Groin Pain

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- Understand the causes of pain about the groin (athletes)
- Know the anatomy
- Know how to image
- Right test
- Right technique
- Know what changes are important
- Understand what can’t be seen

Groin

- Complex and poorly understood area
- Anatomy falls between the thigh and the pelvis - gets left out of radiology teaching
- Groin pain is common
  - Particularly in athletic population
  - Acute
  - Chronic

Causes of Groin pain

- Around the symphysis
  - Bone stress fracture
  - Apophysitis
  - Tendon tear
- Hernia
- Scar tissue
- Osteitis Pubis
- Adductor tendon
- Tendinopathy
- Enthesopathy
- Remote from the symphysis
- Hip
- Common hamstring
- Lumbar spine
- Sacroiliac joint

Acute injury

- Apophyseal injury
  - Scoliosis
- Stress fracture/Insufficiency fracture
- Myotendinous injury
  - Young athlete
- Avulsion
  - Pre-existing tendinopathy
  - Injections
- Less young athlete

Acute Bone Stress/Insufficiency
Chronic Groin Pain
- Controversial area in the professional athlete
- In professional soccer groin pain forms a significant proportion of all soccer injuries (~10%)
- Often chronic, insidious injuries that do not respond to conventional treatment
- Main clinical difficulty is defining origin
- Professional soccer players will have previously undergone previous groin injuries therefore abnormal imaging does not necessarily explain the patient’s current symptoms.


Inguinal Hernia
- Visualised on US and MRI
- MRI not dynamic
- Always worth looking for the unsuspected hernia on MRI
- Eg when doing Hip MRI

Potential imaging findings
- Posterior wall bulging (on strain)
- Inguinal canal inflammatory change
- External ring dilatation

Sportsman’s Hernia?
- Posterior wall weakness
- Ext Oblique tear
- Nerve entrapment syndrome
- Many operations proposed

“Sportsman’s hernia” remains a clinical diagnosis

Role of imaging
- Excludes other causes
  - Hamstring
  - Oblique Pubis
  - Adductor longus enthesis pathology

Findings in asymptomatic elite academy soccer players
- Weakness/bulging of the posterior inguinal wall (ultrasound)
- Capsular/tendon enhancement (MRI)
- Capsular/tendon oedema (MRI)

Little Literature


Anatomy of the Pubic Symphysis
- Pelvic tilt

Pelvic tilt
**Impact of Anatomy & Pathology on Imaging**

- Need to review
  - Symphysis & associated soft tissues
  - Hernial orifices

- But also
  - SIs
  - Hamstring origins
  - Hips

**Imaging the Groin**

- Coronal STIR (Large FOV – cover pelvis)
- Coronal T1 (Large FOV – cover pelvis)
- Axial T2 (Large FOV – cover pelvis)
- Sagittal T2 Fat Sat (Through Symphysis)
- Oblique Axial FO Fat Sat (Through Symph)
**Imaging the Groin**
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- Coronal T1 (Large FOV – cover pelvis)
- Axial T2 (Large FOV – cover pelvis)
- Sagittal T2 Fat Sat (Through Symphysis)
- Oblique Axial PD Fat Sat (Through Symphysis)
- Sagittal PD Fat Sat (Through Hip(s))

**Development of the Symphysis**
- In utero – bridging synchondrosis thick cartilage
- < 2 years
- Fibrocartilage disc
- Thin hyaline cartilage

**Interpubic Disc and Cleft**
- **Disc**
  - Fibrocartilage
  - Similar to intervertebral disc
- **Primary Cleft**
  - Slit-like fluid-filled cavity
  - Larger and more prevalent in women

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**Ligamentous Support**

Superior Pubic Ligament

- Pubic bone has an irregular bone apophysis
- Fuses very late (35 – 40)
- Pubic symphysis continues to actively remodel

Adapted from Becker et al. J Anat 2010 Nov; 217: 480

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**Pubis - Apophysis**

- Complex attachments of tendons to the symphysis capsule
- Fibrous tissue connects
  - Rectus abdominis & Pyramidalis
  - Adductor longus
  - Iliinguinal ligament
- Fusion with gracilis:
  - Adductor longus: 5-35%
  - Adductor brevis: 100%


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**Relationships with Surrounding Soft Tissues**

- Adductor longus: 5-35%
- Adductor brevis: 100%
Complex attachments of tendons to the symphysial capsule
- Rectus abdominis (contralateral)
- Adductor longus (contralateral)
- Ilioinguinal ligament (40%)
- Fusion with gracilis:
  - Adductor longus: 5-35%
  - Adductor brevis: 100%
- Complex Shearing Forces can exist


Chronic Groin Pain
- Adductor Tendinosis
- Enthesopathy
- Chronic tearing
- Osteitis Pubis

But:
- Lack of gold standards
- Diagnostic Confusion
- Variety of terminology
  - Adductor tendinosis
  - Adductor strain
  - Adductor-related pain
  - Adductor enthesopathy
  - Adductor syndrome
  - Osteitis Pubis
  - Athletic pubalgia


4 Main Radiological Findings Around the Symphysis Pubis
1) Degenerative changes around symphyseal joint
2) Pubic bone marrow oedema
3) Secondary cleft sign (inc superior)
4) Pathology at the adductor muscle insertions


1. Cortical Changes & Bone Irregularity
- Not significant
- We generally ignore


2. Pubic Bone Marrow Oedema
- Maybe associated with
  - Adductor tendon oedema
  - Perisymphysial soft tissue oedema
  - Fluid in symphysial cleft
- Association with symptoms
  - But normal finding < 20 years old
  - Usually self limiting

3. Adductor/Symphysial - Cleft

- Pulling away of the capsular "plate" from the symphysis
- Tractional
- Good correlate with pain

Brennan D. Radiology 2005;235:162-167
Robinson P. Skeletal Radiol 2004;31:454-457

Superior Cleft

- Said to relate to rectus abdominis as well as adductor longus
- Higher location


Secondary and Superior Clefs

- Both predictive of symptoms
- We don't tend to distinguish
- Partial tearing of capsule/tendon "plate"
- Communicate with primary cleft

Secondary
Superior

Secondary and Superior Clefs

- Both predictive of symptoms
- We don't tend to distinguish
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- Communicate with primary cleft
4. Adductor Muscle Insertions

Adductor Tendinositis or Enthesitis
- We rarely see in isolation
- Doubtful significance
- Manage in same way as "cleft"
  - Core Physiotherapy/Rehabilitation
  - Injection
  - Surgery

Cleft Injection

Most important findings to report
- Osteitis Pubis
- Presence or Absence of Cleft
You must relate to symptoms — Pubic symphyseal oedema is a normal finding in the under 20s.

Recognise that clefts may not always be associated with symptoms.

Understand the causes of pain about the groin in the athlete.
- Know the anatomy
- Know how to image
- Right test
- Right technique
- Know what changes are important
- Understand what can’t be seen

Around the symphysis
- Muscle tears
- Tendon tear
- Hernia
- True
- Spermatic
- Osseous Pubis
- Adductor tendon
- Tendinopathy
- Enthesopathy

Remote from the Symphysis