Diagnosis Dialog:
Classification of Shoulder Disorders
in the ICF-based Clinical Practice
Guideline and Alternative Approaches

Introduction to Panel Members
• Joseph Godges, DPT, University of Southern California
• Paula M. Ludewig, PhD, PT, University of Minnesota
• Aimee B. Klein, PT, DPT, DSc, University of South Florida
• Philip McClure, PT, PhD, FAPTA, Arcadia University
• Shirley A. Sahrmann, PT, PhD, FAPTA, Washington University in St. Louis
• Barbara J. Norton, PT, PhD, FAPTA, Washington University in St. Louis

Purposes of Session
• Provide a brief overview of the Diagnosis Dialogs
• Provide a context for discussion regarding labels to use for diagnosis in physical therapy
• Provide case examples based on two systems for diagnosis
• Engage audience in collegial discussion

Brief Overview of the Diagnosis Dialogs
Barbara J. Norton, PT, PhD, FAPTA
Washington University in St. Louis

When, Why, and Who?
• When?
  – July 2006 for 2+ days and 10 times since then
• Why?
  – Inherent in Vision 2020 was the need to diagnose
  – Cyndi Zadai’s call to action in her 2004 Maley Lecture
  – We decided we need to define the diagnoses
• Who?
  – Individuals who were
    • known to have an interest in the topic
    • able to help support their own participation in the effort

Sample of Questions Discussed
• What is a diagnosis?
• How should we refer to the diagnoses?
• How important is it that we establish our professional identity with the movement system?
• To what extent and how should existing conceptual models be used to inform the development of diagnoses related to physical therapy?
More Questions

• How do we define and differentiate among the concepts of diagnosis, differential diagnosis, screening, & classification?
• What are the rules for defining our diagnosis labels?
• What are the names (labels) for the diagnoses?
• How do we describe and label the conditions that are relevant to the movement system?

Answers to Questions

• Group has reached consensus on answers to some but not all questions
• Issues resurface and are reconsidered as specific examples are presented
• Summaries of discussions are posted on-line — http://dxdialog.wusm.wustl.edu
• Focus today is on just a few points that will provide some context for the session

Relevant Points for Today

• Use the word “diagnosis” alone
  — or perhaps the term physical therapist’s diagnosis
  — not PT diagnosis
• Use existing conceptual models of enablement or disablement (e.g., ICF) to inform but not constrain the choice of diagnostic descriptors
• Focus on the human movement system
• Use current working set of guidelines for naming diagnoses

Guidelines for Naming Diagnoses

• Use recognized anatomical, physiological or movement-related terms to describe the condition or syndrome of the human movement system.
• Include, if deemed necessary for clarity, the name of the pathology, disease*, disorder, or symptom that is associated with the diagnosis.
• Be as short as possible to improve clinical usefulness.

What next?

• Recent action by the 2013 HOD on the identity statement associated with the new vision increases focus on movement system
• Even greater imperative to decide
• Present two viable approaches
• Compare and contrast the approaches
• Present case example of each approach
• Engage in collegial dialog with audience
Classification of Shoulder Disorders: A Staged Algorithm for Rehabilitation
Phil McClure PT, PhD, FAPTA
Arcadia University

The Shoulder and ICF

<table>
<thead>
<tr>
<th>Popular Label</th>
<th>ICD 9</th>
<th>ICF Body Function</th>
<th>ICF Body Structure</th>
<th>Activities/Participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotator Cuff Tendinopathy (Impingement)</td>
<td>726.1</td>
<td>Shoulder of shoulder region</td>
<td>Shoulder of shoulder region</td>
<td>24042 - Reaching 24040 - Lifting 24050 - Wrist 24520 - Caring for well persons 24051 - Packing 24042 - Reaching 24060 - Throwing</td>
</tr>
<tr>
<td>Frozen Shoulder</td>
<td>726.0</td>
<td>Mobility of a single joint</td>
<td>Mobility of a single joint</td>
<td>24051 - Control of complex voluntary movements 24031 - Ligaments and fasciae of shoulder region</td>
</tr>
<tr>
<td>Glenohumeral Instability</td>
<td>726.2</td>
<td>Shoulder</td>
<td>Shoulder</td>
<td>24031 - Control of complex voluntary movements 24031 - Ligaments and fasciae of shoulder region</td>
</tr>
</tbody>
</table>

Why Classify?

