

# The Human Movement System: Our Professional Identity The Importance of Diagnosis

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Program in Physical Therapy



# Topics

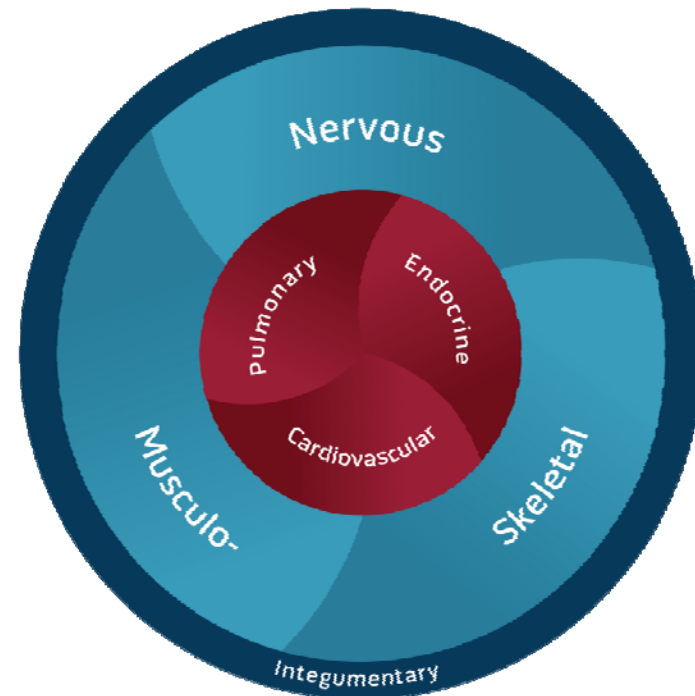
- What is the Movement System?
- Why the focus on the Movement System?
  - Vision statement
  - Guiding principles
    - **We** have not defined our identity
- Why an Identity?
  - The detrimental effects of the title of “therapist”
- Why should the Movement System be our Identity?
- The highlights of the Movement System Summit
  - Terminology; examination; diagnoses
- Examples of Movement System Diagnoses
  - Movement System Impairment Syndromes

# The Movement System

## The Washington University Version

### The Human Movement System

- Movement is an essential function of life at all levels of living organisms.
  - From ions moving through membranes to moving your limbs to moving in your environment



The human movement system is a system of physiological organ systems that interact to produce movement of the body and its parts.

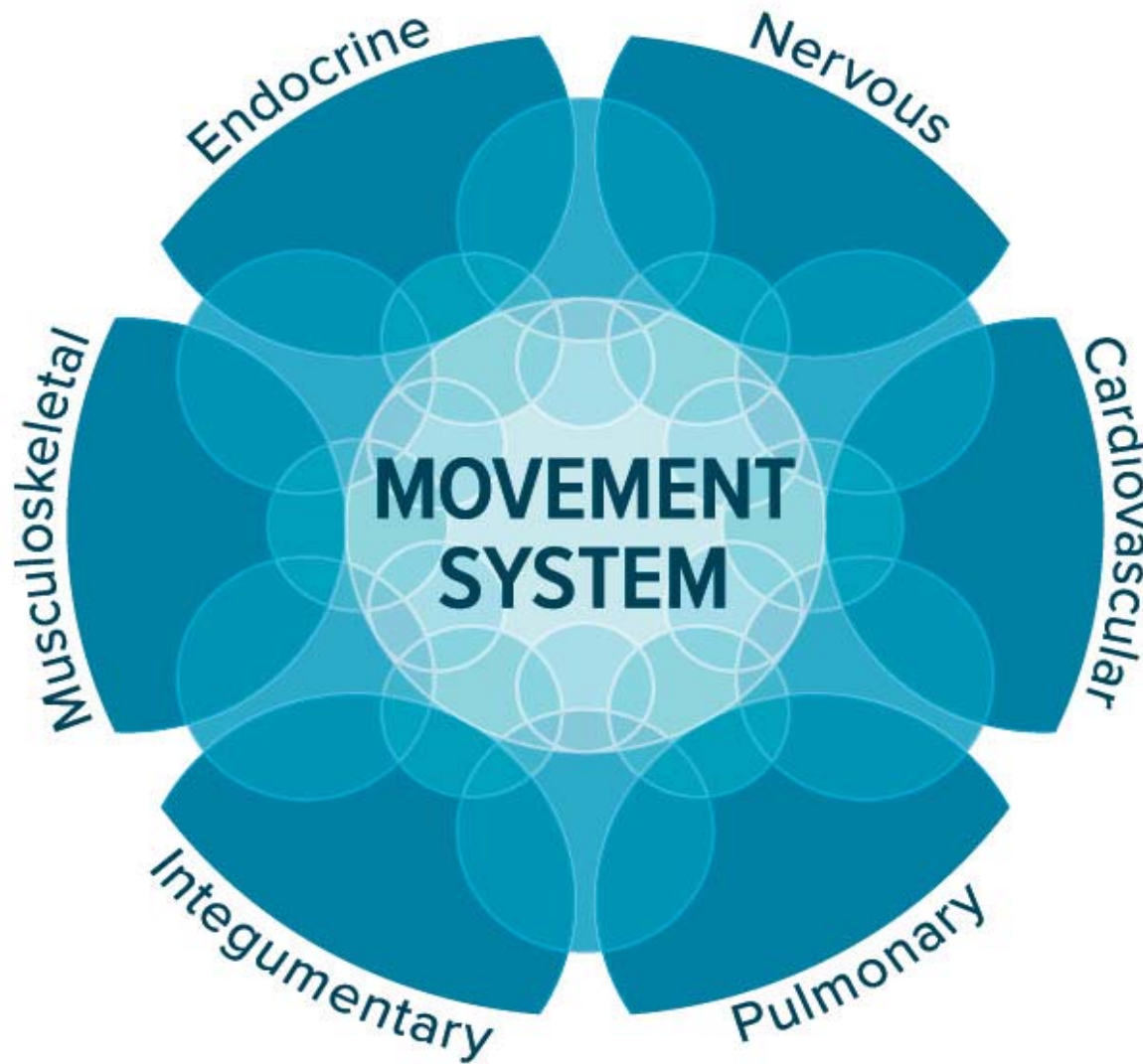
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Program in Physical Therapy

