HIP INTRA-ARTICULAR IMPAIRMENT MANAGEMENT UPDATE - OVERCOMING THE CHALLENGES OF CONSERVATIVE AND POST-OPERATIVE MANAGEMENT

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# Anterior Hip and/or Groin Pain

## Intra-Articular
- OA
- Labral Pathology
- Avascular Necrosis (femoral head)
- Legg-Calve-Perthes
- Slipped Capital Femoral Epiphysis
- Iliopsoas Bursitis

## Extra-Articular
- Femoral Neck Stress Fracture
- Osteitis Pubis
- Obturator nerve entrapment
- Ilioinguinal nerve entrapment
- Lumbar spine or SIJ referral

## Non-Musculoskeletal Causes
- Retrocecal Appendicitis
- Hernia
- Renal
- Infection (septic arthritis or osteomyelitis)
- Neoplasm
- Systemic causes (RA and Reiter’s syndrome)
ANATOMY AND LABRAL TEAR

- Hip Bone
- Acetabular Labrum
- Articular Hyaline Cartilage
- Superior
- Posterior
- Anterior
- Inferior
- Transverse Acetabular Ligament

Labral Tear
CLINICAL CHARACTERISTICS OF PATIENT WITH SYMPTOMATIC LABRAL TEARS

- Age 18-50
- Isolated labral tears = younger
- Labral tear in conjunction with chondral lesions = older

- Sex: Females > Males
- Symptom duration: Average 2 years with onset gradual and not associated with trauma
- Higher level of athletic activity
INCIDENCE – AL TEARS

- 22% of athletes with groin pain
- 55% of all patients with mechanical hip pain of unknown cause
- 70-80% hips undergoing THA
- 93% identification in 54 cadaveric hips

- Is it normal in some age/cohort groups?
PATIENT COMPLAINTS

- Pain, clicking, locking, catching, instability, giving way and/or stiffness (Martin)
- Anterior groin pain 96-100% Sn
- Hip locking or catching 58%
- Predisposing factor: Coxa Valga 87% (Garrison – angle above 135 degrees femoral neck)
- Clicking in the hip (+) LR 6.67 (Cleland)
- MOI: torsional or twisting movements, hyperabduction, hyperextension, and hyperextension with lateral rotation
  - 74.1% insidious onset. Likely repetitive microtrauma (Santori)
ASYMPTOMATIC AND SYMPTOMATIC LABRAL TEARS

Acetabulum
Labrum
Capsule
Femoral Head
ASSESSMENT – CLINICAL SPECIAL TESTS

- FADIR – Passive Flexion, adduction and internal rotation added at 90 degrees hip flexion
- Sensitivity 59-75%
- Specificity 43-100%
- +ve LR range 1.03 – 75
- -ve LR range 0.25 – 0.95
- Pain reproduced in groin

Pictures from Kevin Lulofs-Macpherson
ASSESSMENT – CLINICAL SPECIAL TESTS

• FABER – passive flexion with abduction and external rotation at 45 degrees flexion
• Sensitivity 41-88%
• Specificity 100% intra-articular
• +ve LR range 41-88
• -ve LR range 0.59 – 0.12
• Pain reproduced in groin, or is it the SIJ?
ASSESSMENT – CLINICAL SPECIAL TESTS

- Clicking – subjective is a consistent finding
- Sensitivity reported up to 100%
- Specificity 85%
- +ve LR 6.7
- -ve LR 0.01
- To clinically identify a click
  - Suspected anterior – full FABER, moved to EADIR
  - Suspected posterior – full EABER, moved to FADIR
BRIEF ANATOMICAL REMINDERS

- Hip joint – ball and socket, deep
- Femoral head 2/3rd’s a sphere
- Alignment 120-125 degrees neck to femoral shaft
- Anteversion around 16 degrees anterior, so an early thought….