- Direct Intervention
- Prognosis
- Communication
- Other?

Shoulder Dx /Classification

Pathoanatomic Classification
- Rotator Cuff “Syndrome” / Impingement
- Glenohumeral Instability
- Adhesive Capsulitis
- Others

Assumptions within a Pathoanatomic Model
- Tissue pathology represents an homogenous group
  - i.e. they look similar and should be treated similar
- Strong relationship between tissue pathology and patient complaints
  - i.e. must “fix” pathologic anatomy for pain and function to improve
Pathoanatomic Diagnoses

<table>
<thead>
<tr>
<th>Level 2</th>
<th>Pathoanatomic Diagnoses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotator Cuff / Impingement</td>
<td>Adhesive Capsulitis</td>
</tr>
</tbody>
</table>

“Rule In”
- Positive Findings
  - Instability Signs
  - Pain with end-range
  - Decreased range
  - Muscle atrophy
- Key Cognitive Findings
  - Decreased functional mobility
  - Increased pain with activity
- High Irritability
- Multiple factors contribute to irritability

“Rule Out”
- Negative Findings
  - Instability signs
  - Pain with end-range
  - Normal range
  - Muscle atrophy
- Key Cognitive Findings
  - Normal functional mobility
  - Decreased pain with activity
- Low Irritability
- Minimal factors contribute to irritability

Pathoanatomic diagnosis based on specific physical examination. Most diagnostic accuracy studies address this level. As examples, findings are listed for the three most common diagnoses only.

Discussion
Comparison of Pathoanatomic Dx and Rehab Classification

- Pathoanatomic Dx
  - Primary Tissue Pathology
  - Stable over episode of care
  - Guides general Rx strategy
  - Important for Surgical Decisions
- Rehab Classification
  - Irritability / Impairment
  - Often changes over episode of care
  - Guides specific rehab Rx
    - Physical stress dosage
    - Specific Impairments
  - May inform prognosis

Rehabilitation Classification

<table>
<thead>
<tr>
<th>Level 3</th>
<th>Rehabilitation Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tissue Irritability / Tissue Impairment</td>
<td>High</td>
</tr>
</tbody>
</table>

- History and Exam
  - High Pain (>7/10)
  - Pain before end ROM
  - AROM < PROM
  - High Disability (DASH, ASES)
  - Mod Pain (4-6/10)
  - Pain at end ROM
  - AROM = PROM
  - Mod Disability (DASH, ASES)
  - Low Pain (<3/10)
  - None
- Red or Yellow Flags
- Low Disability (DASH, ASES)

- Intervention Focus
  - Minimize Physical Stress through activity modification
  - Monitor impairments
  - Restore impairments
  - Basic level functional activity restoration
  - High demand functional activity restoration

Key Decisions:

<table>
<thead>
<tr>
<th>Level 1: Screening</th>
<th>Key Decisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pt, Basic Phys Exam, Red or Yellow Flags</td>
<td>PT and/or Referral?</td>
</tr>
</tbody>
</table>

- General Intervention strategy?
  - Surgery? Key tissue and movement precautions
  - Prognosis and Patient Education

- What Physical Stress Intensity?
  - Minimal
  - Moderate
  - High

- What are the Key Impairments?

