Clinical Examinations Used for Diagnosis of Shoulder Conditions: What Should Be the Focus?

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Learning Objectives
Upon completion of this course, you will be able to:
• Understand which clinical tests to consider for making a diagnosis of shoulder conditions within the context of the human movement system.
• Compare and contrast the relevance of various clinical tests for diagnosing movement system problems.
• Discuss the differences in focus of various clinical tests.
• Discuss integrating movement impairments toward a diagnostic label.

Session Outline
• Introduction
• Case presentations, one each by Godges, Sahrmann, and Ludewig
• Each case presentation will include
  – video demonstration of examination and
  – discussion of treatment for each case by all 3 presenters (Godges, Ludewig, and Sahrmann)
• Summary, Discussion, and Questions

Context for Today’s Discussion
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Disclosures
No relevant financial relationships exist for Barbara J. Norton.

Introduction to Panel Members
• Joseph Godges, PT, DPT, University of Southern California
• Paula M. Ludewig, PhD, PT, University of Minnesota
• Shirley A. Sahrmann, PT, PhD, FAPTA, Washington University in St. Louis
• Barbara J. Norton, PT, PhD, FAPTA, Washington University in St. Louis

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Purposes of Today’s Session

• Provide a context for discussion about the answer to the following question:
  – For patients with shoulder pain, which tests should be included in our clinical examinations?
• Use case examples to demonstrate use of selected tests in a clinical examination
• Engage audience in collegial discussion about the focus of tests used in clinical examinations

Recent Developments

• Both are important contributions but not the focus of today’s presentation

APTA Vision Statement

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

How do we get started?

Guiding Principle: Identity

• “The physical therapy profession will define and promote the movement system as the foundation for optimizing movement to improve the health of society.
• Recognition and validation of the movement system is essential to understand the structure, function, and potential of the human body.
• The physical therapist will be responsible for evaluating and managing an individual’s movement system across the lifespan to promote optimal development; diagnose impairments, activity limitations, and participation restrictions; and provide interventions targeted at preventing or ameliorating activity limitations and participation restrictions.
• The movement system is the core of physical therapist practice, education, and research.”

What is the human movement system?

Definition
• developed by APTA Movement System Work Group and
• adopted by APTA Board of Directors:
• “The human movement system comprises the anatomic structures and physiologic functions that interact to move the body or its component parts.”

Human Movement System

• A system of physiological organ systems that interact to produce and support movement of the body and its parts.

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Case Examples of Tests to Include in Clinical Examinations of the Human Movement System

Physical Therapist Practice and the Human Movement System

- Human movement is a complex behavior within a specific context.
- Physical therapists provide a unique perspective on purposeful, precise, and efficient movement across the lifespan based upon the synthesis of their distinctive knowledge of the movement system and expertise in mobility and locomotion.
- Physical therapists examine and evaluate the movement system (including diagnosis and prognosis) to provide a customized and integrated plan of care to achieve the individual’s goal-directed outcomes.
- Physical therapists maximize an individual’s ability to engage with and respond to his or her environment using movement-related interventions to optimize functional capacity and performance.

Case Example

Shoulder Pain
Reports of Instability

Joe Godges DPT
Editor, ICF-based Clinical Practice Guidelines
Orthopaedic Section, APTA
Adjunct Associate Professor
University of Southern California

Profile

- 26 year-old female
- Health care practitioner
- Exercises almost daily: Running, yoga, or gym routines
- No previous history of shoulder trauma or shoulder pain

Reported Problems / Concerns

- 1 month history of sensation of popping and clunking in left shoulder with lifting the arm overhead
- Pain at end range of over head reaching
- Feeling of free play, “like a mild inferior sliding” with every initial contact/loading response on left while running

Primary Activity Limitations - Visit 1

- Exercise limitations:
  - Sensation of being unstable with kettleball workout – especially the “Turkish Get-up” exercise – with left arm overhead / 8 kg
  - Pain and paresthesias down arm with yoga downward dog routine – pins and needles in left volar thumb, index and middle fingers
  - Note video of reported instability

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Physical Impairments - Visit #1

- Visible “clunk” at 160° of active shoulder flexion
- + apprehension signs with OH and 90/90 positions
- Mild excessive scapular internal rotation with mid-range lowering from shoulder flexion
- Mild pectoralis minor shortening on left

Physical Impairments - Visit #1

- C5-C6 and T1-T2 segmental mobility deficits – painful but provocation does not reproduce symptoms
- Full glenohumeral passive flexion, IR, ER – pain free when supported posteriorly
- Hypermobile with glenohumeral posterior glide

Physical Impairments - Visit #1

- 4+/5 strength of left infraspinatus and lower trapezius compared with left – pain free with resisted testing
- Positive upper limb nerve tension test – reproduces reported shoulder pain with median bias – pain altered with wrist flexion

Physical Impairments - Visit #1

- Manual stretch to pectoralis minor reproduces sensation of “shoulder popping out backwards”
- Exquisite, local pain with provocation of upper arm and forearm nerve entrapment sites

Now What?

