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"Anterior Hip Impingement & Labral Tears"
A case of biomechanical overload?

Presented by: Nichole Hamilton

Will commence LIVE from Sunshine Coast, Australia at 7:00pm AEST

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Andrew Ellis
BSc (Ex. Sci), M. Phty

- World Health Webinars CEO
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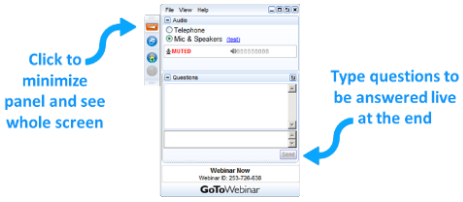

Nichole Hamilton

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B.App.Sc.(Phty)

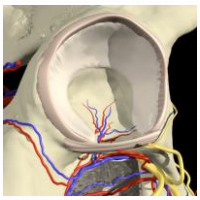
Physiotherapist

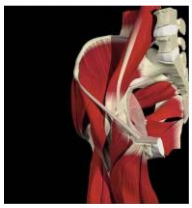
- Graduated from Sydney University at the end of 1997
- Has a passion for physiotherapy education. She is the Queensland representative for the APA's Educator group.
- Worked in private practice in London for five years and completed courses with Dianne Lee and Shirley Sahrmann
- Nichole has since worked as an assistant teacher on AMTA courses teaching manual therapy and MET techniques for the lumbar spine and pelvis.
- Started work with orthopaedic hip specialist Dr Michael O'Sullivan in 2005 at North Sydney Orthopaedic and Sports Medicine Centre to develop post-operative protocol for hip arthroscopy.
- Michael and Nichole have lectured together on management of labral tear and hip impingement since 2007.
- Nichole has subsequently worked as an assistant teacher for LJ Lee on her "Discover the Sports Pelvis" course.

Summary

- Hip: Anatomy and biomechanics review
- Anterior Hip Pain- Causes
- Labral tears and impingement- biomechanical overload
- Potential effects of the SIJ and lumbar on the hip
- Potential effects of the foot on the hip
- Potential effects of the thorax on the hip

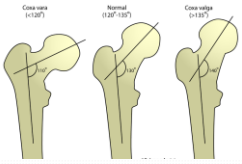
Anatomy and biomechanics review





Bony Anatomy- femoral head

- Femoral Head should contour with acetabulum (structural variations)
- Normal angle of inclination 125 degrees
- Coxa Vara
- Coxa Valgus



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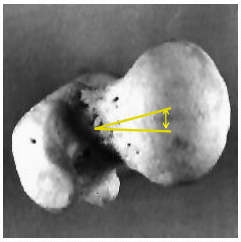
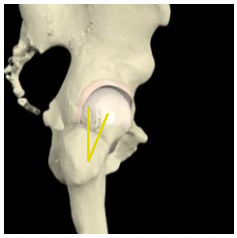
Femoral Structure- normal anteversion

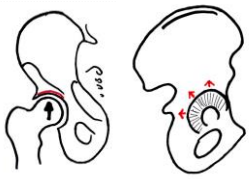




Structure of the Acetabulum

- Faces obliquely, downward and outward:
- Rotated 30-40 degrees inferiorly to absorb superiorly directed forces
- Rotated 30-40 degrees anteriorly to absorb posteriorly directed forces
- If forces directed anteriorly through femur- absorbed more by labrum

(Sahrmann 2003)



Hip Stability; ligaments

Iliofemoral ligament, Pubo-femoral ligament and ischio-femoral ligament. Small anterior area without ligamentous support.

Acetabular Labrum

- Fibrocartilage, mostly triangular
- Length 4-7 mm (longer ant-sup)
- Attachment to bone via zone of calcified cartilage
- Continuous with transverse acetabular lig
- Relatively avascular
- Innervated

Anatomy of the Labrum

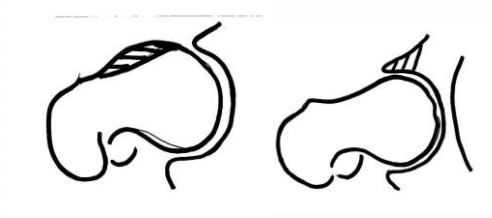
Hip capsular ligaments insert onto the bony acetabulum, proximal and distinct from the acetabular labrum

(Seldes Tan, Hunt, Katz, Winiarsky & Fitzgerald 2001)

Common Hip Complaints- Anterior

- Cartilage: Labral Tear and articular cartilage wear
- Soft Tissue: Anterior capsule sprain, Iliopsoas tendinopathy, Iliopsoas Bursa
- Joint: OA, Synovitis
- Other Dx: Stress Fracture (NOF, Pubic ramus), OP, hernia/abdominal pathology→ Sports Medicine Review

FAI- Cam and Pincer (Lavigne et al 2004)



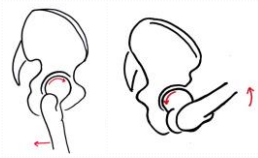
Anterior Hip Pain- Why?

- Excessive load on the anterior hip - structural dysfunction?
- Excessive load on the anterior hip can also occur with biomechanical dysfunction
- Increased biomechanical load on anterior hip can occur with excessive anterior translation of the femoral head. (Sahrmann 2003)

Interactive Hip © 2000 Primal Pictures Ltd.

