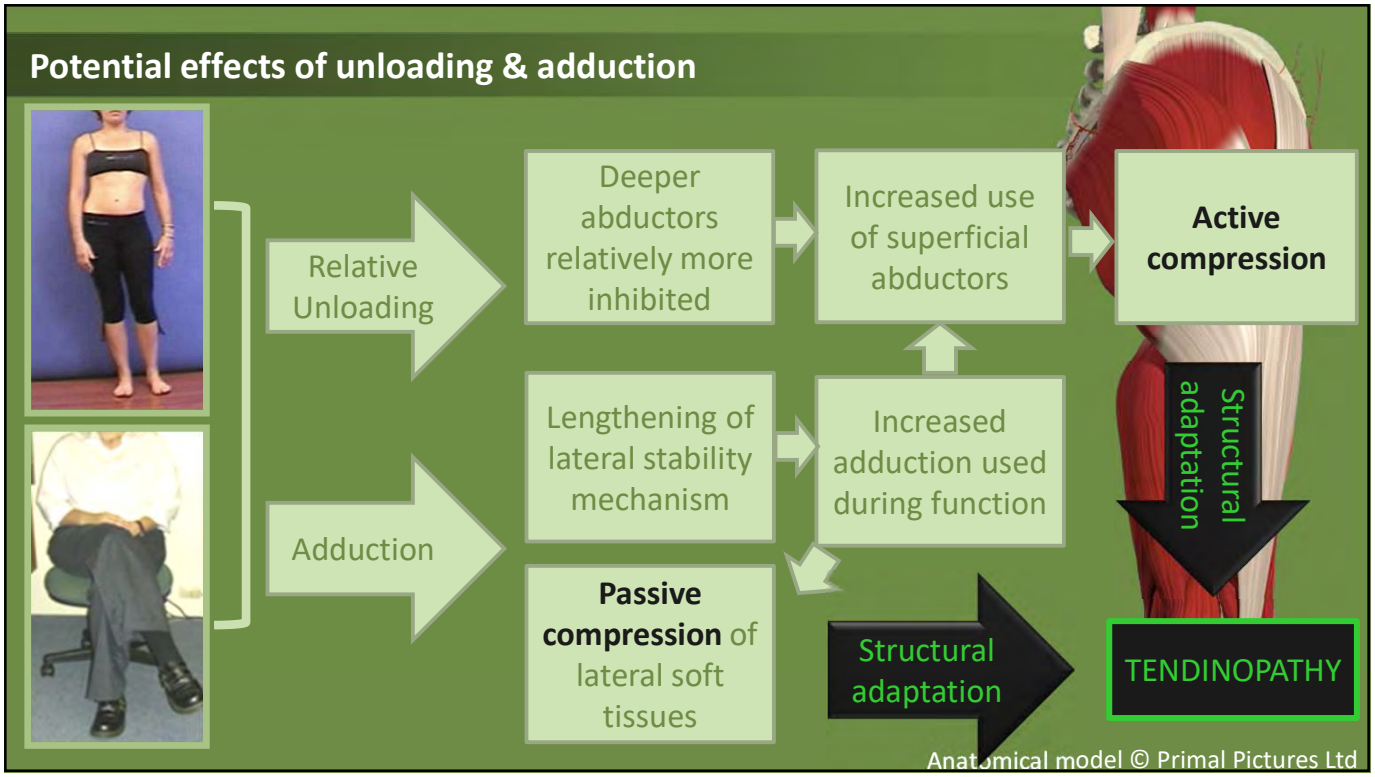

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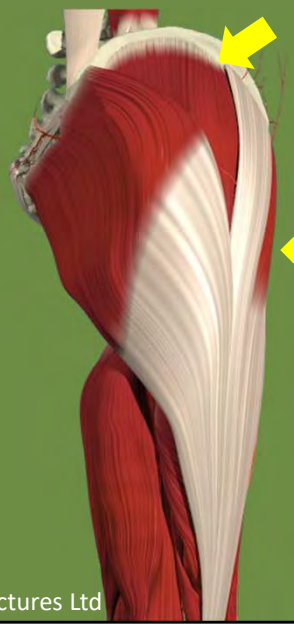
Tendinopathies of the Hip and Pelvis
Gluteal Tendinopathy

Patho-aetiology

Research evidence:



Atrophy of G Med & G Min
Pfirrmann et al 2005

Hypertrophy of TFL
Sutter et al 2012

Anatomical models © Primal Pictures Ltd

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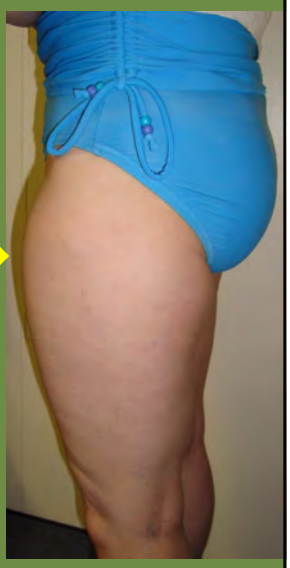
Tendinopathies of the Hip and Pelvis
Gluteal Tendinopathy

Patho-aetiology

Clinical Observations:

Atrophy of G Med & Min

Hypertrophy of TFL, UGM, & VL



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Tendinopathies of the Hip and Pelvis
Gluteal Tendinopathy

Patho-aetiology

Most common clinically:
Postural & dynamic adduction leading to lengthening



Excessive add & compression

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Tendinopathies of the Hip and Pelvis
Gluteal Tendinopathy

Patho-aetiology

Less common clinically:
Postural abduction leading to shortening





Relative add & compression

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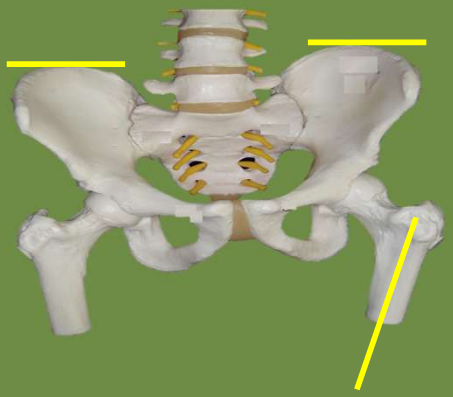
Tendinopathies of the Hip and Pelvis
Gluteal Tendinopathy

Patho-aetiology



Pelvic Obliquity & Relative Adduction

Scoliosis

Leg Length Diff

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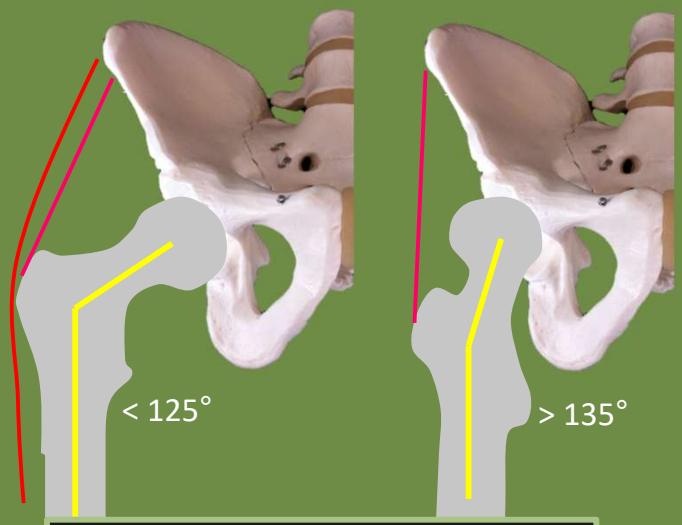
Tendinopathies of the Hip and Pelvis
Gluteal Tendinopathy

Patho-aetiology

Coxa Varus
Reduced neck-shaft angle

Greater offset
Increased GT prominence
Increased risk gluteal tendinopathy
(Fearon et al 2012)



Normal 125-135°

Coxa Valgus
Increased neck-shaft angle

Reduced offset
Poor lever arm for abductors
Function in relative adduction

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Patho-aetiology

Training factors

- Running on a camber
- Track running

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CONSERVATIVE MANAGEMENT

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Tendinopathies of the Hip and Pelvis
Gluteal Tendinopathy

Traditional Management

Anti-inflammatory treatment

Stretching

RATIONALE??

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Tendinopathies of the Hip and Pelvis
Gluteal Tendinopathy

Contemporary Management

Decompression

Minimise amount of compression over each 24 hour period

+

Exercise

Optimise muscle function & tendon loading

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Tendinopathies of the Hip and Pelvis
Gluteal Tendinopathy

Decompression

MINIMISE:

Sustained, repetitive, or loaded

HIP ADDUCTION

HIP FLEXION > 90°

HIP FLEXION/ADD

HIP OUT **KNEE ACROSS THE BODY**

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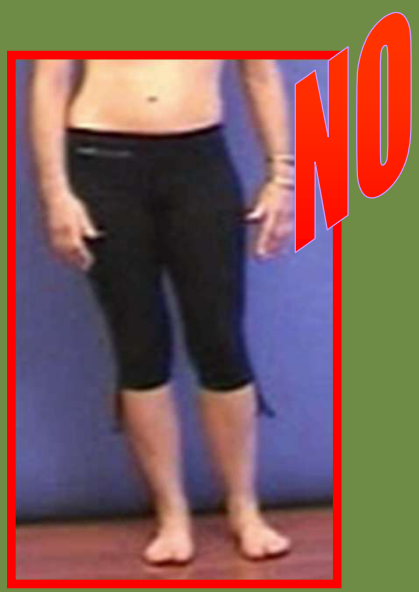
Tendinopathies of the Hip and Pelvis
Gluteal Tendinopathy

Decompression: Standing



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Tendinopathies of the Hip and Pelvis
Gluteal Tendinopathy

Decompression: Standing

YES

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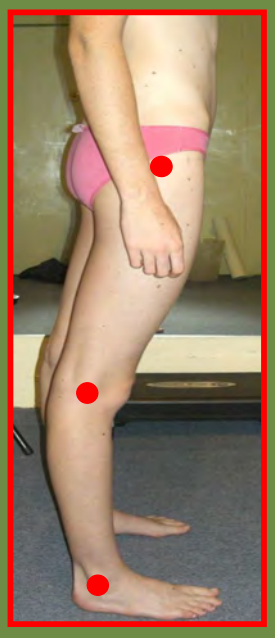
Tendinopathies of the Hip and Pelvis
Gluteal Tendinopathy

Decompression: Standing



NO

YES

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Tendinopathies of the Hip and Pelvis
Gluteal Tendinopathy

Decompression: Walking

Think tall

Minimise pelvic drop & rotation

Lead with the knees & soft on the impact

Feet a little wider

Avoid hills until pain settles

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Tendinopathies of the Hip and Pelvis
Gluteal Tendinopathy

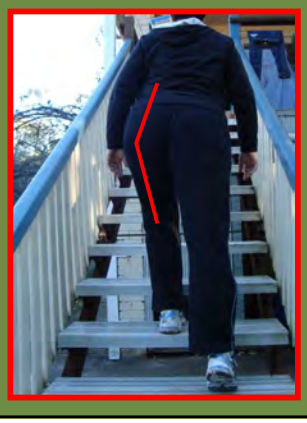
Decompression: Stairs

Place feet a little wider

Keep the greater trochanter tucked in during the push up to the next step

Use a rail on the opposite side

Avoid step aerobics until pain settles



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Understanding Tendinopathies of the Hip and Pelvis

Dr. Alison Grimaldi
PHYSIOTHERAPIST, RESEARCHER & EDUCATOR

Tendinopathies of the Hip and Pelvis
Gluteal Tendinopathy

Decompression: Sitting

No knee crossing

No knees together

No tucking up feet

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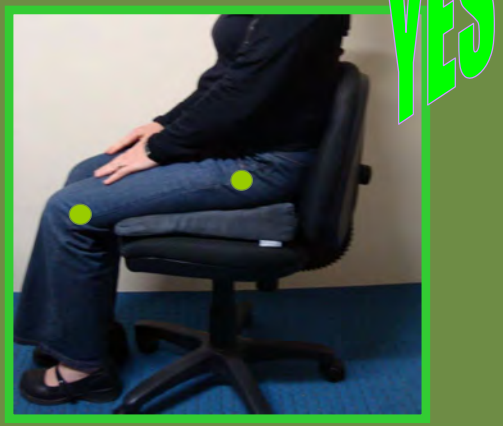
Tendinopathies of the Hip and Pelvis
Gluteal Tendinopathy

Decompression: Sitting

Hips, knees & feet in line



Hips higher than knees

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Tendinopathies of the Hip and Pelvis
Gluteal Tendinopathy

Decompression: Sleeping

Eggshell mattress overlay may help

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Tendinopathies of the Hip and Pelvis
Gluteal Tendinopathy

Decompression: Sleeping

Supine or ¼ turn from, if possible

Hip, knee & ankle horizontal

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Tendinopathies of the Hip and Pelvis
Gluteal Tendinopathy

Decompression: Stretching

NO

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Tendinopathies of the Hip and Pelvis
Gluteal Tendinopathy

Exercise

Static Abduction

Supine;Sidelying; Standing

Bridging

Double leg bridge; Offset; Single leg progressions

Functional Retraining

Double leg squats; Offset; Single leg progressions

Dynamic Abductor Loading

Sidestepping

Reformer work – bilateral abduction, and scooter

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Understanding Tendinopathies of the Hip and Pelvis

Lesson 4-1
Proximal Hamstring Tendinopathy

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- ➔ Prevalence & Presentation
- ➔ Anatomy update
- ➔ Pathology

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PREVALENCE & PRESENTATION

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Tendinopathies of the Hip and Pelvis
Proximal Hamstring Tendinopathy