# Proposed Definitions of Movement System - APTA

- The human movement system comprises the anatomic structures and physiologic functions that interact to move the body or its component parts.
  - *APTA work group*
- The term used to represent the collection of systems (cardiovascular, pulmonary, endocrine, integumentary, nervous, and musculoskeletal) that interact to move the body or its component parts.
  - Current revision



APTA proposed graphic

# Definition Intent

- Intended to be generic and available to be used as are other physiological processes that become a particular focus.
- Other physiological processes that comprise multiple systems –a system of systems
  - Metabolic
  - Immune

# PT Relationship to Movement System— 1 Body of Knowledge

- 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.

*APTA work group*

# PT Relationship to Movement System– 2

## Diagnosis & Intervention Objectives

- 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

*APTA work group*



# PT Relationship to Movement System– 3

## Develop & Implement Treatment

- Physical therapists maximize an individual's ability
- to engage with and respond to their environment
- using movement related interventions
- to optimize functional capacity and performance.

*APTA work group*

# **WHY THE FOCUS ON THE MOVEMENT SYSTEM?**

2013 Vision Statement and 8 Guiding Principles

# APTA Vision Statement - 2013

- “The physical therapy profession
- will transform society
- by optimizing movement
- to improve the human experience.”

This new vision statement unflinchingly affirms that **movement is indeed the essence of physical therapy.**

Education & practice – not consistent

Pathoanatomic vs kinesiopathologic  
or pathokinesiologic

# Intro to Guiding Principles

- *“The physical therapy profession’s greatest calling is*
- *to maximize function and minimize disability for all people of all ages.*
- *In this context, **movement is a key***
- *to optimal living and quality of life*
- *for all people of all ages*
- *That extends beyond health*
- *to every person’s ability to participate in and contribute to society.”*

# APTA Introduction to Identity

- 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.
- The profession will be responsible for monitoring an individual's **movement system across the lifespan** in order to
  - promote optimal development, diagnose dysfunction, and
  - provide interventions targeted at preventing or ameliorating restrictions to activity and participation.
- The **movement system** will form the basis of practice, education and research of the profession."

# Identity

- The characteristics determining who or what a person or thing is:
  - Oxford Dictionary
- Condition or character as to who a person or what a thing is
- The qualities, beliefs, etc., that make a particular person or group different from others
  - Merriam-Webster

# PT and Identity – Hislop 1975

- PT is in the midst of a crisis of identity; a profession in search of an identity.
- Pathokinesiology is the distinguishing clinical science of physical therapy.
  - It is the study of anatomy and physiology as they
  - relate to abnormal human movement
- PT can claim the unique privilege of placing the role of exercise in “health??” and disease in its proper scientific focus and perspective.
  - I wish – we are not even recognized for expertise in exercise except with post-surgical or paralyzed patients

# PT and Identity—Rothstein 1984

- The *identity crisis* Hislop saw a decade ago has *worsened*.
- We, as a profession, may be doing more things,
- But in *no way* have we developed a *true sense of who and what we are*.
- All too often, we are *defined by the tasks we do*, and, as a result,
- only those who have seen therapists in practice have the vaguest notion of who and what we are.



