Merging Your OMPT Toolbox and Sports Skills Set in the High Level Athlete: An Evidence-Based and Clinical Reasoning Approach

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Body System Term for Physical Therapy

• Editors of Manual Therapy
  – Gwendolen Jull
  – Anne Moore

• Contend for a more:
  – “Movement System” Approach

APTA 2013 Vision Statement

• “Transforming society by optimizing movement to improve the human experience”

• Movement System Approach

• Ludwig et al, 2013
  – Movement system diagnoses better reflects and informs physiotherapy treatment than pathoanatomical diagnoses
Background

• Hickey et al, Manual Therapy, 2007

• Assessed manipulative physical therapists’ visual skills in identifying shoulder movement disorders

Background

• Hickey et al

  – Determine whether the observation skills of manipulative PT’s ALONE allow
    • Decide if shoulder symptoms are present
    • Decide which shoulder is symptomatic

Background

• Hickey et al

  – Describe the nature of the observed aberration
  – Whether PT’s can agree on this description
Importance of Observational Movement Analysis

• Hickey et al
  – Experienced Manipulative PT’s were
    • Difficulty determining symptomatic status of a clinically diagnosed shoulder problem with movement analysis alone
  
  • Successful in determining an asymptomatic patient

Poor at Determining a Relationship between Asymmetry and Symptomatic Side

Importance of Observational Movement Analysis

• In the Absence of Clinical History
  – Relate Observation of Movement Anomalies to Symptom Presence
  
  • Accurately determine if movement dysfunction coincides with symptom pathology

Athletics and Observational Movement Analysis

• Understanding Correct Movement and Aberrant Movement Patterns
OMPT Toolbox

Manual Therapy ALONE vs Movement Analysis ALONE vs Manual Therapy and Movement Analysis COMBINED

OMPT Toolbox

• Increasing Joint Mobility
  – Does not correlate to increased mobility on the field

Clinical Reasoning

• Issues in Extremities
  – Resolved with Proximal Stabilization and Muscle Coordination
Clinical Reasoning

- Bhatt et al. JOSPT 2013
  - Case Study
  - Treating Lateral Epicondylagia through Scapular Strengthening
  - First Study to treat distal symptoms with proximal stabilization

Precise Movement Assessment

- Point of Instantaneous Center of Rotation
  - PICR

- Point around which a rigid body rotates at a given instant of time

OMPT Toolbox

PICR

- Joint Mobilizations require knowledge of PICR

- Knowledge of PICR and Joint ROM guide observation and judgment of movement

- Knowledge of NORMAL and ABNORMAL FUNCTIONAL Movement is KEY
Complete Return to Function

• Optimizing rehabilitation through joint mobilization

• Optimizing rehabilitation through movement analysis

• Optimizing total plan of care using both methods

References

• Sahrmann S. Diagnosis and Treatment of Movement Impairment Syndromes. 2002.

Centering the Hip
Marie Potter PT, DPT, OCS, SCS, FAAOMPT, ATC
Introduction

Injury occurs in 50% of recreational runners training for a marathon

Hip injury accounts for 3-11% of all LE injuries in long distance runners

LE forces upward of 2.5 x BW with jogging

Need to control loads during stance phase

Purpose

Discuss significance of using movement analysis & restoration of joint centration (PICR) in treatment of a long distance runner with hip pain

Background

35-year-old female with right anterior hip/thigh pain

Novice runner

Aggravating factors: initiation of running, sharp turns, prolonged sitting, sleeping on R side
**Differential Diagnosis**

- Hip Flexor Tendonitis
- Femoral Acetabular Impingement
- Lumbar Radiculopathy (L2,3,4)
- Hip Bursitis

**Objective**

**OH squat:**
- ↓ hip flex
- ↑ lumbar lordosis

**SL squat:**
- painful femoral ADD/IR
- ↓ depth

**Objective**

- Tight posterior capsule of hip
- + femoral anterior glide with active SLR & prone hip extension
- Poor PICR of the hip
Movement Assessment

ICF Classification:
Non-arthritic hip joint pain with mobility deficits

MIS Diagnosis:
Femoral Anterior Glide with Medial Rotation

Pathoanatomical:
Femoral Acetabular Impingement

REDDUCED HIP STRENGTH IS ASSOCIATED WITH INCREASED HIP MOTION DURING RUNNING IN YOUNG ADULT AND ADOLESCENT MALE LONG DISTANCE RUNNERS
Jeffery A. Taylor-Haas, PT, DPT, OCS, CSCS et al.

Master class: Conservative management of femoroacetabular impingement (FAI) in the long distance runner
Janice K. Loudon, Michael P. Reiman

Path of Instantaneous Center of Rotation

Used to assess precise or balanced movement of a joint

Determining factors:
1. Shape of joint surfaces
2. Control by ligaments
3. Force-couple action of muscular synergists
Femoral Anterior Glide Medial Rotation

Objective:
- Hamstrings dominant over glutaeals
- TFL dominant over HF
- Sway back posture
- Anterior glide with SLR

Anterior glide with hip extension
Increased hip height with quadruped rock
Sitting knee extension with hip medial rotation

Impairments

Hip always in extension
- loose anterior capsule
- hip flexor long and weak
- hypertonic hip flexor from running

Tight posterior capsule
Weak gluteal muscles
Overactive TFL

Visit 1

Manual Therapy

STM hip flexor
Posterior/lateral hip mobilizations

Results
No pain at rest
Deeper squat
SL squat still painful
Visit 2
Overall better, but still pain at the end of the day

Manual therapy not enough
Restoration of PICR
Gluteal activation
SL bridging
Clamshells
Quadruped leg lift

Visit 3
No pain at end of day

Restoration of PICR & movement coordination
Progressed to running specific exercises & return to running program