Prevalence

Most common in runners (Lempainen et al 2009)
- middle & long distance

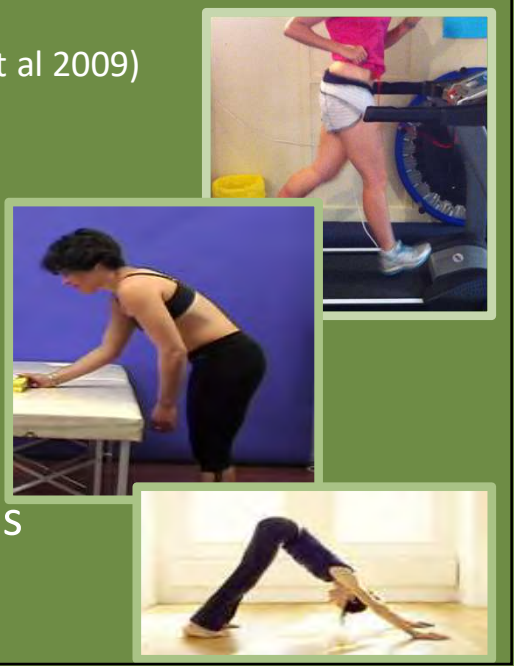
Soccer, Ice hockey, rowing

*Also consider in:

peri/post menopausal women

certain occupations

- those working in fwd lean postures
- yoga instructors



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Tendinopathies of the Hip and Pelvis
Proximal Hamstring Tendinopathy

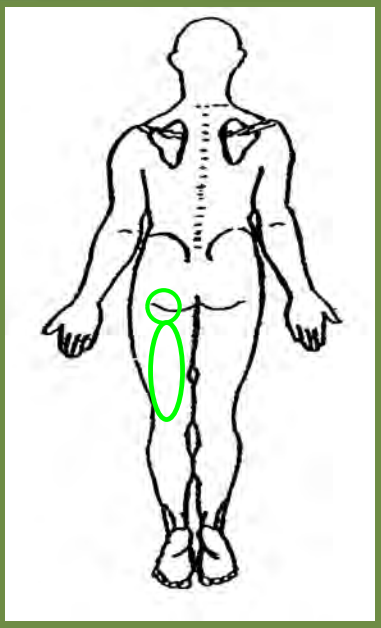
Presentation

Ischial pain

+/- post thigh pain or tightness

Often misdiagnosed as sciatica

May have sciatic symptoms related to irritation or entrapment at the IT



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Tendinopathies of the Hip and Pelvis
Proximal Hamstring Tendinopathy

Presentation

Aggravating activities:

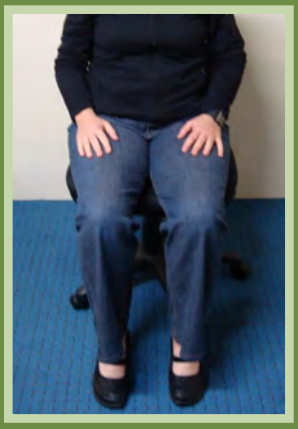
Sitting, esp on hard surfaces,

Stairs

Walking esp uphill

Forward lean activities

Running – uphill, higher speeds



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ANATOMY UPDATE

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Understanding Tendinopathies of the Hip and Pelvis

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Tendinopathies of the Hip and Pelvis
Proximal Hamstrings Tendinopathy

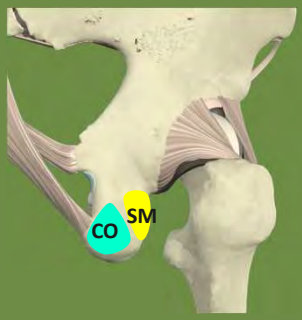
Anatomy

Biceps femoris (LH) & semitendinosis: common origin from superior region of ischial tuberosity

Semimembranosis: Tendon lies deep to common origin of ST & BFLH.
Originates from superolateral aspect of IT

Miller, Gill & Webb 2007

Miller & Webb 2008



Anatomical models © Primal Pictures Ltd

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Tendinopathies of the Hip and Pelvis
Proximal Hamstrings Tendinopathy

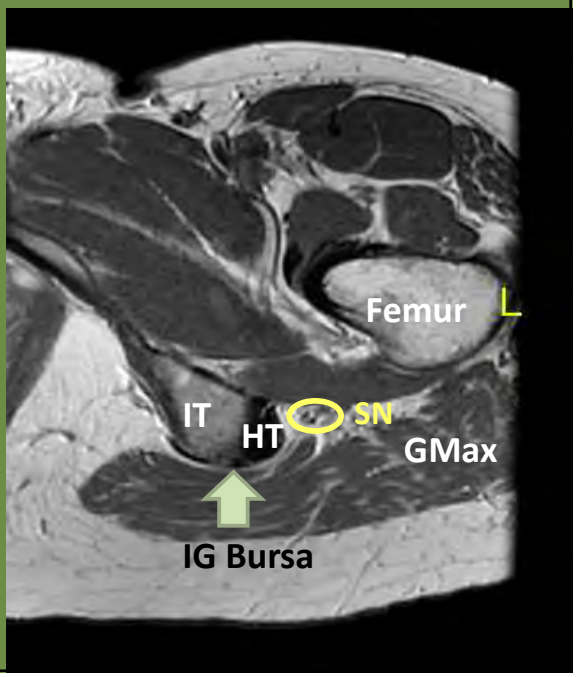
Anatomy

Associations:

Attachments into sacrotuberous ligament

Close association with sciatic nerve

Ischiogluteal Bursa



Anatomical model © Primal Pictures Ltd

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Tendinopathies of the Hip and Pelvis
Proximal Hamstrings Tendinopathy

Functional Anatomy

SM	ST
BFLH	BFSH

Medial Pair

Lateral Pair

Shorter pennated fibres
Designed for:
Force production

Longer fibres
Generate lower peak forces
Designed for:
Excursion

Kellis et al 2012

Anatomical model © Primal Pictures Ltd

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Tendinopathies of the Hip and Pelvis
Proximal Hamstrings Tendinopathy

Functional Anatomy

SM & BFLH :

Act most strongly across the hip

Ono et al 2010,2011

ST :
Acts most strongly across the knee

Anatomical model © Primal Pictures Ltd

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PATHOLOGY

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Pathology

Most commonly injured regions:

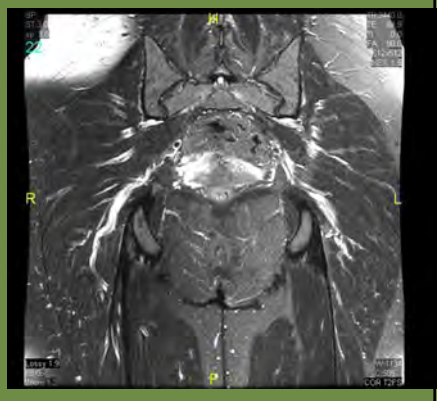
Hamstring Muscle/MTJ Injury

– BFLH

Proximal Hamstring Tendon Injury

– SM

(Askling et al 2012, Lempainen et al 2009)



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Tendinopathies of the Hip and Pelvis
Proximal Hamstrings Tendinopathy

Pathology

Histopathology: (Lempainen et al 2009)

No inflammatory cells

Typical morphological findings of tendinosis

- Rounding of tenocyte nuclei
- Increased ground substance – large proteoglycans
- Collagen disintegration
- Increased vascular proliferation

Fat cells within collagen bundles – fatty degeneration

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Tendinopathies of the Hip and Pelvis
Proximal Hamstrings Tendinopathy

Pathology

MRI: (DeSmet et al 2012)

90% of all tendons:

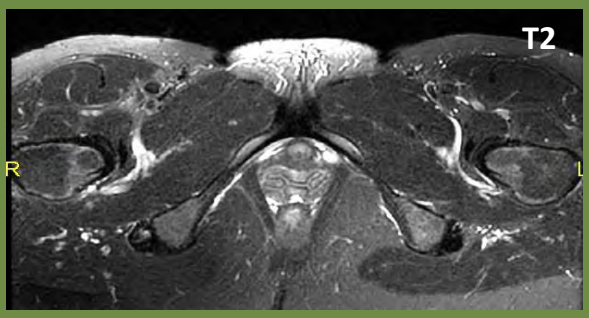
Increased T1 or T2 signal

Symptomatic tendons:

Increased tendon AP diameter &/or width

Peritendinous T2 signal

Ischial tuberosity oedema



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Understanding Tendinopathies of the Hip and Pelvis

Lesson 4-2
Proximal Hamstring Tendinopathy

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- Patho-aetiology
- Management Overview
  - Decompression
  - Exercise

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PATHO-AETIOLOGY

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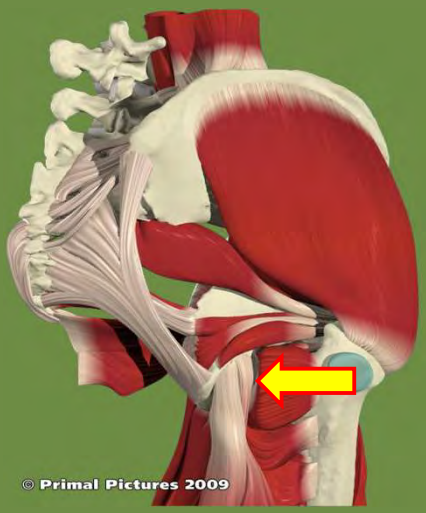
Tendinopathies of the Hip and Pelvis
Proximal Hamstring Tendinopathy

Patho-aetiology

Compression of deep tendon fibres against ischium

*semimembranosis

Occurs in positions of hip flexion (Cook & Purdam 2012)



Compression is key

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Tendinopathies of the Hip and Pelvis
Proximal Hamstring Tendinopathy

Patho-aetiology

Stretching often provocative

(Lempainen et al 2009, Cook & Purdam 2012)

Excessive stretching may be a predisposing factor

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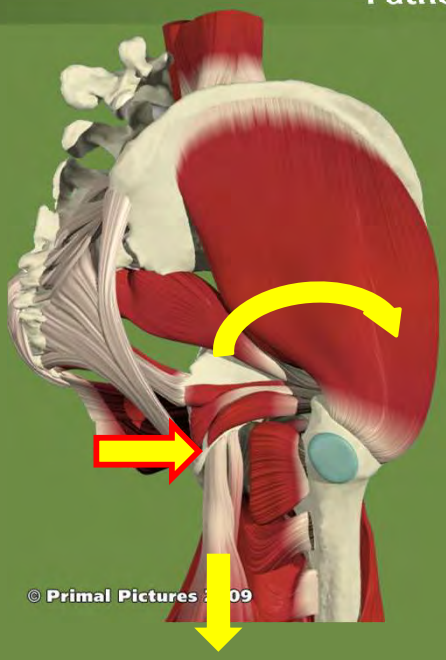
Tendinopathies of the Hip and Pelvis
Proximal Hamstring Tendinopathy

Patho-aetiology



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Tendinopathies of the Hip and Pelvis
Proximal Hamstring Tendinopathy

Patho-aetiology

Excessive use of hip flexion may be associated with:

Excessive hip mobility/habitual

Ankle or knee restrictions

– unable to use triple flexion

Quads weakness

Calf tightness, hip flexor tightness

difficulty achieving trunk upright posture

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Tendinopathies of the Hip and Pelvis
Proximal Hamstring Tendinopathy

Patho-aetiology

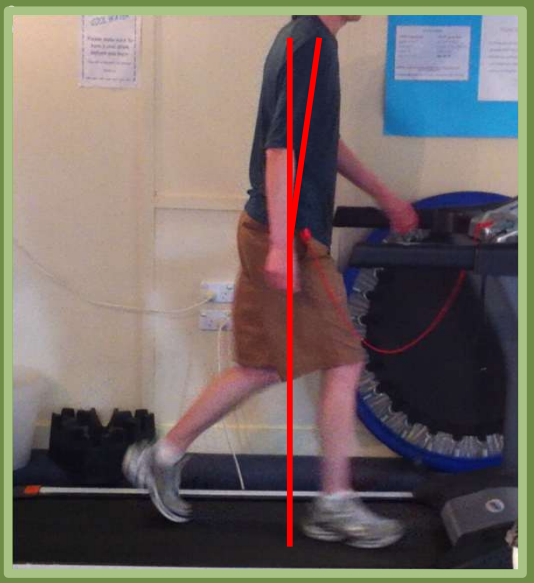
Walking or running technique

Forward lean postures

Excessive anterior pelvic tilt

Overstriding

Excessive hill running, stair bounding



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Tendinopathies of the Hip and Pelvis
Proximal Hamstring Tendinopathy

Patho-aetiology

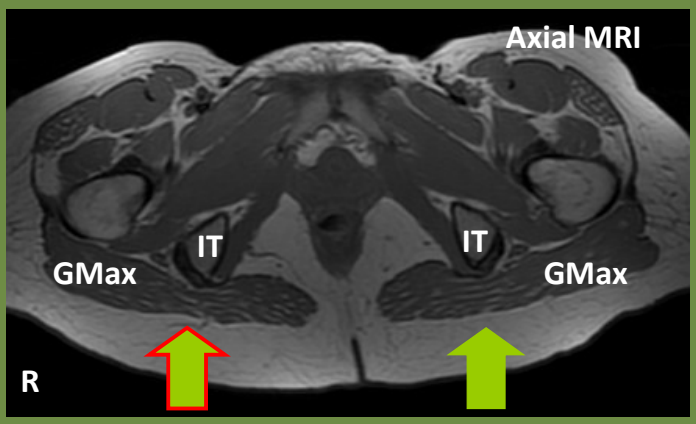
Lower gluteus maximus atrophy

Increased hams workload

Reduced padding over ischial tuberosity

Asymmetrical atrophy:

- pelvic obliquity in sitting
- increased load on affected side



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Tendinopathies of the Hip and Pelvis
Proximal Hamstring Tendinopathy