- If you want to squat in a cardinal plane motion and maximize the gluteal efficiency should you rotate your femurs out 16 degrees?
RELEVANT ANATOMY

- A consideration...
• Or is it this...
RELEVANT ANATOMY

- **Role of the labrum:**
  - Increase the depth of the hip joint
  - Disperse forces across the cartilage
  - Ensure joint stability
  - Stability allows for more coordinated muscle contraction

- **Stability**
  - Increases surface area by 28%.
  - Increases acetabular depth by 21%
  - Further stabilization by hydrostatic fluid pressurization
  - 92% increase femoral contact stress without labrum
  - Creates rotational stability (so if lost which muscles more important?)
ETIOLOGY

- Originally considered to be a primarily traumatic occurrence
- Now seen that 73-78% of arthroscopic treated AL tears are degenerative
- Trauma – violent twisting motions or direct lateral impact onto the hip creating forced compression/pinch within the acetabulum
Mechanisms of Labrum Injury

- Trauma
- Repetitive overuse
- Ligamentous laxity
- Hip Dysplasia
- Femoro-Acetabular Impingement (FAI)!
LABRAL TEAR MANAGEMENT

Conservative management

• Currently little evidence

Arthroscopic treatment

• If conservative treatment fails arthroscopic treatment is often indicated
• A post operative course of physical therapy
SURGICAL INTERVENTIONS – QUICK REVIEW

- Two main types are debridement and repair/reconstruction
- The primary surgical interventions is arthroscopy
- Repair following dysplasia less favorable
- Better outcomes with repair over debridement - 29 point reduction in Harris Hip Score reported but 67% good to excellent vs. 90% with repair
INITIAL MANAGEMENT – IDENTIFY IMPAIRMENTS OF individuals

- Pain/limited ROM with hip flexion
- Pain/limitation ROM with ER and IR
- Poor motor control
- Weak gluteus maximus
- Weak gluteus medius
- Tight/over active iliopsoas, and is activity of the iliopsoas appropriate in gait?
- Simonsen 2014 – no EMG in iliacus in gait
INITIAL CONSERVATIVE MANAGEMENT: TRAUMATIC/DEGENERATIVE

- Pain modulation
- Grade I-II traction, MWM with belt, and soft tissue interventions to iliopsoas
- Activity modification
- ER limitation in activity
- Crutches as indicated
- Maintain motor function in core, hip, thigh
- Address regional impairments
- Assess progression – LEFS, PSFS

- Limit un-needed hip flexor activity
- Do not create a problem!
INITIAL CONS MX.

- If no traumatic history...
- Likely less signs of instability, more of impingement in FADIR
- Mobilization of the hip, lower grades
• Gluteus medius retraining, the rotator cuff of the hip! (or is the infraspinatus the gluteus medius of the shoulder?)
• Train in functional and dynamic positions
• What about regional interdependence?
PREVENTION OF ANTERIOR HIP IRRITATION

• Hip flexor tendon impairment a very common post-operative and also conservative care challenge
• Crutches – do legs need to be level in reduced WB phase?
• Prone lay in recovery?
• Is active hip flexion a part of usual gait (Simonsen 2014)?
• Is excessive restriction on hip extension beneficial?
• Contributions to the understanding of gait control.
• Simonsen EB.
• Dan Med J. 2014 Apr;61(4)
• Thesis based on ten published articles
• The hip joint moment varies less between individuals... These experiments ... showed that the trailing leg is brought forward during the swing phase without activity in the flexor muscles about the hip joint. This was verified by the absence of EMG activity in the iliacus muscle measured by intramuscular wire electrodes.
...Instead the strong ligaments restricting hip joint extension are stretched during the first half of the swing phase thereby storing elastic energy, which is released during the last half of the stance phase and accelerating the leg into the swing phase. This is considered an important energy conserving feature of human walking.
WHAT ABOUT INHIBITION IN GAIT?