- What do we call / diagnosis this cluster of clinical findings?
- What does the PT plan for treatment?
- What should the PT do first?

Suggestions?

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Clinical Practice Guidelines

www.jospt.org

www.orthopt.org

Key Positive Findings
• Impingement Signs
• Painful Arc
• Pain Resistive Tests
• Rotator Cuff and Scapular Weakness
• Atrophy

Key Negative Findings
• Significant Loss of Passive Motion
• GH Instability Signs

Key Positive Findings
• Spontaneous, Progressive Pain
• Loss of Motion in Multiple Planes
• Pain at End-Range

Key Negative Findings
• Normal Motion
• Age less than 40

Key Positive Findings
• Age less than 40
• Hx of dislocation or subluxations
• Apprehension
• Generalized Laxity

Key Negative Findings
• No Hx of Dislocation
• No Apprehension

Slide courtesy of Phil McClure – CSM 2015
Clinical Decisions

Most Relevant Physical Impairments
(Best use of Treatment Time)

Reassessment Strategy / Outcome Measure
(Reported Activity Limitations)

Clinical Decision

Most Relevant Physical Impairments
• Positive upper limb nerve tension test – reproduces reported shoulder pain with median bias – pain altered with wrist flexion
• Manual stretch to pectoralis minor reproduces sensation of “shoulder popping out backwards”
• Exquisite, local pain with provocation of upper arm and forearm nerve entrapment sites
  (Note video of exam procedures)

Interventions

Visit #1

• Mobilization/Manipulation:
  – Upper Thoracic (T1) and Cervical (C6) Manipulation
• Soft Tissue Mobilization
  – Pectoralis Minor (STM and manual stretching)
  – Median Nerve Entrapment Sites (scalenes, anterior sub deltid area, brachialis and pronator teres myofascia)
• Therapeutic Exercises
  – Nerve Mobility Exercises (median nerve bias - into end ranges – note photo)
  – Continue other current exercise routines as preferred

Post treatment Reassessment

Visit #1

• Visible “clunk” at 160° of active shoulder flexion no longer present
• Overhead reach - 180° of active shoulder flexion - is pain free
• Downward dog stretch can be performed without pain or paresthesias
• Improved stability with Turkish Get-up using 5 kg kettleball

Visit 2

Two days later
Visit 2 – Two days later
Primary Activity Limitations

— Pain and paresthesias down arm with yoga downward dog has resolved (note photo)

— Able to perform “Turkish Get-up” exercise using 8 kg kettlebell with minimal/no sensation of instability (note video)

Physical Impairments - Visit #2

• Unable to reproduce “clunk” with active shoulder flexion
• No apprehension with overhead and 90/90 positions
• Mild excessive scapular internal rotation with mid-range lowering from shoulder flexion – still present
• Mild pectoralis minor shortening on left - lessened

Physical Impairments - Visit #2

• C5-C6 and T1-T2 segmental mobility deficits – less painful, improved mobility
• 4+/5 strength of left infraspinatus and lower trapezius compared with left – unchanged
• Positive upper limb nerve tension test – still positive, but need to go farther into ranges to elicit reproducible symptoms

Physical Impairments - Visit #2

• Manual stretch to pectoralis minor reproduces sensation of “shoulder popping out backwards”
• Exquisite, local pain with provocation of upper arm and forearm nerve entrapment sites Both still positive, but need to go farther into tissue barriers to elicit reproducible symptoms

Treatment plan – Visit 2:

1) Continue Nerve Mobility Exercises

2) Add / Modify current exercise routine to include:
   Pectoralis Minor Stretching
   Rotator Cuff Strengthening
   Serratus Anterior Strengthening
   Lower and Mid Trapezius Strengthening

3) Discharge (expected outcomes achieved)

Interpretations?

Lessons?

Discussion
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February 18, 2016
3:00 – 5:00 pm

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**Relative Flexibility & Relative Stiffness**

- These factors are intrinsic to movement impairments at all joints
- Relative Flexibility
  - Intra-joint – movement in one or more of the accessory motion directions occurs more readily than in the other directions
    - For example glide more readily than spin – too easily
  - The motion is excessive compared to ideal – occurs too frequently
  - Inter-joint – movement occurs more readily at an adjoining joint rather than the appropriate joint.
    - For example – the glenohumeral motion occurs more readily than the scapular motion.
    - The glenohumeral motion is excessive and scapular upward rotation is insufficient.
- Relative Stiffness
  - The passive tension of muscle and connective tissue
  - The change in tension/unit change in length
  - Relative stiffness of rhomboids vs serratus anterior

**Neuromotor Activation Impairment – Timing Problems (Major Factor)**

- Contraction of the deltoid causes glenohumeral superior glide
- Contraction of the posterior deltoid causes scapular internal rotation
- During shoulder flexion the glenohumeral motion occurs too rapidly compared to the scapular motion resulting in insufficient scapular upward rotation and excessive glenohumeral motion.
- During the return from flexion the scapular moves too rapidly compared to the glenohumeral joint.
  - The scapula anteriorly tilts or downward rotates instead of maintaining its position.
  - Scapulohumeral muscles elongate more rapidly than scapulothoracic muscles.