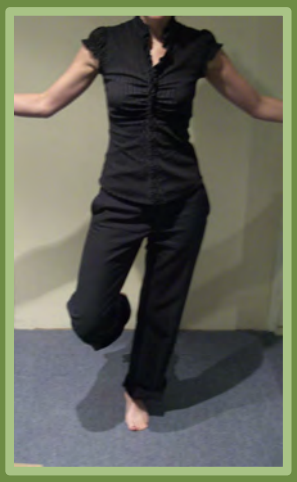
Patho-aetiology

Gluteus medius & minimus dysfunction

Lack of local pelvic support

Increased contribution from thigh muscles

White (2011) Case studies all abd weakness



May be one factor in the development of concurrent gluteal & proximal hams tendinopathy

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MANAGEMENT

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Tendinopathies of the Hip and Pelvis
Proximal Hamstring Tendinopathy

Traditional Management

Ice & electrotherapy

Regular hamstring stretching

Strengthening

Fredericson et al 2005, White 2011

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Tendinopathies of the Hip and Pelvis
Proximal Hamstring Tendinopathy

Contemporary Management

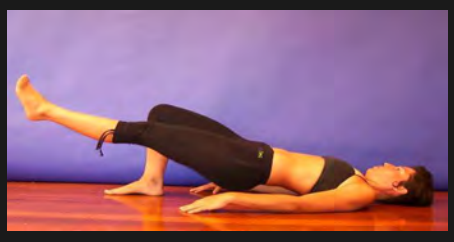
Decompression

Minimise amount of compression over each 24 hour period

+

Exercise

Optimise muscle function & tendon loading



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Tendinopathies of the Hip and Pelvis
Proximal Hamstring Tendinopathy

Decompression: Sitting

Sitting:

Minimise sitting

Alternate with standing work station

Kneeling on cushion for short breaks

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Tendinopathies of the Hip and Pelvis
Proximal Hamstring Tendinopathy

Decompression: Sitting

NO

YES

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Tendinopathies of the Hip and Pelvis
Proximal Hamstring Tendinopathy

Decompression: Forward leaning/bending

Minimise forward leaning/bending in ADL:

Lifting

NO

YES

Bend the knees

AVOID INCITING FEAR OR HYPERVIGILENCE

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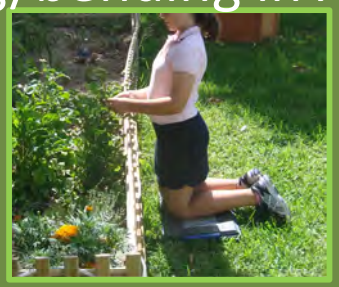
Tendinopathies of the Hip and Pelvis
Proximal Hamstring Tendinopathy

Decompression: Forward leaning/bending

Minimise forward leaning/bending in ADL:

Gardening

NO



YES

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Tendinopathies of the Hip and Pelvis
Proximal Hamstring Tendinopathy

Decompression: Forward leaning/bending

Minimise forward leaning/bending in ADL:

Cleaning teeth, shaving

NO

YES

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Tendinopathies of the Hip and Pelvis
Proximal Hamstring Tendinopathy

Decompression: Forward leaning/bending

Minimise forward leaning/bending in ADL:

Cleaning, working in the kitchen

NO

YES

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Tendinopathies of the Hip and Pelvis
Proximal Hamstring Tendinopathy

Decompression: Forward leaning/bending

Minimise forward leaning/bending in ADL:

Tying shoelaces, dressing

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Tendinopathies of the Hip and Pelvis
Proximal Hamstring Tendinopathy

Decompression: Stretching

Hamstring stretching should be avoided

(Cook & Purdam 2012, Lempainen et al 2009)

Use massage, trigger point release, acupuncture/needling

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Tendinopathies of the Hip and Pelvis
Proximal Hamstring Tendinopathy

Posture/Gait/Running

Posture
- avoid sway posture, or forward trunk inclination

Gait and running
- avoid overstriding
- increase cadence, reduce stride length, soften impact
- avoid fast pace, hills & distance initially
- If still painful, rest & practice good walk technique
- Gradual return to higher level activities when painfree
- Careful control of compressive loading in training

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Tendinopathies of the Hip and Pelvis
Proximal Hamstring Tendinopathy

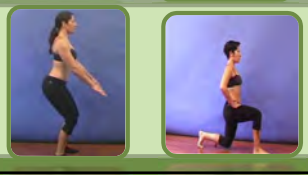
Exercise

Static Hams & Glutes
Low load, in hip neutral, slow contract/relax

Graduated Strengthening
Glutes & Hams

Other associated muscle groups
Trunk (abs/mulitifidus), Hip abd's & flexors

Functional Retraining/Strengthening



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Tendinopathies of the Hip and Pelvis
Proximal Hamstring Tendinopathy

Other contributors

Address other potential contributors:

Ankle and knee ROM

Calf length

Hip flexor length

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Understanding Tendinopathies of the Hip and Pelvis

Lesson 5-1
Iliopsoas Tendinopathy/ IRGP

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- ➔ Prevalence & Presentation
- ➔ Anatomy update
- ➔ Pathology

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PREVALENCE & PRESENTATION

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Prevalence

Iliopsoas related groin pain (IRGP):

1°clinical entity: 36% of 207 athletes

2°or 3°: 55% of athletes

18% were runners

IRGP most common 1°clinical entity for runners

(Holmich 2007)

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Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Prevalence

Prevalence Post Surgery:

Iliopsoas tendinopathy post THR

Around 4% (Henderson & Lachiewicz 2012)

Also common post hip arthroscopy

(Philippon et al 2011)

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Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Prevalence

Internal Snapping Hip

10% of general population

90% of elite dancers

Most will be asymptomatic

(Ilizaliturri et al 2009, Winston et al 2007)

May lead to iliopsoas tendinopathy and bursal irritation

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Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Presentation

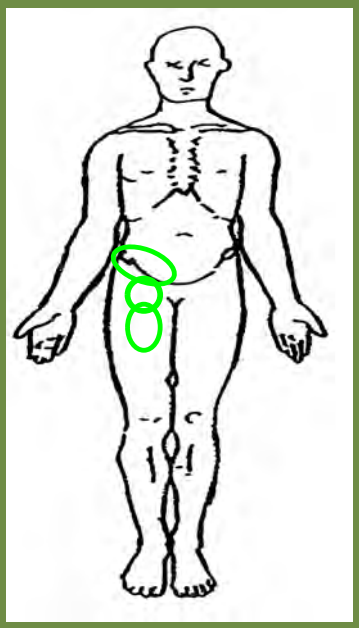
Area of pain:

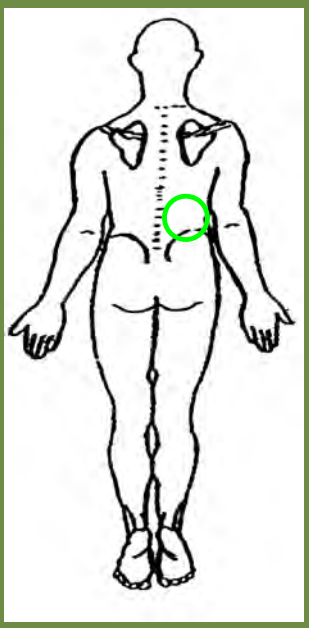
Anterior-medial groin

Proximal anterior thigh

Low abdomen

Fatigue/ache low back





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Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Presentation

Symptoms:

Pain with:

- Walking or running esp long distance & fast pace
- Stairclimbing
- Lifting leg to dress or get in/out car
- Sitting in deep chairs
- Cough/sneeze

+/- snapping with hip flexion/extension movements

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ANATOMY UPDATE

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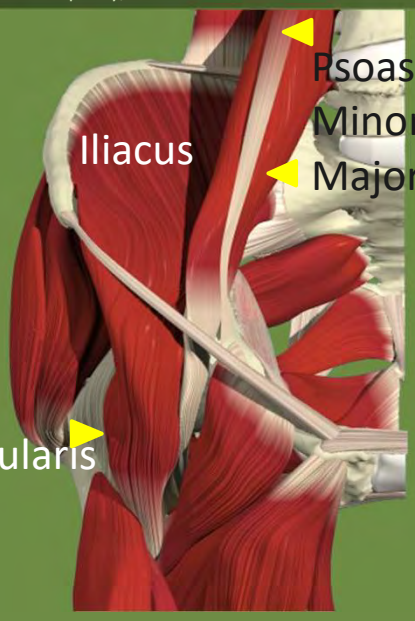
Anatomy



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Iliacus: Iliac fossa
LT & ant femur

Psoas Major: T12-L5
Lesser trochanter

Psoas Minor: Absent in 40%
T12-L1 – IPE

Iliocapsularis: Just below AIIS
Just below LT

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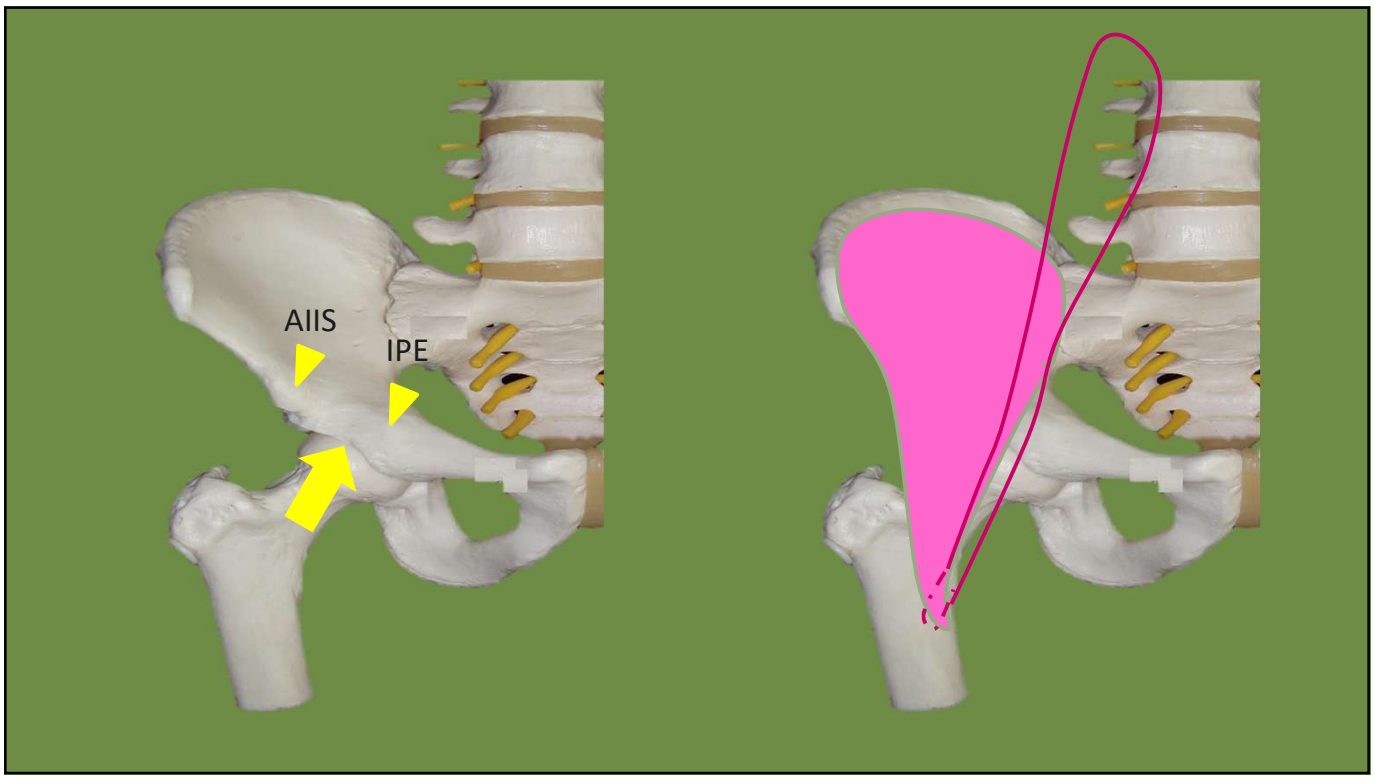

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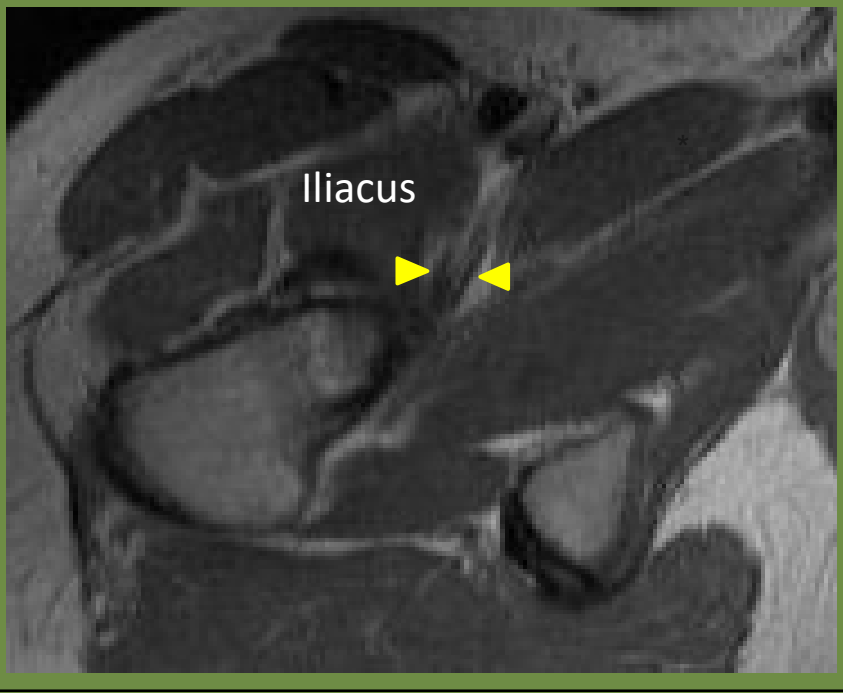