Discussion:
A Staged Algorithm for Rehabilitation

- Limitations (at least a few)
  - Does “irritability” capture key features determining application of physical stress?
  - Does not address “non-physical” issues
  - Reliability
  - Validity

- Potential Features
  - Relatively simple
  - Captures thought process of many seasoned clinicians
  - Possible broad application
  - Not “separate” from medical framework
Movement System Impairment Syndromes

Shirley Sahrmann, PT, PhD, FAPTA
Professor Emeritus
Washington University School of Medicine – St. Louis
Program in Physical therapy

APTA Vision Statement

• Transformation Society by optimizing movement to improve health and participation in life.
• Guidelines: Identity
  – The profession will define and promote the movement system as the foundation for optimizing movement.
  – The recognition and validation of the movement system is essential to fully understand the physiological function and potential of the human body.

Movement System Definition

• “The movement system is a physiological system that functions to produce motion of the body as a whole or of its component parts.
• The functional interaction of structures that contribute to the act of moving”, 9
• Steadman’s dictionary

Defining Professional Expertise

• If professional identity is movement system
• If identifying movement system impairments is your core expertise
• Then need labels that convey to public and other health professionals that expertise
• Convey that impaired movement can cause pathology as well as result from pathology
• Why movement can be used for treatment
• Why PT is important for guiding development & prevention the movement system

Consistent with Other Health Professions

• PT does not treat pathoanatomical tissues by surgery or medication
• If use same label does not convey the difference in identifying cause and developing treatment
• Other professions learn new labels – e.g., FAI (even Lady Gaga)
• PT learns labels of other professions, certainly they can learn our labels
• Using Movement System Dx – would clarify differences in
  – focus & scope of practice
  – alert other practitioners to variations in mechanisms
Movement System Models

Kinesiopathologic - cause
- Movement impairments – deviations in precision of movement
- Accessory motion hypermobility
- Subthreshold for pathology - initially
- Cause tissue injury and eventual tissue pathology

Pathokinesiologic - result
- Movement impairments/pathologies
- Result of a lesion in a component system
  - Nervous system – stroke – Neural - denervation
  - Skeletal – rheumatoid arthritis
  - Trauma – Fracture – tissue injury

Kinesiopathologic Model of Movement System

Scapular and Humeral Diagnoses

Diagnosis assigned based on:
- Alignment and movement impairments noted throughout exam
- The movement impairments that, when corrected, best alleviate the symptoms determine the diagnosis
- Both a scapular & humeral diagnosis can be assigned, if appropriate

Humeral MSI Syndromes (Diagnoses)
- Humeral Anterior Glide
- Humeral Superior Glide
- Glenohumeral Multidirectional Accessory Motion Hypermobility
- Shoulder Medial Rotation
- Glenohumeral Hypomobility

MSI Scapular Syndromes

Scapular internal rotation (AC joint)
- With anterior tilt (AC joint)
- with insufficient UR (SC and AC joint)
- with abduction (SC joint protraction)

Scapular depression (SC depression)

Scapular external rotation/adduction
(SC retraction; AC ER)

Scapular Winging (pathological) (AC joint)

Scapular elevation (SC elevation)

Scapular Internal Rotation with Anterior Tilt (muscle activation)
- Movement impairments as the result of muscle activation impairments (timing)
  - Scapulohumeral activity prolonged – dominant
  - Axioscapular activity decreased too rapidly
- These patients usually have a combination of IR and tilting
Scapular Internal Rotation with Anterior Tilt (muscle activation)

Scapular motion controlled – elbow extended – post 3 visits

Scapular Internal Rotation with Insufficient Upward Rotation
Glenohumeral Anterior Glide

Neck Pain (Cervical Flexion) with Scapular Depression

Scapular Depression
(With Insufficient Upward Rotation)
Pathokinesiologic MSI Syndrome
Insufficient upward rotation – abduction
Left Side Involved

Onset after biking trip for several weeks with backpack on back; 20 y/o

Video: initial (left) and 6 weeks later (right)

Humeral Diagnoses
• Humeral Anterior Glide
• Humeral Superior Glide
• Shoulder Medial Rotation
• Glenohumeral Hypomobility
• Glenohumeral Multidirectional Accessory Hypermobility