Normal Accessory Motion

- Accessory PA glide of 0.4 to 1.54mm with 89 N (Harding et al 2003)
- Anterior Femoral Glide- with hip extension and external rotation
- Posterior Femoral Glide- with hip flexion and internal rotation



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Postural Malalignment

Excessive anterior translation of the femoral head can place increase load on the anterior hip

Increased anterior hip joint force with increased hip extension (Lewis & Sahrmann 2007, 2009)

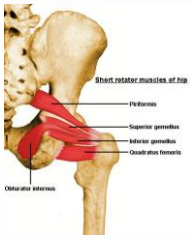
Basic Postural Assessment

Standing plumb line:

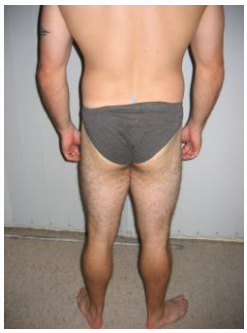
- Manu-sternal junction to
- Pubic Symphysis
- ASIS symmetrical

- Greater Trochanter to
- Lat fem condyle to
- Just anterior to lateral mallelous

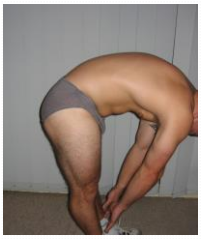
Tight Posterior Hip



- A consequence of dysfunction in the SIJ or pelvis
- A consequence of poor motor control strategies
- Muscles that become overactive in an attempt to compensate for poor lumbar-pelvic stability, can reduce hip joint motion.



Forward Flexion with Reduced Posterior Glide of the Hip



Pathways to Anterior Hip Pain- Clinical Observations

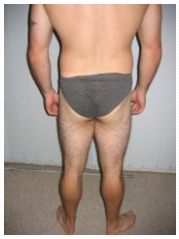
- Hypermobility or long inhibited psoas
- Reduced hip stability & motor control
- Increased translation femoral head in extension
- Increased load anterior hip structures

- Articular SIJ or lumbar dysfunction and/or
- Poor motor control strategy
- Hypertonic posterior hip
- Restricted posterior hip glide during flexion
- Anterior hip impingement with flexion

Ant hip impingement
Labral Tear

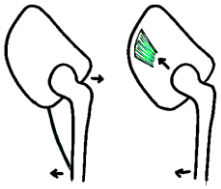
SIJ Dysfunction- effects on the hip

Implication for the hip:
Clinical observations:
Increased tonic activation posterior hip muscles in patients with signs of SIJ dysfunction, limiting posterior glide of the femoral head



SIJ Dysfunction- Implications for the Hip

- Altered muscle recruitment with single leg balance:
  Delay in onset IO, Multifidis, Glut Max
  Increase in activation hamstrings
  (Hungerford et al 2003)
- Hamstrings dominance during hip extension is correlated with increased anterior hip joint forces (anterior translation of femoral head) (Sahrmann 2003, Lewis & Sahrmann 2009))



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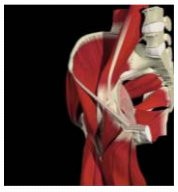
Lumbar Dysfunction- Implications for the Hip

- Reduced CSA psoas evident in patients with unilateral back pain (Barker, Shamley, Jackson 2004)
- During ASLR reduced activity iliopsoas results in increased anterior hip joint force (Lewis & Sahrmann 2009)

  Implicates reduced hip stability anteriorly? More research needed



Foot &Lower Limb Chain- implications for the hip

- Foot: Rigidity & Mobility
- Propulsion: Requires a more rigid lever (supination)
- Shock absorption and adaptability: Requires mobility or "give" in the system (pronation)
- Inability to perform either can have a knock on effect up the chain
- Clinical observation- excessive rigidity in either forefoot, midfoot or rearfoot can contribute to excessive anterior hip load

Assessment Options

Subjective: WHEN does the patient feel symptoms of impingement? Related to hip flexion? Related to load into extension?

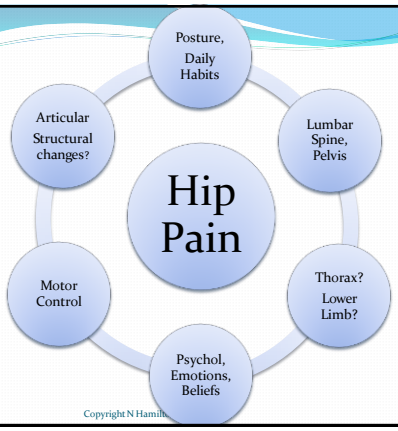
Test: Does femoral head remain centred in the activity?

Observe: Are there other areas of the body that might be adding to load on the anterior hip? Thorax? SIJ? Foot?

Palpate: Are there local areas of the hip that are hypertonic and are also contributing to poor hip centring?

Treatment Options

- **Educate:** Posture and daily habits, mechanics and injury management, pain education
- **Manual Therapy**: Areas of hypertonicity that may be contributing to non optimal centring of the femoral head. Locally: TFL, Rectus Femoris, piriformis, OI. Distally: Foot? Thorax? SIJ? Lumbar?
- **Exercise prescription;** Could include self 'release' based exercises, correct activation of core, functional hip centring supine, with squats, lunges and progress challenges according to patient goals.



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QUESTIONS?

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Live Q & A

With Nichole Hamilton

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Coming up next week

Part 5 / 6 in our Hip & Groin Series

"Post-Operative Rehabilitation & Return to Sport after Groin Surgery"

1) Understand the anatomy of structures that may require surgery in the groin

2) Understand the indications for surgical intervention

3) Understand the principles that underpin the rehab process and indications for caution and poor prognosis

4) Understand and implement the Physiotherapeutic protocols for management of these post-operative patients

5) Understand, apply and communicate realistic goals and criteria for return to sport

6) Understand the research that supports the rationale for the rehabilitative process discussed

Amanda Turner

Live Q & A

With Nichole Hamilton

Thank you

From Nichole Hamilton

&

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