At the lesser trochanter

Variations in distal tendon anatomy

Fatty cleft may be evident in distal tendon structure

Polster et al 2008

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Understanding Tendinopathies of the Hip and Pelvis

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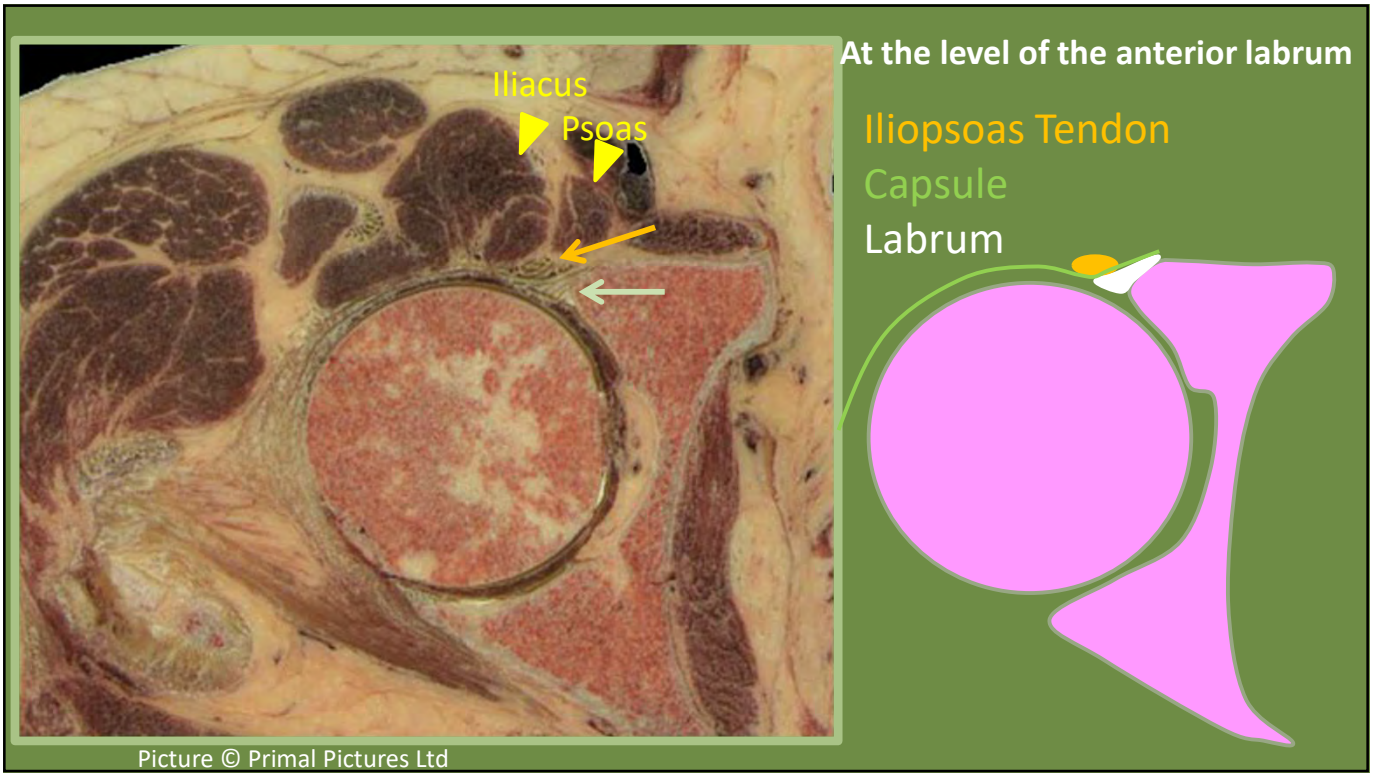

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Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Anatomy

DISSECTION STUDIES	No hips	Circ mm Muscle + Tendon	Circ mm Tendon only	% of sample tendinous
Alpert et al 2009	8	Lab: 63.7± 7.3 LT:	28.3± 2.8 25.5± 2.5	44.5%
Blomberg et al 2011 **Lab**:Labrum **TRS**: Transcapsular Release Site **LT**: Lesser trochanter	40	Lab:68 TRS:58 LT:46	27 31 27	40% 53% 60%

Elderly cadavers – may underestimate normal muscle content

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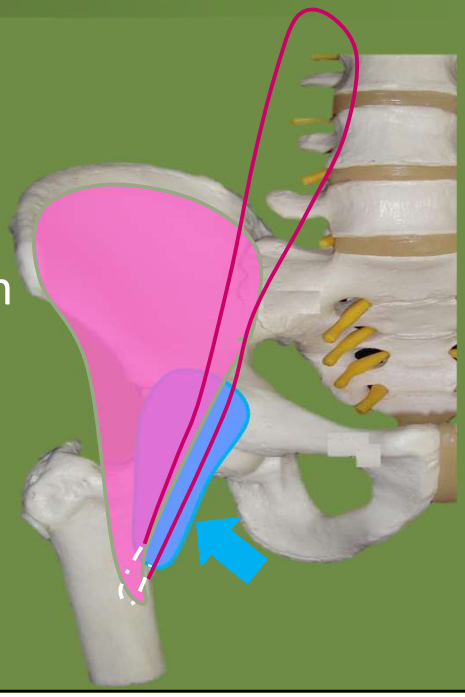
Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Anatomy

Iliopsoas Bursa

Largest synovial bursa
5-7cm long; 2-4cm wide
Lies between MT unit & pelvic brim
May extend:
proximally into iliac fossa
distally to lesser trochanter
Communicates with hip joint in 14% of adults
(Johnston et al 1998)



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Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Actions

Actions of iliopsoas:

Primary hip flexor

Flex trunk forward over femur

Small lateral rotation moment

(Blankenbaker & Tuite 2008, Rajendran 1989)

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Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

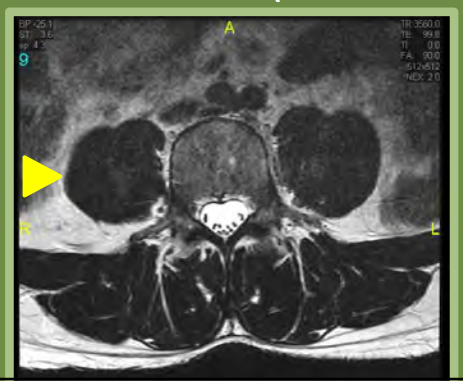
Actions of Psoas

Sagittal MRI

Stability function: Lumbar Spine

Axial compression

Important role in maintaining lumbar lordosis (Park et al 2013)



Axial MRI

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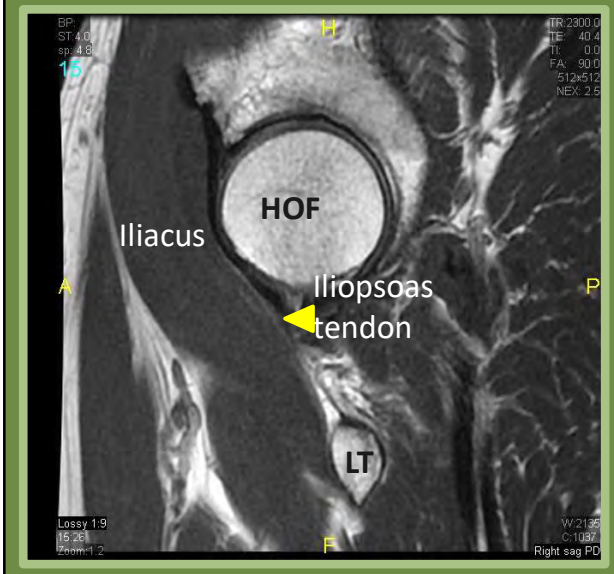
Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Actions



Sagittal MRI

Stability function: Hip

Iliopsoas tendon

Iliacus muscle belly

Iliocapsularis & attachments into capsule

Provide anterior support for the hip joint esp in extension

(Lewis et al 2009, Ward et al 2000)

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PATHOLOGY

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Pathology

Sites of reported IL pathology:

Proximal tendon

Musculotendinous junction

Muscle belly

Iliopsoas bursa

(Bui et al 2008, Johnston et al 1998)

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Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Pathology

Related labral pathology:

At 3 o'clock position adjacent to iliopsoas tendon anteriorly

Most commonly labral lesions occur in 11.30-2pm position – superior, anterosuperior

(Alpert et al 2009, Domb et al 2011)

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Understanding Tendinopathies of the Hip and Pelvis

Lesson 5-2
Iliopsoas Tendinopathy/ IRGP

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- ➔ Patho-aetiology
- ➔ Management Overview
  - ➔ Decompression
  - ➔ Exercise

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PATHO-AETIOLOGY

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Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Patho-aetiology

Compression

Snapping/Friction

Traction

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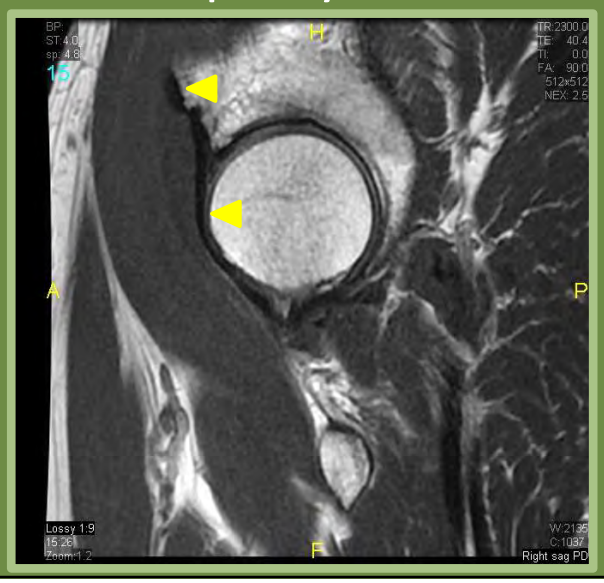
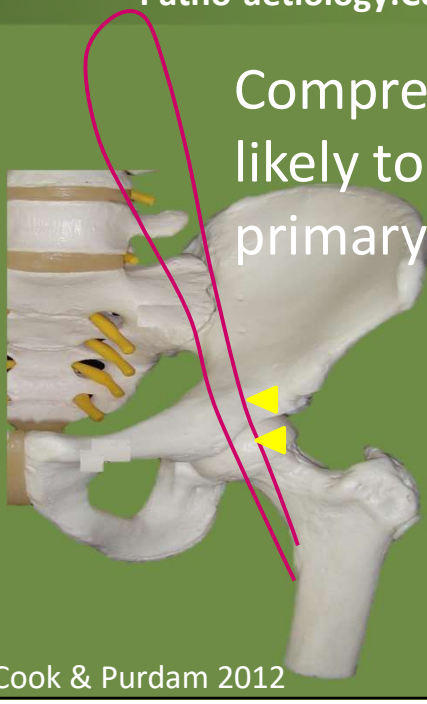
Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Patho-aetiology:Compression

Tendinopathy:



Compression likely to be a primary factor



Cook & Purdam 2012

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Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

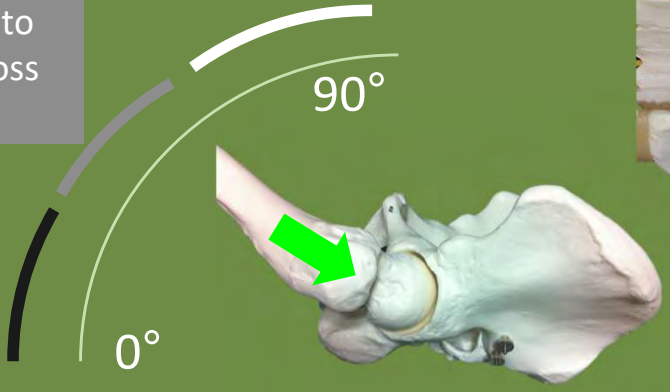
Patho-aetiology:Compression

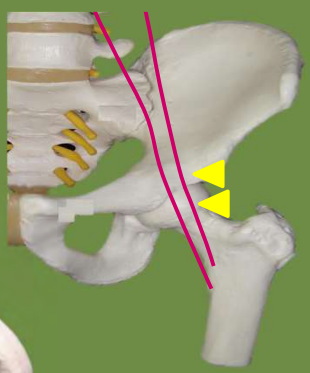
Tendon contact and compression through range:

Above 60°
No bony contact

15-60°
Pulley transferred to pelvic brim after loss of contact HOF

0-15°
Max pressure HOF
HOF acts as pulley
Tendon stabilises HOF
Posterosuperior force





Loss of contact:
HOF: 14° (7-19°)
Pelvis: 54 ° (42-67 °)

Yoshio et al 2002

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Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Patho-aetiology:Compression

What about hip extension?