Humeral Anterior Glide
Resting Alignment: humeral head relative to anterolateral corner of acromion
Humeral head more anterior relative to acromion during active abduction
Summary

- Professional Identity – mandates conveying of that expertise to public & other health professionals
- Conveys PT expertise in a body system
- Contributes to awareness of other mechanisms of injury
- Directs treatment clarifies to patient their role instead of just identifying pathological tissue
- Parallels the practice patterns of other professionals with expertise in body systems
- (No one will know there are movement impairments and that they can be diagnosed unless we develop and use labels describing these syndromes)
Comparison of Alternative Diagnostic Labeling Systems
Paula M Ludewig, PhD, PT
The University of Minnesota

Acknowledgements
• Becky Lawrence, PT, OCS
• Justin Staker, PT, OCS, SCS
• Jon Braman, MD
• Diagnosis Dialog Group

Why Classify?
• Direct Intervention
• Prognosis
• Communication
• Others
  – Influence reimbursement
  – Define homogenous subgroups for research

Pathoanatomic Diagnostic Labels
• Common and “Traditional”
• Communication with Physicians/Surgeons
• Focuses on identifying tissue pathology that is the basis for the patients pain or dysfunction
• Important to surgical decision making
• Important for physical therapy decision making

Concerns with Pathoanatomic Labels
• Often do not adequately direct physical therapy intervention
• Disconnect between our diagnostic and treatment process
• Often we cannot determine an anatomical source
• What about co-existing pathologies?
• Inconsistent use confounds communication

Diagnosis as Pattern Recognition
• Assumes subgroups of subjects exist for which similar treatment interventions are useful
• For orthopaedic physical therapy, what best defines these subgroups?
• Should they be based in the movement system?
• Should they be based in movement impairments?
• How far do we need to “drill down”?
Clinical Practice Guidelines/ICF Approach

• Shoulder Pain & Mobility Deficits: Adhesive Capsulitis
• Shoulder Stability & Movement Coordination Impairments
• Shoulder Pain and Muscle Power Deficits: Rotator Cuff Syndrome

Pathokinesiologic Model

• Focus on identification of characteristic movement impairments that are the cause of the patient’s pain or dysfunction
• Also (more) important for physical therapy decision making – greater potential to guide interventions
• Stronger relationship between impairment and function, easier integration with ICF
• Does not presume or preclude specific tissue pathology

Possible Labels

• Glenohumeral mobility deficit associated with capsular contracture
• Glenohumeral mobility deficit associated with osteoarthritis
• Inadequate scapular upward rotation associated with rotator cuff disease
• Inadequate scapular upward rotation associated with multi-directional instability

Other Advantages

• “reorders the label” consistent with physical therapist identity as movement system experts
• Prioritizes movement in diagnostic process
• No issues of scope of practice
• Avoids “misdirection” of intervention from tissue pathology that may not relate to function

Concerns About Pathokinesiologic Model

• Creating a new and unfamiliar language/system
• Are we just “afraid” to use traditional labels or advances in diagnostic tools (imaging)?
• Reliability/validity not established
Questions

- Do we agree on the most common clusters of patients?
- Do we want to classify or stage within traditional medical diagnostic labels, or associate tissue impairments with movement diagnoses?
- Is the status quo adequate?
- How do we most efficiently teach students to think like seasoned clinicians?
- How should health care reform/cost accountability impact our approach?
Case Example

Shoulder Pain and Mobility Deficits

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

Profile

- 53 year-old female
- Film editor – intermittently employed
- Typically exercises doing aquatic exercises
- Prior history of moderate traumatic brain injury and recurrent cervical radiculopathies

Reported Problems / Concerns

- 3 month history of shoulder pain
- Onset related to reaching strain – to back seat
- Stiffness noted in past 6 weeks
- Difficulty with sleeping – position changes are painful
- Saw a PT for one visit 2 weeks ago – produced “terrible” pain for several days following shoulder “stretching procedures”
- Expresses fear/anxiety over disabling pain