• Theoretical Rationale - Kokmeyer
  • Biomechanical modeling of the hip joint has shown that decreased strength in the Gmax, GMed and Iliopsoas muscles increase anterior hip joint forces with active flexion and extension of the hip.

Gait Alterations with Anterior Hip Pain after Hip Arthroscopy
Research Proposal - 2014
WHAT ABOUT INHIBITION IN GAIT?

- **Theoretical Rationale - Kokmeyer**
  - In the presence of a joint effusion of the hip joint, the Gmax and GMed muscles become inhibited. While gait analysis studies have identified differences in kinematic and kinetic variables in comparison to controls, these studies did not measure alterations in muscle firing patterns during gait, which can be expected as a result of a joint effusion, pain inhibition or morphologic factors attributed to this condition. These factors support the development of hip pain after hip arthroscopy in gait.

Gait Alterations with Anterior Hip Pain after Hip Arthroscopy
Research Proposal - 2014
YEP...QUESTION TIME.

- What is the implications of the findings from Simonsen with regard to hip flexor impairments post hip surgery or trauma, and the theoretical rationale of Kokmeyer?
PROTOCOLS

• Well intended, good starting point
• Tend to be similar yet different
• My preference is for ones which blend with clinical decision making
• Generally four stages, and most patients would progress to approximately stage three in clinic
• Now have you ever had a ‘most patient’…
• I am still most patiently waiting
DISCUSSION

- What is motor control?
MOTOR CONTROL
STRENGTHENING

- Wall sits with ball introducing abductor band
- Clamshells resisted with strap and ball between feet
- Reverse clamshells with ball between knees
- Progressive bridges, single or ball
- Light assisted plyometrics
- Introduce side steps resisted or cone step over's
- Ball hamstring curls, hip IR and ER seated and prone
- Flexibility – hamstrings, hip flexors in a lunge, reformer based exercises for hip abductors, adductors, rotators, hamstring, quads, calves and muscle length

- Pelvic floor motor control! – WHY?

Bi, X et al. Pelvic floor muscle exercise for chronic low back pain.

**METHODS:** Adults (aged ≥ 18 years) with chronic low back pain (with or without radiculopathy) were randomized to undergo either routine treatment (ultrasonography, short wave diathermy and lumbar strengthening exercises; control group) or routine treatment with pelvic floor exercises (intervention group) for 24 weeks. Pain, disability (Oswestry Disability Index [ODI] score) and trunk muscle function were assessed at baseline and after completion of treatment.

**RESULTS:** The study included 47 patients (control group n = 24; intervention group n = 23). Pain severity and ODI scores were significantly lower in the intervention group than in the control group after 24 weeks. There were no significant between-group differences in trunk muscle function.

**CONCLUSION:** Pelvic floor exercise in combination with routine treatment provides significant benefits in terms of pain relief and disability over routine treatment alone.


**CASE DESCRIPTION:** A 45-year-old female distance runner was referred to physical therapy for proximal hamstring pain that had been present for several months. Examination of the patient’s lumbar spine, pelvis, and lower extremity led to the initial differential diagnosis of hamstring syndrome and ischiogluteal bursitis. The patient’s primary symptoms improved during the initial four visits, which focused on education, pain management, trunk stabilization and gluteus maximus strengthening, however pelvic pain persisted. Further examination led to a secondary diagnosis of pelvic floor hypertonic disorder. Interventions to address the pelvic floor led to resolution of symptoms and return to running.

**OUTCOMES:** Pain level on the Visual Analog Scale decreased from 7/10 to 1/10 over the course of treatment. The patient was able to return to full sport activity and improved sitting tolerance to greater than two hours without significant discomfort.

**DISCUSSION:** This case suggests the interdependence of lumbopelvic and lower extremity kinematics in complaints of hamstring, posterior thigh and pelvic floor disorders. This case highlights the importance of a thorough examination as well as the need to consider a regional interdependence of the pelvic floor and lower quarter when treating individuals with proximal hamstring pain.
DISCUSSION TWO...