Compressive forces will be even greater
Iliopsoas provides an important restraint against anterior translation of HOF
Active here in gait (Andersson et al 1997)

Ant hip joint loading highest in extension
Loading significantly increased with weakness of iliopsoas (Lewis et al 2009)

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Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Patho-aetiology:Compression

Effect of posture:

Sway posture

Rest in hip extension

Usually use excessive extension in gait

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Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Patho-aetiology:Compression

Extension during dynamic function:

Power walking

Running with long stride length

Ballet

Gymnastics

Martial arts

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Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Patho-aetiology:Compression

Extension during dynamic function: kicking

Wind Up phase:
Hip reaches ~20° of extension
High velocity
High eccentric, then concentric load of hip flexors

Charnock et al 2009

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Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Patho-aetiology:Compression

Stretching

To achieve range for sport

Or due to feeling of anterior tightness associated with pain and pathology

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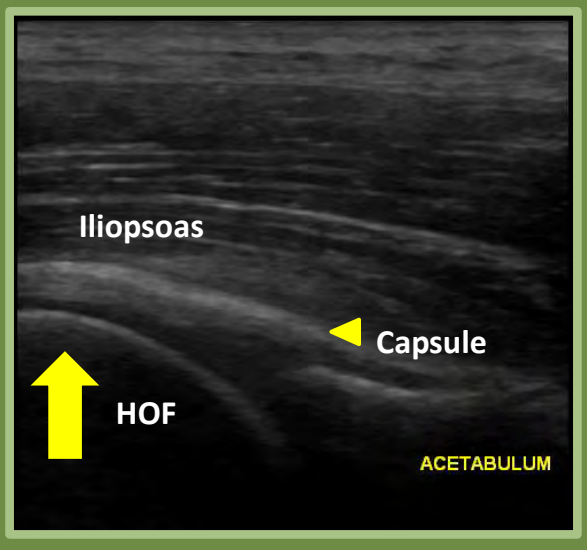
Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Patho-aetiology:Compression

Factors increasing prominence of the HOF

Anterior translation associated with:

- Ant Instability
- Inadequate dynamic stability mechanisms



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Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Patho-aetiology: Compression

Factors increasing prominence of the HOF/acetab:

FAI

OA

Prominent prosthesis

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Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Patho-aetiology

Compression

Snapping/Friction

Traction

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Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Patho-aetiology: Snapping/friction

Anterior/Internal Snapping Hip

What does the tendon snap over?

- HOF
- Iliopectineal eminence

(Byrd 2005, Anderson & Keen 2008, Ilizaliturri et al 2009, Contreras et al 2010)

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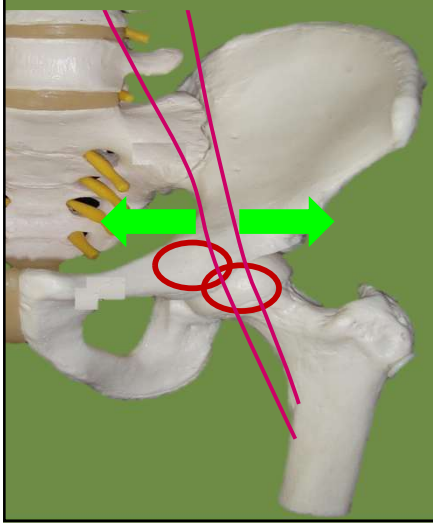
Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Patho-aetiology: Snapping/friction

Mechanism: During flexion/abduction/external rot tendon slides laterally



Snaps back medially across HF/IPE during hip extension

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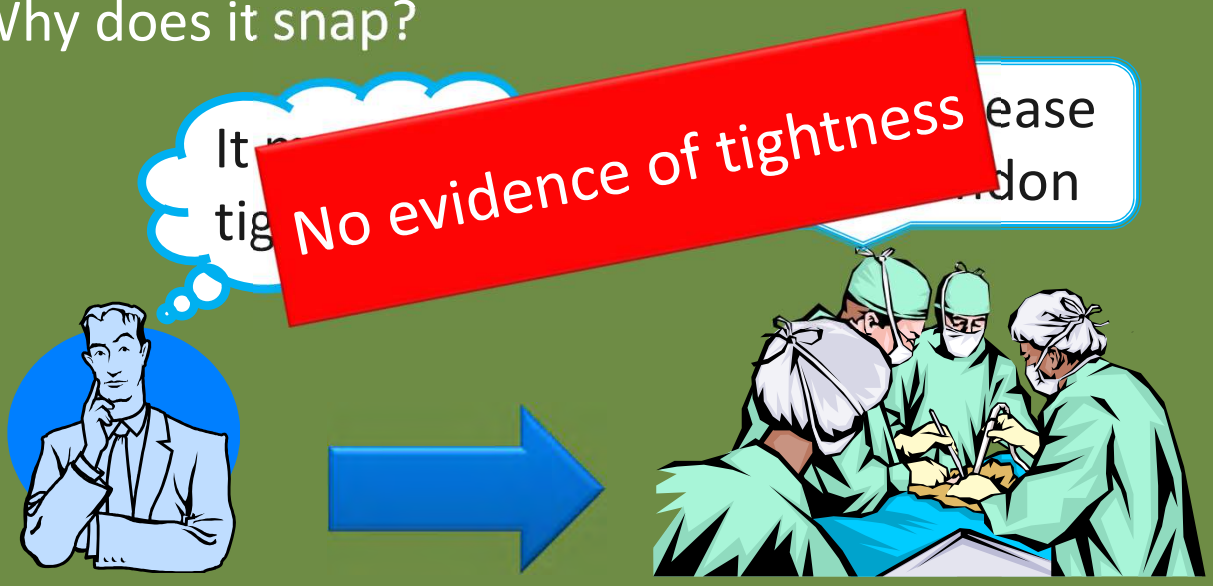
Patho-aetiology: Snapping/friction

Why does it snap?



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Patho-aetiology: Snapping/friction

Evidence from conservative literature:

No evidence of iliopsoas tightness

Single case study, reported normal length and pain at EOR

Treatment ➡ stretching

(Keskula et al 1999)

Johnston et al 1998, 1999 – 'clinical impression' only

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Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Patho-aetiology: Snapping/friction

Those with sway postures &/or long iliopsoas also develop internal snapping hip

Studies providing further evidence are required

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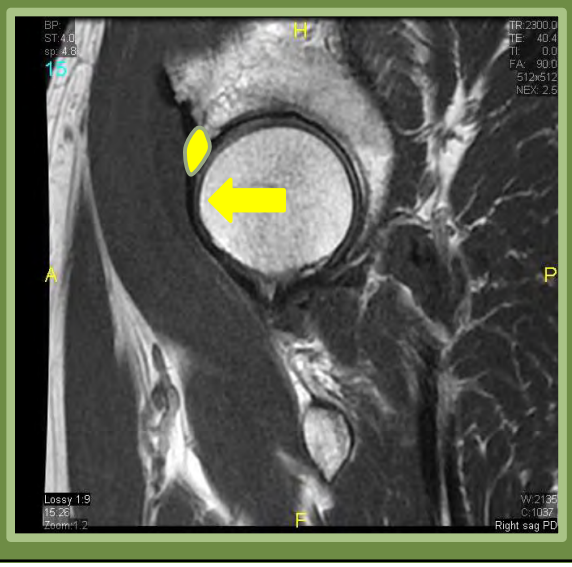
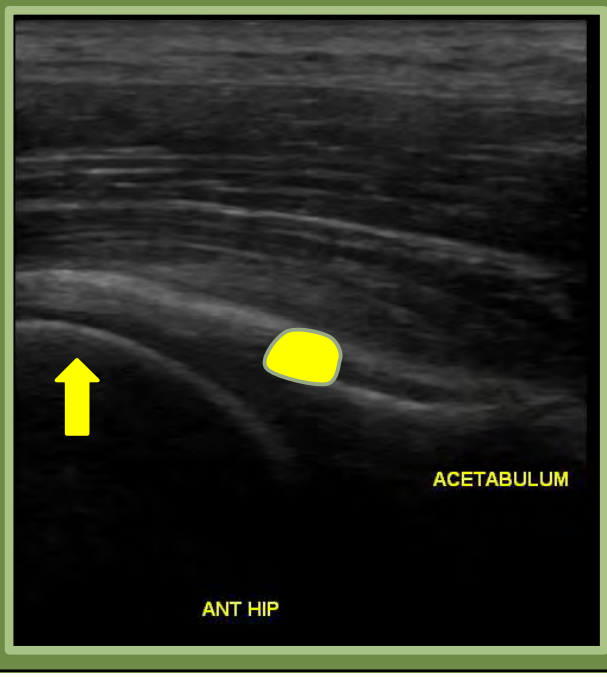
Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Patho-aetiology

Deslandes et al 2008





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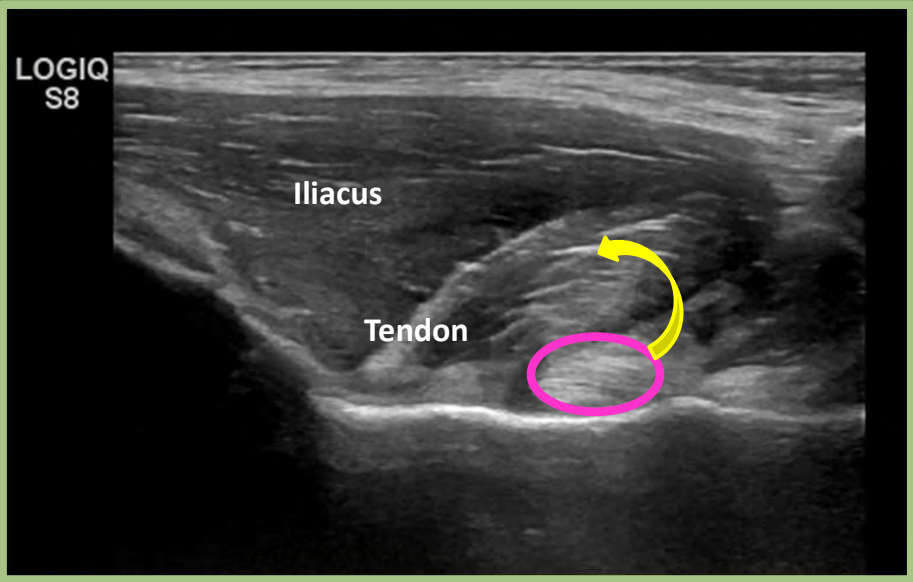
Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Patho-aetiology



Video kindly supplied by Andrew Wilmot GE Healthcare, Australia

Mechanism described by:
Deslandes et al 2008
Winston et al 2007

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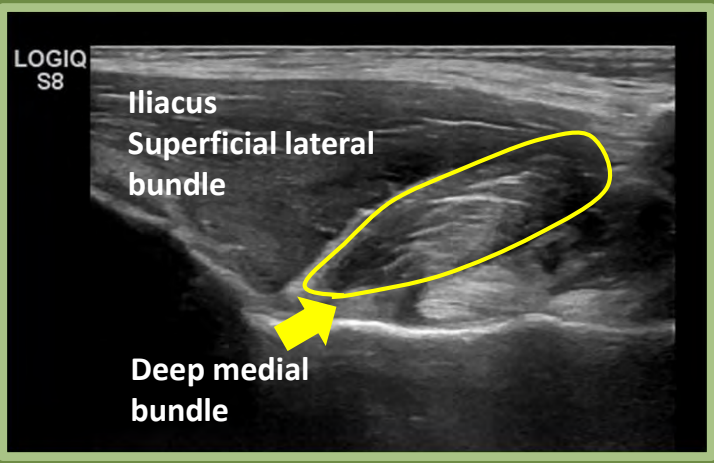
Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Patho-aetiology



Why?

Bulky, poorly compressible muscle
Deslandes et al 2008

Insufficient iliacus, unable to stabilise underlying tendon?

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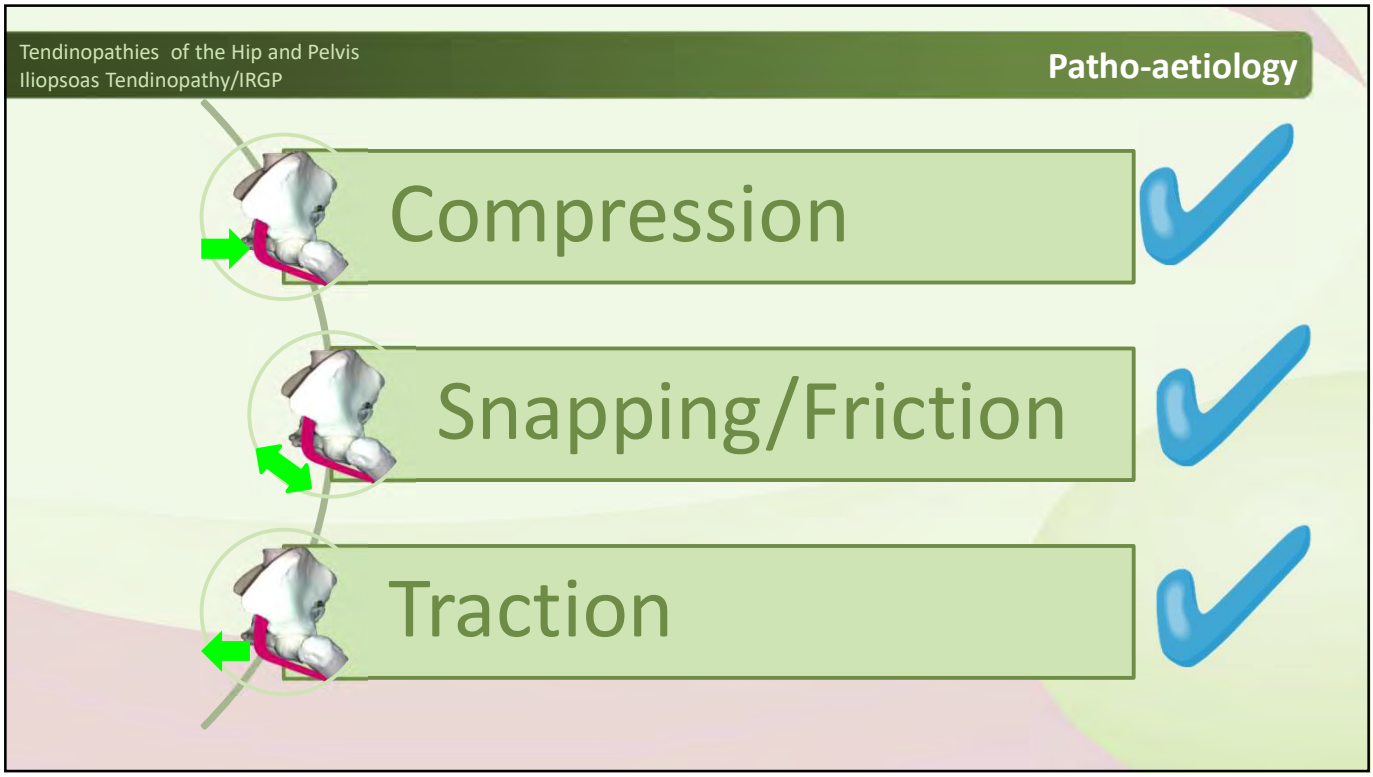