Running Mechanics
Running Gait Retraining

Decreased stride length and increased step rate

Increasing step rate by 10% decreases forces incurred at the hip joint

References

• Sahrmann S. Diagnosis and Treatment of Movement Impairment Syndromes. 2002.
Evidence and Clinical Reasoning: Combined Manual Therapy and Motor Control Training in 2 Throwers with Chronic Shoulder Pain

Emmanuel Yung, PT, DPT, MA, OCS, FAAOMPT
Clinical Assistant Professor, DPT
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INTRODUCTION

Overhead throwing athletes face the challenge of the “throwers paradox”
Stability within laxity
Arm acceleration occurs through the shoulders biomechanically weakest position

DISCLOSURE
Emmanuel Yung, PT, DPT, MA, OCS, FAAOMPT

NIOSH/NIH Grant for PhD coursework in Ergonomics and Biomechanics at New York University. The funding was through the New York University School of Medicine
Overhead throwing tensions the middle and inferior glenohumeral ligaments (passive stabilizers).

Active Stabilizers: RTC
Angular torque may exceed 7000°/sec

Phases of Throwing
Arthrokinematics

- ER Arthrokinematics include:
  - Posterior roll
    - Generated by Infraspinatus and Teres Minor
  - Anterior slide
    - Tensioning of posterior capsule
    - CHECKED
      - Passively by anterior joint capsule and GH ligaments
      - Actively by subscapula

Path of Instantaneous Center of Rotation (PICR)

The point around which a rigid body rotates at a given instant in time

Determined by:
  - Joint surface shape
  - Ligamentous control
  - Force couple synergistics

This paradigm aims to improve:
  - Joint flexibility
  - Muscle length
  - Muscle strength
  - Improve movement patterns
Cervical Segmental Motion Induced by Shoulder Abduction Assessed by Magnetic Resonance Imaging

Figure 1. The rotation angles for each vertebra and each arm position. The vertical axis shows the degree of rotation, positive values indicating left rotation. The horizontal axis shows each vertebra.
ICF Shoulder Classification
Shoulder pain with muscle power deficits
Shoulder pain with coordination deficits

• **Impingement**
  – Painful AROM
  – Pain Passive overpressure
  – Weak and/or painful resisted tests

• **Instability – Shoulder pain with coordination deficits**
  – Normal or excessive AROM/PROM
  – Painful/excessive PAM (passive accessory motion)
  – (+) Biceps Load II, Crank, Resisted Supination External Rotation tests

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ER with humeral anterior glide

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ER self-correction
IR with humeral anterior glide

IR with self-correction

Shoulder Progression

• Supine rotation
  – Progression includes increasing degrees of shoulder abduction (abd)
  – Towel placed under elbow if necessary
Shoulder Progression

- Prone rotation; shoulder at 90° abd
  - Progressed with resistance or self support
  - Towel under shoulder if necessary

- Standing rotation; shoulder at 90° abd
  - Progressed with resistance band or cable

- Sport specific training
  - Incorporate learned motor pattern with dynamic trunk and lower extremity control

Case Study 1

- 50 year old male
- Enjoys company softball - outfielder
- 8 month worsening anterior and superior/posterior shoulder pain
- Shoulder Pain and Disability Index (SPADI): 34/130

- Symptom reproduction:
  - Squeegee front windshield
  - Arm cocking to arm acceleration with softball throw
Case Study 1

- Weak and painful resisted shoulder flex, abd, ER/IR
- 90° passive ER
- 70° passive IR
- Anterior humeral translation:
  - 35° active IR
  - 70° active ER

Treatment visit 1

- Prone shoulder ER PICR with towel roll support under shoulder and elbow

Treatment visit 2

- Prone shoulder ER PICR, no towel, with 2 lb weight
- Prone shoulder ER PICR, no towel, rapidly without weight

Treatment visit 3

- Pectoralis minor and major trigger point release
  - To re-establish effective muscle length tension relationship and antagonist scapular stabilizer activity

Treatment visit 4

- Standing shoulder 90/90 level 1 resistance band PICR ER
- Discharge – goals met
Case Study 1 results

- 4 visits over 2 months
- Full return to daily activities and softball play pain free
- SPADI upon discharge 3/130 (3%)
- Pain free resisted shoulder flexion, abduction, ER & IR
- SPADI at 4.5 months follow-up 0/130 (0%)

Case Study 2

- 23 year old male
- 6 month history of worsening superior shoulder pain
- SPADI: 24/130 (18%)
- Symptom reproduction:
  - Rugby throw-in
  - Resistance exercise
  - Sprinting
  - Shooting basketball
  - Reaching hand behind back

Case Study 2

- Painful end range motion shoulder flexion, abd, ER, IR
- Weak and painful shoulder IR MMT with noted trunk compensation
Treatment visit 1
- Supine PICR shoulder IR with towel support

Treatment visit 2
- Supine PICR shoulder IR with towel support
- Prone PICR shoulder ER with towel support

Treatment visit 3
- Prone PICR shoulder ER without towel support
- Standing shoulder 90/90 PICR level 2 resistance eccentric ER

Treatment visit 4
- Standing shoulder 90/90 PICR controlled IR (ER eccentrics)

Case Study 2 results
- 6 visits over 2 months
- Full return to daily activities and partial return to regular sports activity
- SPADI upon discharge 4/130 (3%)

- No difficulty throwing football, sprinting, and shooting basketball
- SPADI at 2.5 months follow-up 4/130 (3%)
Summary

Patients progressed in 2 months

(SPADI score by 20-34 points)

Full-partial return to sport symptom free

Conclusion

Patients with motor control deficit of GHJ position may benefit from PICR training

Theorized improved subscapularis activation and control of humeral head during arm acceleration

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Reference

QUESTIONS?
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