• How do we incorporate pelvic floor motor function in routine outpatient care?
PELVIC FLOOR MOTOR CONTROL

- Does not need to be an internal approach
- Recognition that we move through a series of single stance episodes
- Stability of the pelvis on the femur demands a high degree of pelvic motor control
- Foundational core strength is the platform we move on
- Integrate a pelvic motor control approach into functional exercises
STRENGTHENING
MANUAL THERAPY

- Long axis-traction
- Prone ant glides
- Prone FABER
- MWM using a belt
- 2-person side lying medial glide with traction
- Combined hip mobilizations with isometrics
- RI – knee, LS, SIJ, TL junction
- A series of interventions you can use for hip OA management though consider a primary manual or exercise approach in each session (Abbott/Wright 12, 13’)
LATERAL GLIDE WITH BELT + POSTERIOR AND INFERIOR GLIDES
POSTERIOR TO ANTERIOR GLIDE

• Patient facilitated anterior glide with gluteus medius contraction
MANUAL THERAPY

- IR with pelvic rock, ER with anterior glide
MORE MANUAL INTERVENTIONS

- Helping a hurdler, 18 months out from Sx.
MORE MANUAL INTERVENTIONS

- IR with pelvic rock, ER with anterior glide
PHASE 2 - BEYOND INITIAL CONSERVATIVE MX

Yazbek et al
PHASE 2

• Proprioception/balance
PHASE 2
EARLY FUNCTIONAL STABILITY EXERCISES

• Push me pull me – Dr Seuss!
• Hip strap step through with rotation
• Hip IR/ER knee on low bolster
• Lateral resist step up
• Single foot disc punches
• Standing star

• Reformer based split kneeling +- discs
TWO-PERSON TRACTION

- Two-person inferior traction with combined medial glide through progressive abduction
- Rather useful for LTPS also....
PHASE 2 TO 3

• Criteria to progress to stage III:
  • Normal gait pattern with no trendelenburg pattern
  • Ascent and decent of stairs with no compensation
  • Single knee bends to approximately 70 degrees without compensation
  • Symmetrical ROM without noted pain on assessment
FURTHER MANUAL THERAPY

- IR with pelvic rock, ER with anterior glide
PHASE 3

- Advanced exercise/strengthening
  - This stage may not be necessary for more sedentary patients
  - Goal is to establish multi-directional strength in combination with optimal motor control
  - More aggressive soft tissue mobilization, joint mobilization and stretching as needed
PHASE 3

• Integration of function into strengthening:
  • Combining multi-planar movements into exercise – resist lateral step up with rotation
  • Reformer and ball based progressions – kneeling adduction on knee pads
  • Plyometric training with jump and land training
  • Advanced perturbation and stability exercises
  • Resisted lateral agility
  • Emphasis to eccentric control for shock absorption
  • Prepare for sports specific exercises and testing
PHASE 3

Yazbek et al
PHASE 4: ACTIVITY SPECIFIC TRAINING

• Activity specific training
  • Generally beyond 6 months
  • Resisted rotational disc work
  • Cutting drills
  • Hop, jump and skip
  • Continue to work on eccentric control

Note: Phase 3 and 4. Yazbek’s only had 3 phases.
FURTHER THOUGHTS - RI

- Treat the whole person
- The surgical approach is the Hip and only the hip, the rehabilitative approach needs to address the spine and the entire lower quarter
- Test-re-test at all times if utilizing a RI approach to interventions
- Consider manual interventions prior to exercise to assist in neuro-motor response
- Clinically preferred test-re-test is the functional squat
CONCLUSION

• Utilize clinical evidence to assist with differential diagnosing of anterior hip/groin pain
• Several causes and potential contributing factors of labral tears
• Current available evidence is sparse, yet in support of non-surgical management of hip labral tears prior to surgical intervention
• Integrate evidence into clinical practice
• Identify practice based evidence!
CASE REASSESSMENT