**The Movement System Impairments Syndromes**

- Scapular movement impairments
  - Internal rotation with: Insufficient upward rotation
    - Anterior tilt
    - Depression with insufficient upward rotation
  - External rotation/adduction with insufficient upward rotation
  - Elevation – pre vs post GHJ problem
  - Winging – pathological; lesion of long thoracic nerve (pathokinies)
- Humeral movement impairments
  - Superior glide
  - Anterior glide
  - Medial rotation
  - Inferior glide
  - Multidirectional accessory hypermobility
  - Hypomobility – pathological; adhesive capsulitis, OA (pathokinies)

**The Examination**

**Standing**

- Alignment
  - Scapula & Humerus

**The Examination**

- Shoulder flexion
  - Bilateral
  - Unilateral
  - Corrected
    - Note resistance of scapular motion & timing
- Shoulder Abduction
- Lateral rotation with arm at side
  - Scap adduction – Internal rotation
  - Humeral spin – off axis
    - Anterior glide

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Examination

- Supine
  - Posterior tilt - ROM - resistance
  - Shoulder flexion - ROM
  - Humeral head motion
  - Passive abduction
  - Medial rotation
    - Scap tilt
    - Anterior glide
    - Anterior inferior glide
    - ROM – change with reps
  - Lateral rotation

- Prone
  - Hold or motion in elevation 145 deg
    - Glenohumeral motion
    - Shoulder lateral rotation
    - Scapular internal rotation
    - Humeral anterior glide
    - Shoulder extension
    - Shoulder medial rotation
    - ROM
    - Humeral motion precision
    - Ability to hold

Exam

- Quadruped
  - Scapular position

- Rocking backward
  - Scapular motion
    - Upward rotation

Exam – Functional – Work Activities

- Body language habits
- Reaching patterns
- Work station
- Sports
- Sleeping positions

Treatment Strategy

- Reversing relative stiffness
- Preventing relative flexibility
- Primarily by training the coordination between glenohumeral and scapular motion
  - To optimize the known kinesiologic relationships
  - Note that many of these movement impairments are evident during the return from flexion – means that strength of axiscapular muscles is not the issue
- Challenge – “strengthening” of axiscapular muscles is difficult without simultaneously “strengthening” the glenohumeral muscles.
  - Improving rotator cuff performance without over activating the Deltoid muscle is also a challenge.

Scapular Internal Rotation with Anterior Tilt – elevation

- Insufficient Upward Rotation – return
  - Muscle activation problem

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Movement Based Diagnostic Classification for the Shoulder

"DISEASE IS VERY OLD AND NOTHING ABOUT IT HAS CHANGED. IT IS WE WHO CHANGE AS WE LEARN TO RECOGNIZE WHAT WAS FORMERLY IMPERCEPTIBLE."

— JEAN MARTIN CHARCOT

Patient Complaint

PT Screening

Exam

Pathoanatomic Diagnosis

Movement Impairments

Traditional Approach

Human Movement System

• A system of physiological organ systems that interact to produce and support movement of the body and its parts.

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**Shoulder CPG Proposed Model**

- **Evaluation/Intervention Component 1**: medical screening
- **Evaluation/Intervention Component 2**: differential evaluation of clinical findings suggestive of musculoskeletal impairments of body functioning (ICF) and the associated tissue pathology/disease (ICD)
- **Evaluation/Intervention Component 3**: diagnosis of tissue irritability level

**An Overview Of The Examination Process**

**Case Based Example**

**Traditional Approach – Pathoanatomic Diagnosis 1st**
- Adhesive Capsulitis
- Osteoarthritis
- Massive Rotator Cuff Tear
- Post-surgical hemiarthroplasty
- Only after assess movement impairments

**Movement Approach**
- 1st determine common movement pattern
  - Major loss of range of motion
  - Increased upper trapezius activation
  - Excess superior humeral translation
- Secondarily identify pathoanatomy (when possible)
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Important Features

- Distinguish active versus passive range of motion
- Determine presence of positive and negative compensations
- Direct treatment to movement based patterns versus pathoanatomic groupings

What do you think?

Discussion, Summary, Conclusions

Thank you for your interest!

Selected References


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