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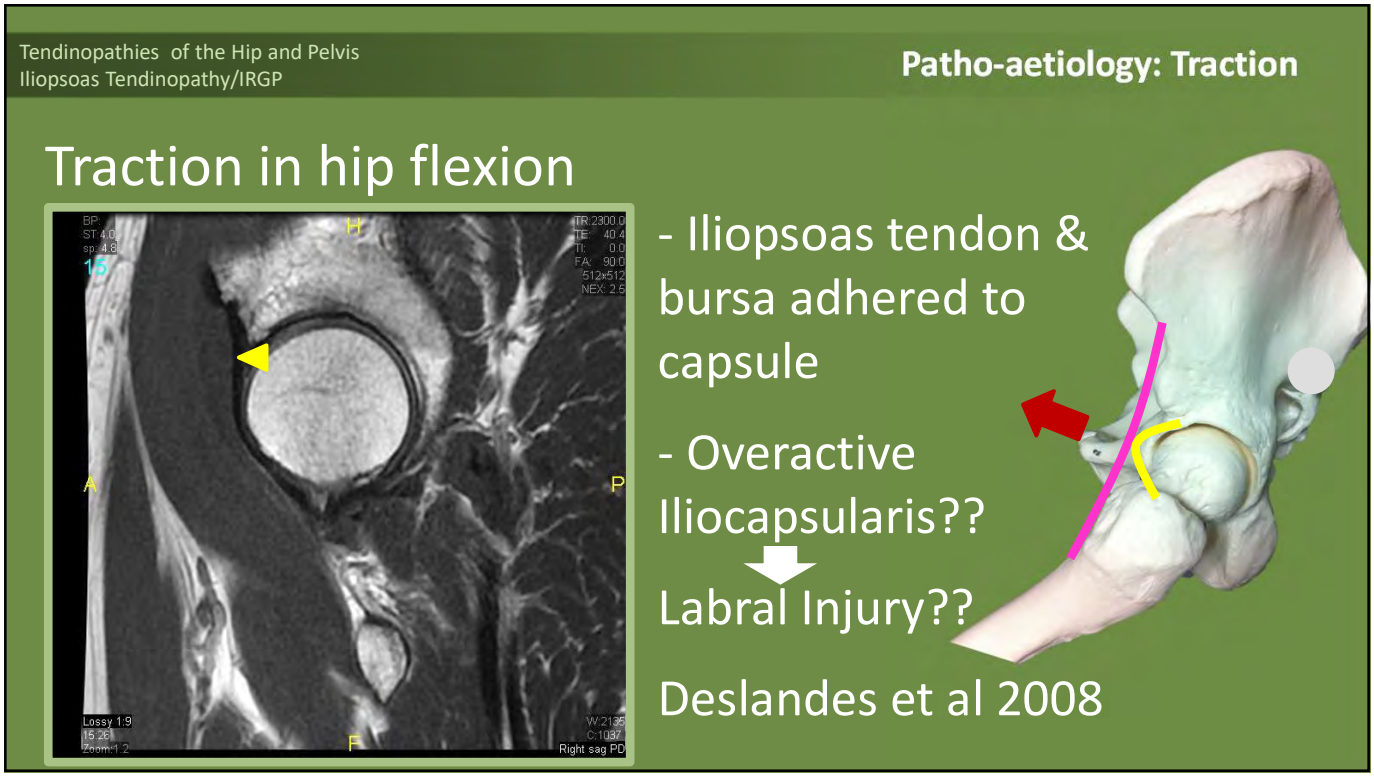

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MANAGEMENT

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Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Contemporary Management

Reduction of Negative Forces

In ADL & Exercise

+

Exercise

Optimise muscle function & tendon loading

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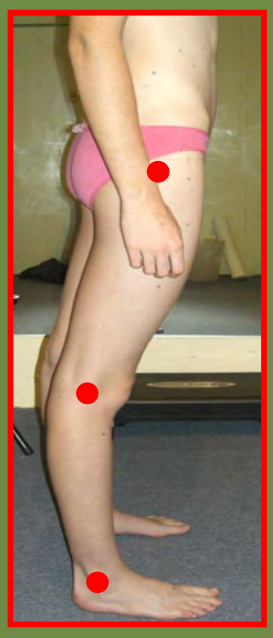
Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Decompression: Standing



NO

YES

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Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Decompression: Stride length

Gait/Running: Stride length

NO

YES

Long stride length

Normal stride length

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Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Decompression: Stretching

NO

No stretching into hip extension even if hip flexors are tight
Use massage, trigger point treatment, needling

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Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Decompression: During Exercise

NO

YES

Consider compression occurring during exercise
Minimise or avoid kicking while painful
Modify joint position during exercise

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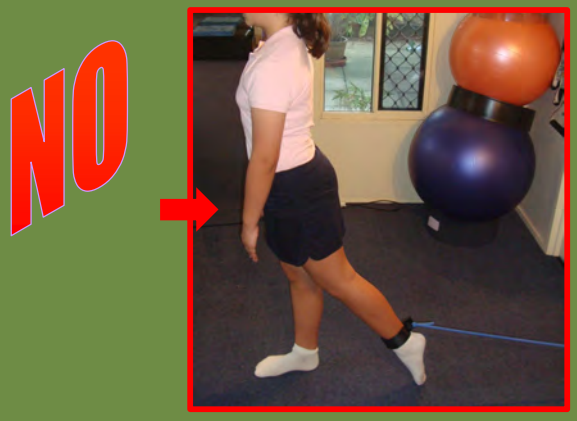
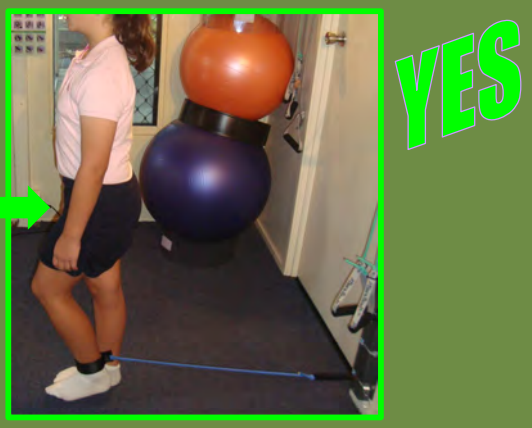
Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Decompression: During Exercise





Consider compression occurring during exercise
Modify joint position during exercise
Avoid hip extension at least until pain settles

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Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Avoiding snapping and friction

During dressing – sit to lift leg into pants
Avoid range of snapping during exercise

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Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Avoiding snapping and friction

Friction may occur:
with snapping
with activities that involve abduction and external rotation
Philippon et al 2012 - high activation of iliopsoas during these tasks
- recommend avoidance for 'iliopsoas tendinitis'

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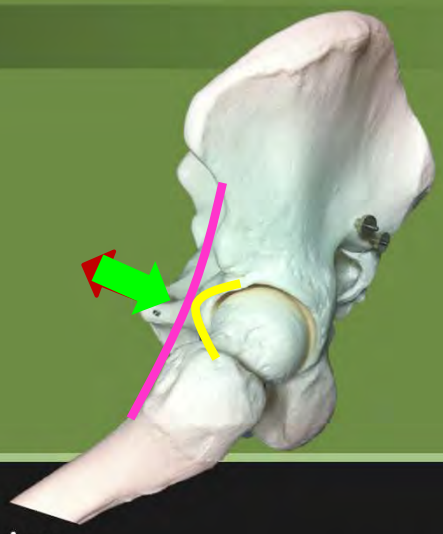
Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Avoiding traction



Avoiding traction:
Loaded or repetitive hip flexion
Manual pressure over the iliopsoas tendon during hip flexion

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Tendinopathies of the Hip and Pelvis
Iliopsoas Tendinopathy/IRGP

Exercise

Low load recruitment
IL, TA, PF,

Graduated strengthening
Considering recruitment, range & loads

Recruitment of rotator cuff
Glute Min, Deep external rotators

Functional strengthening

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Understanding Tendinopathies of the Hip and Pelvis

Lesson 6-1
Adductor Tendinopathy/ ARGP

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- ➔ Prevalence & Presentation
- ➔ Anatomy update
- ➔ Pathology

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PREVALENCE & PRESENTATION

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Prevalence

Groin injuries: 12-16% of all football injuries – European

~ 65% adductor related groin pain (Werner 2009)

Adductor related groin pain (ARGP):

69% of groin injuries in football/soccer (Holmich et al 2007)

58% of groin injuries in all sports

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Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy

Presentation

Diagnostic Dilemma – Bermuda triangle?

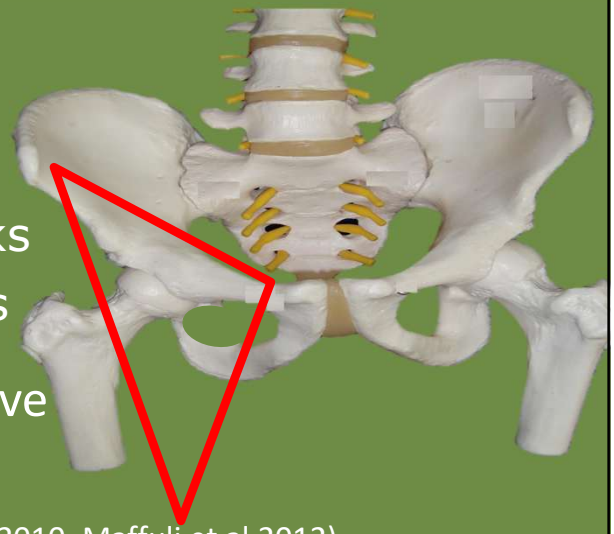
(Bizzini 2011)

Outcomes of Management:

RTS: Conservative 77-79%; 18 wks
Tenotomy 54-69%;18 wks

Recurrence: 26% after conservative
After surgery ?

(Weir et al 2010, Holmich et al 1999, Atkinson et al 2010, Maffuli et al 2012)



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Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy

Presentation

A 'clinical entity approach'

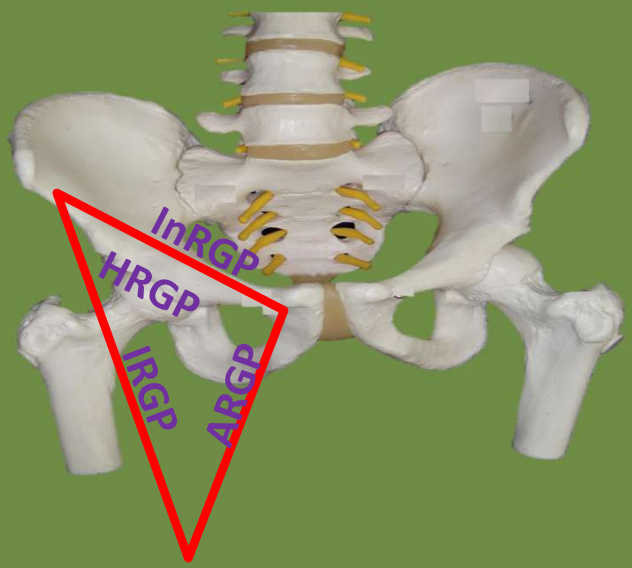
(Holmich 2007,2011-APA Conf)

Adductor related groin pain

Iliopsoas related groin pain

Inguinal related groin pain

Hip joint related groin pain



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Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy

Presentation

Adductor related groin pain

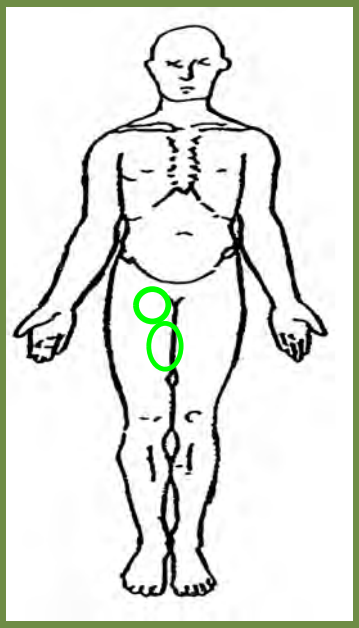
(Holmich 2011)

Area of pain:

Medially, deep in groin

Medial to iliopsoas

May radiate to medial thigh or scrotum



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Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy

Presentation

Aggravating activities

Fast turns

Long runs

Kicking

Standing on one leg to dress

Cough/Sneeze

Dancers – lengthening movements (eg deep plie in 2nd)