Primary Activity Limitations
Visit 1

- Sleep disturbances: wakes up every 2 hours at night because of the pain
- Deskwork and driving limitations: pain with reaching above shoulder level of objects

Relevant Physical Impairments
Visit #1

- External Rotation PROM: 40° at 45° abduction
- Internal Rotation PROM: 15° at 45° abduction
- Pain before resistance with GH PROM tests
- Positive Upper Limb Nerve Tension Test – reproduces reported shoulder pain
- Limited 1st Rib inferior glide
- Infraspinatus trigger point – reproduces reported shoulder pain

Interventions
Visit #1

- Mobilization/Manipulation:
  - Upper Thoracic and Rib Manipulation
- Soft Tissue Mobilization
  - Ulnar and Radial Nerve Entrapment Sites
  - Infraspinatus Myofascia/TPs (with PNF)
- Therapeutic Exercises
  - Nerve Mobility Exercises in Pain Free Ranges
  - Glenohumeral Rotation AROM Ex’s in Pain Free Ranges
- Counseling
  - Sleeping and Deskwork Ergonomic Instructions
Visit 2– one week later
Primary Activity Limitations
• Sleep disturbances: wakes up only once at night because of the pain
• Deskwork and driving limitations: able to reach to shoulder height – pain with reaching above head height
• Would like to return to aquatic & gym exercises

Relevant Physical Impairments
Visit #2
• External Rotation PROM: 60° at 45° abduction
• External Rotation PROM: 30° at 80° abduction
• Internal Rotation PROM: 45° at 45° abduction
• Subscapularis trigger point – reproduces reported shoulder pain
• Pain with resistance - end ranges of GH motions – moderate irritability (improved from last visit)

Interventions
Visit #2
• Repeat Interventions of Visit #1
Add
• Soft Tissue Mobilization and Manual Stretching
  – Subscapularis
• Therapeutic Exercises
  – Scapular Activation with GH AROM exercises
  – Initiate Aquatic Exercises in pain free ranges

Visit 3– two weeks later
Primary Activity Limitations
• Sleep disturbances: able to sleep through night
• Deskwork and driving limitations: able to reach above head height – pain only at end ranges of overhead reaching
• Feels competent with care progress, less fearful of disablement

Relevant Physical Impairments
Visit #3
• External Rotation PROM: 70° at 45° abduction
• External Rotation PROM: 40° at 80° abduction
• Internal Rotation PROM: 50° at 45° abduction
• Pain with resistance – at end ranges of glenohumeral motions
  – moderate irritability

Relevant Physical Impairments
Visit #3
• External Rotation PROM: 60° at 45° abduction
• External Rotation PROM: 30° at 80° abduction
• Internal Rotation PROM: 45° at 45° abduction
• Pain with resistance - end ranges of GH motions
  – moderate irritability (improved from last visit)
• Restricted GH Accessory Motion Testing
• ULTT – radial nerve tension test and provocation of entrapment site in humeral radial groove reproduces reported shoulder pain
Interventions
Visit #3
• Repeat Interventions of Visit #1 & 2
Add
• Soft Tissue Mobilization
  – Relevant Radial Nerve Entrapment Sites
• Joint Mobilization
  – Humeral Posterior Glide in loose pack position (Grade II-III: mobs into tissue resistance, mild pain with resistance – does not worsens with repeated mobs)

Progression Summary
Visits # 4 to 8
Once every other week
• Infraspinatus, Subscapularis, and Radial Nerve mobility normalized by visit 6
• Focus of visits 4 to 8 were on glenohumeral joint mobilization, progressive home stretching instructions and activity tolerance training
• At discharge:
  – Minimal to no pain with daily activities and exercises
  – PROM: 70° ER at 90° abduction
  – AROM: 150° flexion before onset of pain