- fast closing movements esp return from Ext & Abd

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ANATOMY UPDATE

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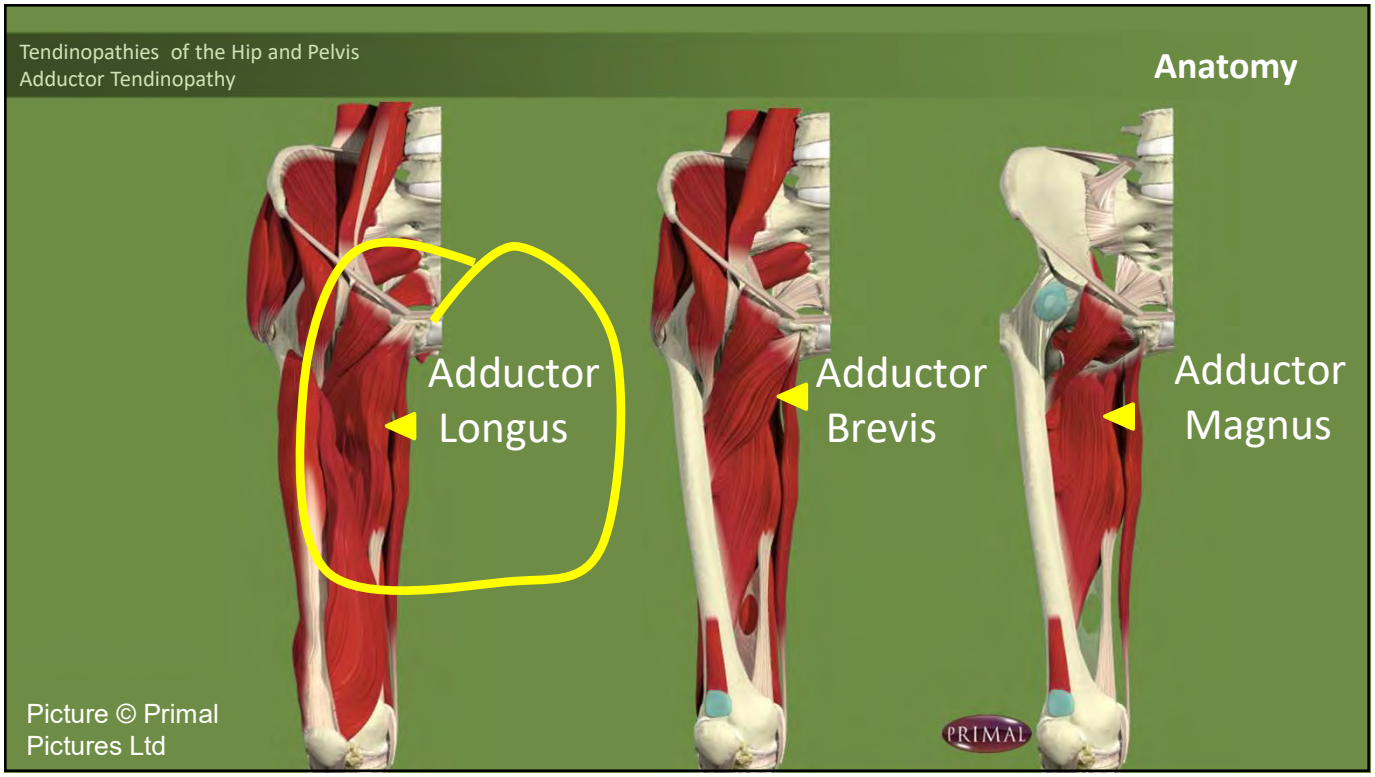

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Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy

Functional Anatomy

Actions of adductor longus:

Adduction

Flexion

Rotation – minimal moment arm; some debate

- Slight IR from neutral (Arnold & Delp 2001)
- May change with joint position

(Dostal et al 1986, Arnold & Delp 2001)

- ER from neutral position (Leighton 2006)

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Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy

Gait:

EMG Activity:
Terminal stance & preswing

Early-Mid Swing

Actions:
Eccentric control of Hip E

(+ Concentric ER
- Isometric contraction
- Leighton 2006)

Concentric hip F

(Lee & Hidler 2008,Green & Morris 1970, Perry 1992)

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Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy

Pelvic stabilisation

Abductor-Adductor Couple:

Mediolateral pelvic control

Involved in balance mechanisms: Coronal and sagittal planes (Henry, Fung & Horak 1998)

Adductor-Abdominal Coupling:

Transfer of large forces across pubic symphysis between lower limbs & trunk

(Robinson et al 2007, Robertson et al 2009)

Picture © Primal Pictures Ltd

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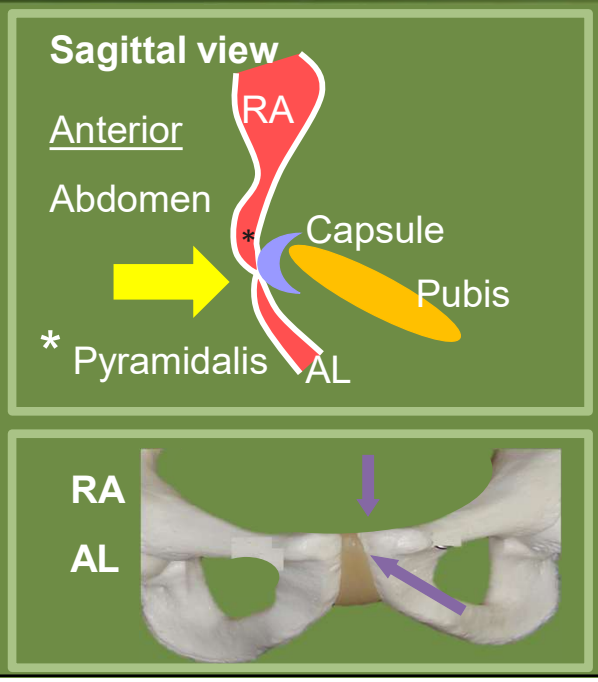
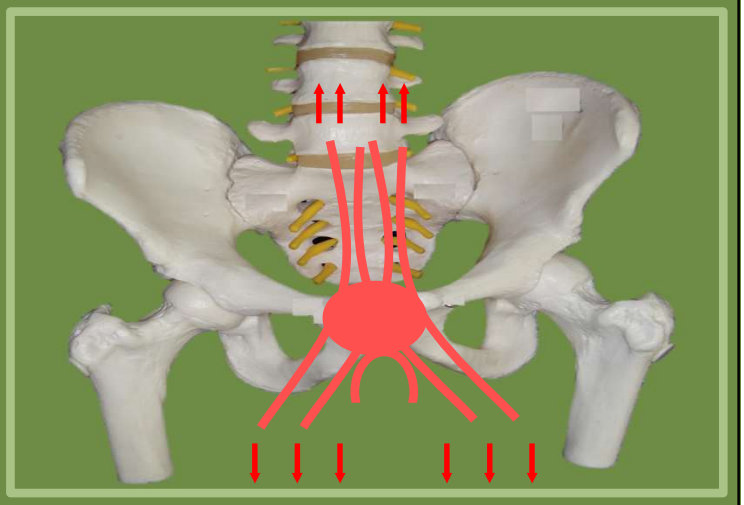
Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy

Anatomy





Robinson et al 2007, Robertson et al 2009

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Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy

Anatomy

DISSECTION STUDIES	M:F	CSA mm2	% of sample tendinous
Strauss et al 2007	17:11	49.3	37.9
Davis et al 2011	3:7	56.6	93.9
Tuite et al 1998	18:19		Muscle on deep surface normal Anatomic variant in 25% - increased muscle in lat insertion unilaterally. Twice as common in males

Greater muscular contribution to insertion more common in men

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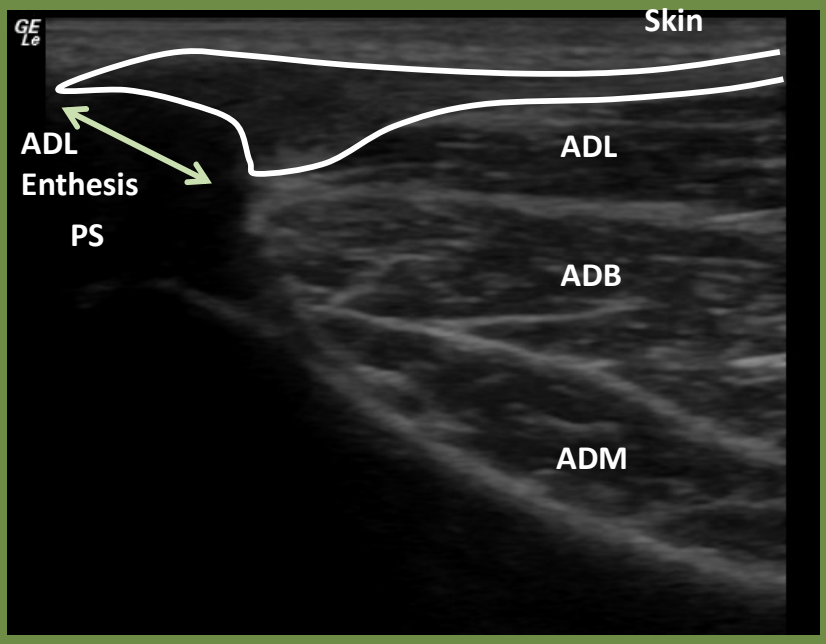
Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy

Anatomy

Longitudinal Ultrasound Image



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Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy

Anatomy

Variation in ADL insertion to PS capsule

(Robinson et al 2007)

1. Both tendon & muscular component have attachments into capsule (53% of cadavers)
2. Tendon attaches to pubic tubercle, muscular component attaches predominantly into capsule (47%)

Attachments may influence specific loading patterns & surgical outcomes

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Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy

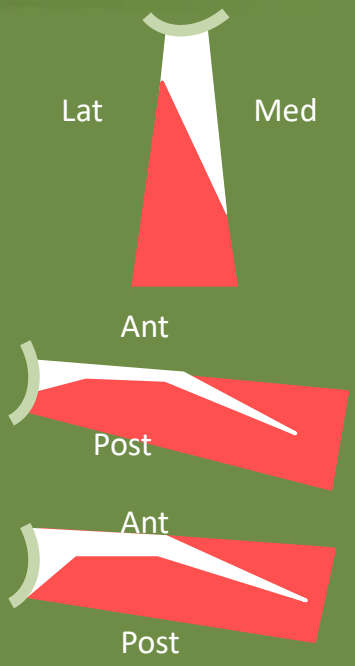
Anatomy

ADL has an intramuscular tendon

(Davis et al 2011)

Extensive intramuscular tendon extending 20% or more of femur length (11-13cm)

May provide extra strength and stability for transmission of large mechanical stresses



Long intramuscular tendon for load transmission

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Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy

Anatomy

AL enthesis is fibrocartilaginous
(Davis et al 2011)

Suggests optimised structure to protect the inserting tendon from compression – high compression zone

Deep surface of tendon most effected in Add longus tendinopathy – zone most compressed (Orchard et al 2004)

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PATHOLOGY

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Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy

Pathology

Sites of reported AL pathology:

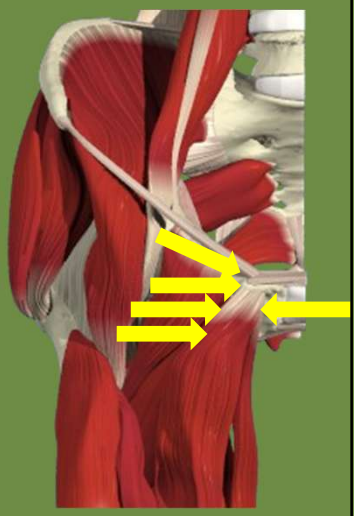
Proximal enthesis

Rectus abdominis-adductor aponeurosis

Proximal tendon

Musculotendinous junction

Muscle belly



(Atkinson et al 2010, Schilders et al 2009, 2007; Shortt et al 2008;Orchard et al 2004;Zoga et al 2008; Kalebo et al 1992, Gabbe et al 2010)

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Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy

Pathology

Histopathology (Ippolito & Postacchini 1981)

Thickening of prox fibrocartilage at the tendon insertion

Reduction in mechanical efficiency for tensile load

Tendon rupture

Adapted to compression (Cook & Purdam 2012)

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Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy

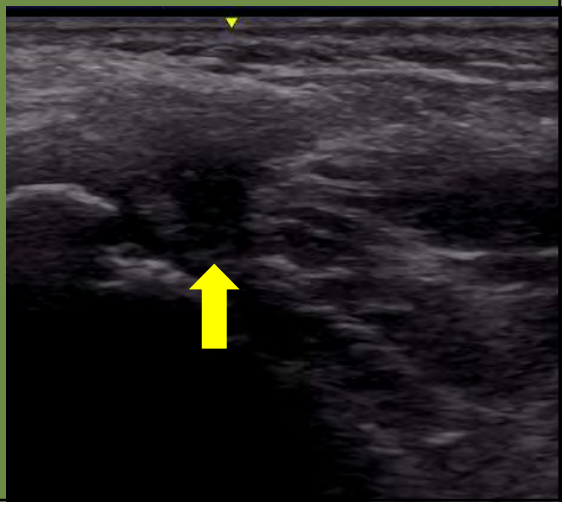
Pathology

Ultrasound findings (Kälebo et al 1981)

Reported focal hypoechoic areas & discontinuity of tendon fibres

Consistent with degenerative stage pathology (Cook &Purdam 2009)

Deep area main site of pathology (Orchard et al 2004)



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Understanding Tendinopathies of the Hip and Pelvis

Lesson 6-2
Adductor Tendinopathy/ ARGP

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PhD, MPhtySt(Sports), BPhty

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www.dralisongrimaldi.com

- ➔ Patho-aetiology
- ➔ Management Overview
  - ➔ Decompression
  - ➔ Exercise

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PATHO-AETIOLOGY

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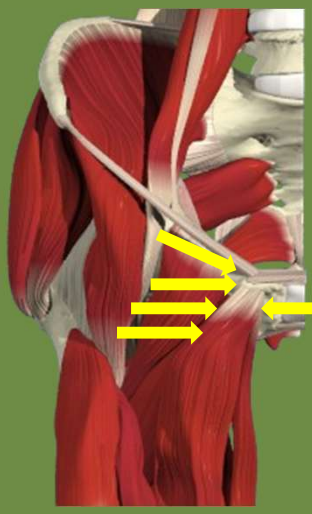
Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy/ARGP

Pathoaetiological mechanisms: Loading



Compression

Tension

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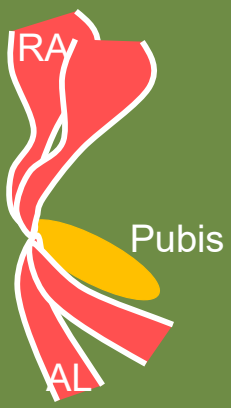
Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy/ARGP

Pathoaetiological mechanisms

Hip extension & abduction

Sagittal View



Compression at proximal tendon & enthesis
Tension at aponeurosis and MT junction

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Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy/ARGP

Kicking

Soccer instep kick

(Charnock et al 2009)

<u>End wind up phase</u>:

- Hip maximally extended
- Maximal rate of AL lengthening
- Max AL

<u>65% swing phase</u>:

Max abduction

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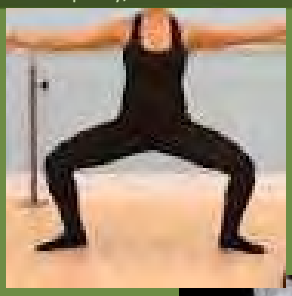
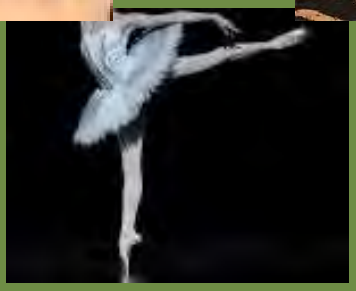
Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy/ARGP

Other sports




Ballet & change of direction sports

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Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy/ARGP

Risk factors

Risk Factors:

Previous injury

Lack of sports specificity in training

Greater abductor:adductor ratio's; adductor weakness

Reduced trunk muscle size MT/TA; delayed onset TA

Limited hip ROM

(Engebretsen et al 2011,Gabbe et al 2010, Maffey & Emery 2007)

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Risk factors: Limited rotation ROM

Association with hip ROM

Limited hip rotation may result in overload of the pubic symphysis and associated structures

Williams 1978,
Verrall et al 2005,2007

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Risk factors: Limited rotation ROM

Association with hip ROM

Study	Sport	Study Type	Injury Status	Position	IR	ER	Total
Verrall et al 2007	Australian Football (AFL)	Prospective	Uninjured	90° F	21.3	30	51.3
			Chronic groin injury > 6/52	90° F	15.5	26	41.5
Weir et al 2011	Mixed Soccer 68%	Cross-sectional	Long standing ARGP >8/52	90° F	22	38	60
Malliaris et al 2009	AFL & soccer	Cross-sectional	Groin P and No Groin P - NSD	Neutral	~30	40-50	70-80

Kouyoumdjian et al 2012 – No difference between positions. Age 20-70; <50% active

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Risk factors: Limited rotation ROM

Association with hip ROM

Study	Sport	Injury Status	IR°	ER°	Total Rotn°	FABER cm
Manning & Hudson 2009	Youth Control Age 17-18	Painfree	45.5	45	90.5	19
	Youth Soccer Age 17-18	Painfree	30	51	81	22
	Senior Control Age 22-30	Painfree	43	43	86	20
	Senior Soccer Age 22-30	Painfree	25	44	69	34

Measured in 90° flexion, supine

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Risk factors: Hip Joint

Incidence of FAI:

Study	Participants	Age	Gender	Incidence of FAI: radiological evidence
Kang et al 2010	50 healthy **normals**	15-40 years	Male Female	48% 31%
Laborie et al 2011	2081 healthy **normals**	Young adults, Mean 18.6 years	Male Female	35% 10.2%
Nepple et al 2012	107 American Footballers Hip/groin P	22.7 years (20-25 years)	Male	94.3%
Weir et al 2011	34 athletes with ARGP	30 years (18-45)		94% +ve Imp Test 13%

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Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy/ARGP

Risk factors: Limited rotation ROM

Association with hip ROM:

- Assess hip rotation range at 90° flexion
- Soccer/football players/males – less range
- < 20° IR/ < 45° Total Rotation – risk factor
- FAI v common in those with groin pain/ARGP
  - Confirm relevance with clinical tests
  - Consider FAI as driver for both intra & extra-articular overload

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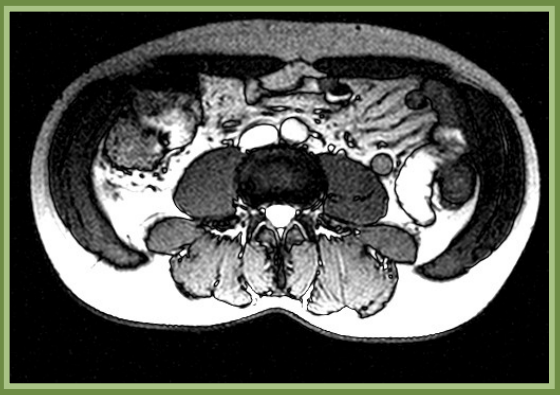
Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy/ARGP

Trunk muscle function – as a risk factor

Transversus abdominis:
Ability to draw in abdominal corset not predictive of hip, groin, or thigh injury.

Multifidus:
Smaller low lumbar MT preseason in AFL players who developed more severe HGT injury (Hides et al 2011)



May reduce neuromuscular control of lumbopelvic region, & efficient distribution of forces

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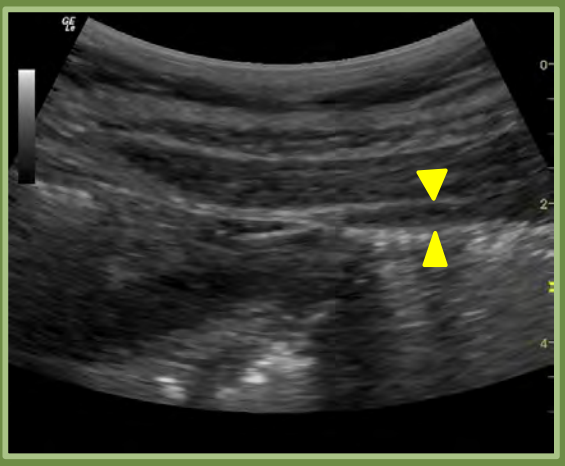
Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy/ARGP

Trunk muscle function impairments

In those with groin pain:
Transversus abdominis:

- Delay in TA onset during ASLR (Cowan et al 2004)
- Resting muscle thickness is reduced in those with ARGP
- NSD in thickness during ASLR or add squeeze (Jansen et al 2010)



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Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy/ARGP

Hip adductor function – as a risk factor

Adductor weakness predisposes to groin injury

Preseason adductor strength 18% lower in ice hockey players who subsequently developed an adductor injury (Tyler et al 2001)

Loss in adductor squeeze strength
1-2 weeks prior to report of groin pain/injury
(Crow et al 2010)

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Hip abductor/adductor ratio– as a risk factor

Abductor/Adductor Ratio's: Normals

Study	Ratio	Relative strengths as a percentage
Tyler et al 2001	Abd:Add 1.05 Ice hockey players	Adductor strength 95% of abductor strength
Thorborg et al 2011	Add:Abd 1.05 Male soccer players	Adductor strength 105% of abductor strength
Kemp et al 2012	Abd:Add 1.13 Non elite, active	Adductor strength 88% of abductor strength

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Hip abductor/adductor ratio– as a risk factor

Abductor/Adductor Ratio's: Groin Pain

Study	Injury status	Relative strengths as a percentage
Tyler et al 2001	Players who developed groin pain during ice hockey season	Adductor strength 78% of abductor strength **17 x more likely to develop an adductor injury if adductor strength < 80% of abductor strength**
Thorborg et al 2011	Soccer players (uninjured) who were painful on adduction strength test	Adductor strength 80% of abductor strength

Tyler recommends adductor strength should be > 90% of abductors & L=R before RTS

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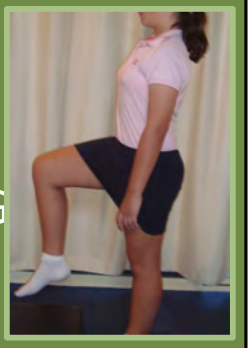
Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy/ARGP

Motor Control impairments

High Load Test:

Previous groin injury – significant reductions of AL EMG on adductor squeeze test

Lovell et al 2012



Low Load Functional Test:

Chronic adductor groin strain – increased AL EMG standing hip flexion–moving leg

Morrissey et al 2012

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Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy/ARGP

Motor Control Considerations

High Load Function
Reduced adductor strength
Reduced EMG AL

Low Load Function
Increased AL EMG
Clinically -increased adductor longus tone
(Hogan 2010)

Inadequate ability to generate force & control high loads

Protective? Compensatory? Inadequate ability to turn off

Change in motor control. Change in muscle phenotype over time?

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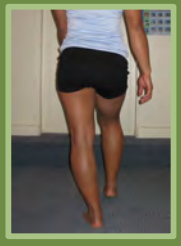
Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy/ARGP

Motor Control Considerations

Adductor longus activation:

Within the adductor synergy

Within the abductor-adductor couple



Within the hip flexor synergy

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Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy/ARGP

Motor Control Considerations

The abductor-adductor couple

For those with groin pain:

GMed:ADL EMG activation ratio reduced in standing hip F

(Morrisey et al 2012)

In stance leg - 40-50% less GMed activation

In moving leg – slightly higher activation ADL

- GMed reduced by up to 70%

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Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy/ARGP

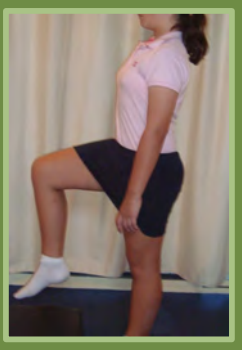
Motor Control Considerations

So

… what resists the adductor pull in flexion?

…..what controls the pelvis in stance?

…..what about the abd:add strength ratio's?



Compensation by superficial abductors *TFL
- Strength may be normal
- BUT loading patterns altered

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Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy/ARGP

Motor Control Considerations

The Hip Flexor Synergy

Weakness of iliopsoas

➡ increased TFL

➡ increased abd force

➡ increased AL

Lewis, Sahrmann, Moran 2009

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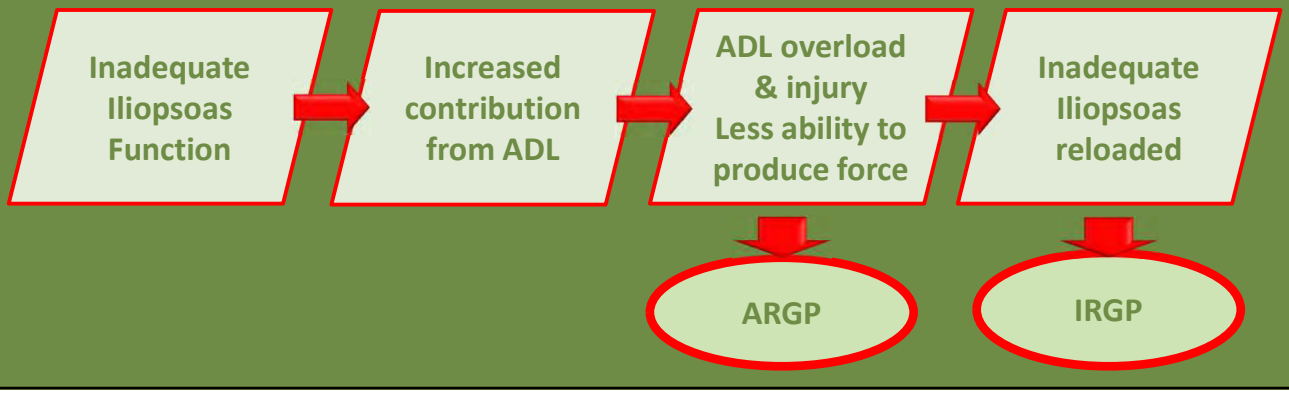
Motor Control Considerations

Relationship between ARGP & IRGP:

33% of those with ARGP have co-existing IRGP

(Holmich 2007)



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MANAGEMENT

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Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy/ARGP

Contemporary Management

Decompression

Minimise amount of compression over each 24 hour period

+

Exercise

Optimise muscle function & tendon loading

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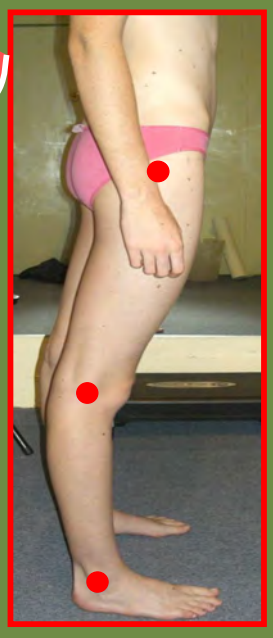
Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy/ARGP

Decompression: Standing



NO

YES

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Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy/ARGP

Stride length

Gait/Running: Stride length

NO

YES

Long stride length

Normal stride length

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Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy/ARGP

Decompression: Sitting

NO

YES

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Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy/ARGP

Decompression: Sitting

No active holding

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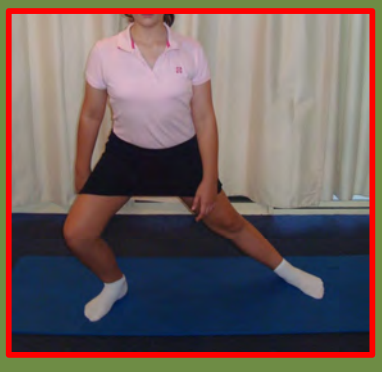
Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy/ARGP

Decompression: Stretching



No stretching into hip extension or abduction
Holmich et al 1999: Stretching not necessary to achieve increases in ROM and may provoke the condition

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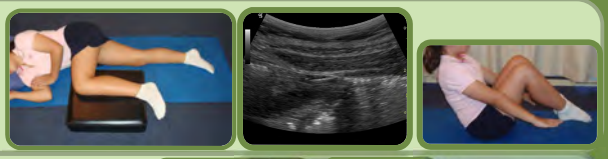
Tendinopathies of the Hip and Pelvis
Adductor Tendinopathy/ARGP

Exercise

Adductor & trunk recruitment
Start Low load, slow contract/relax – Add, TA, PF, MT



Gluteal retraining
Glute Min, Med & Max

Iliopsoas retraining/strengthening

Coronal plane load adductor training

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