# PT and Identity 2017 – 33 Years Later!!??

- Where are we now in our identity?
- What has happened within the profession?
  - Research, education, practice
- Are the progressive changes in the profession evident to
  - Internal community
  - External community (the DPT degree)
    - Other health professionals
    - Our employers, our reimbursement sources
    - The public – consumers both patients & non-patients

# **PT DOES HAVE AN IDENTITY**

## **HOW OTHERS SEE US**

Is the identity appropriate for a major health profession?

What are the implications of this identity?

## New Journal

- Physical Therapy and Rehabilitation is an Open Access journal published by Herbert Publications Ltd.
- Editorial Board has 14 members from Universities with PT Programs
- Here is the definition of Physical Therapy used by this journal?

# Physical Therapy & Rehabilitation

## Definition

- Physical Therapy is the treatment which uses therapeutic and specially designed exercises,
- evidence evaluation of patient and application of physical modalities for restoration of physical function and movement contrived by illness or disorder.
- Rehabilitation is the process of regaining one's strength after a serious surgery or injury.

# Other Definitions from Internet

- A branch of rehabilitative health that uses specially designed exercises and equipment to help patients regain or improve their physical abilities
- The treatment of **physical** dysfunction or injury by the use of therapeutic exercise and the application of modalities, intended to restore or facilitate normal function or development
- **therapy** for the preservation, enhancement, or restoration of movement and **physical** function impaired or threatened by disability

# Implications of the Definitions

- Physical therapy is treatment
- Does not define the condition that is treated,
- Does not imply that therapists make a diagnosis of the condition
  - Easy to assume when the profession does not have diagnostic manuals
- Implies that another practitioner may have identified the underlying problem
- Suggests that treatment is not that complicated

We are recognized for what we DO  
and NOT for what we KNOW

# Movement System – A Body System

- Professions that have a respected identity are associated with a system of the body.
  - Cardiologist, Neurologist, Endocrinologist or
  - A well-defined disease: diabetologist, oncologist
- Why – the body system defines the body of knowledge of the practitioner to other health care practitioners and to public
- as well as knowledge of system dysfunctions and indicated treatment
- Advantage – implies that the practitioner can use whatever tools are necessary to diagnose and treat the system of responsibility

# **WHAT QUALITY DEFINES THE HIGHLY RESPECTED PHYSICIAN?**



# Diagnostic Manuals for Practice & Education

- The profession must have labels for conditions of the movement system that can be identified within our scope of practice.
- Necessary to convey that movement system dysfunctions can be classified.
- De-emphasize treatment approaches named for individuals and emphasize the underlying kinesio pathology or pathokinesiology
- No one will know or believe that PTs
  - can figure anything out or
  - that there is anything to figure out
  - if we do not put a label on conditions.
- Practice will be more parallel to other body system experts

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# WHY SHOULD THE MOVEMENT SYSTEM BE OUR IDENTITY?

Our business model is going to change?

Our practice model has to change to meet the challenge besides a change is the right thing to do!

Our educational model has to change to be consistent with the major emphasis on being the expert

- 1.in movement analysis,
- 2.guiding the development of optimal movement,
- 3.diagnosing movement dysfunctions, and
- 4.development of programs for optimization, prevention, and treatment

# The Movement System

- Clarifies that the physical therapist has responsibility for a system of the body.
  - Respected health professions are identified with a system of the body
  - Provides a context for diagnoses that the physical therapist makes
    - No recognition for being able to identify a problem unless there is a label
- Informs other health professionals of the existence of movement based syndromes
- Physicians identify musculoskeletal problems based on pathoanatomy -
  - Tx *symptoms & consequences* by drugs or surgery
- Physical therapists identify neuromusculoskeletal problems based on pathokinesiology or kinesiopathology
  - Tx **cause** by movement

# THE MOVEMENT SYSTEM SUMMIT

Terminology – Our Understanding of the Movement System

The Essential Components of Movement Analysis of Movement System Exam

The Criteria of a Movement System Diagnosis

## An Amazing Success!!!

# Terminology

- The definition
- Relationship to
  - ICF,
  - Guide to PT Practice (patient/client management model) and
  - House of Delegates Policies
- Basically said no problem incorporating but a little short on specifics except that our emphasis should be on movement.

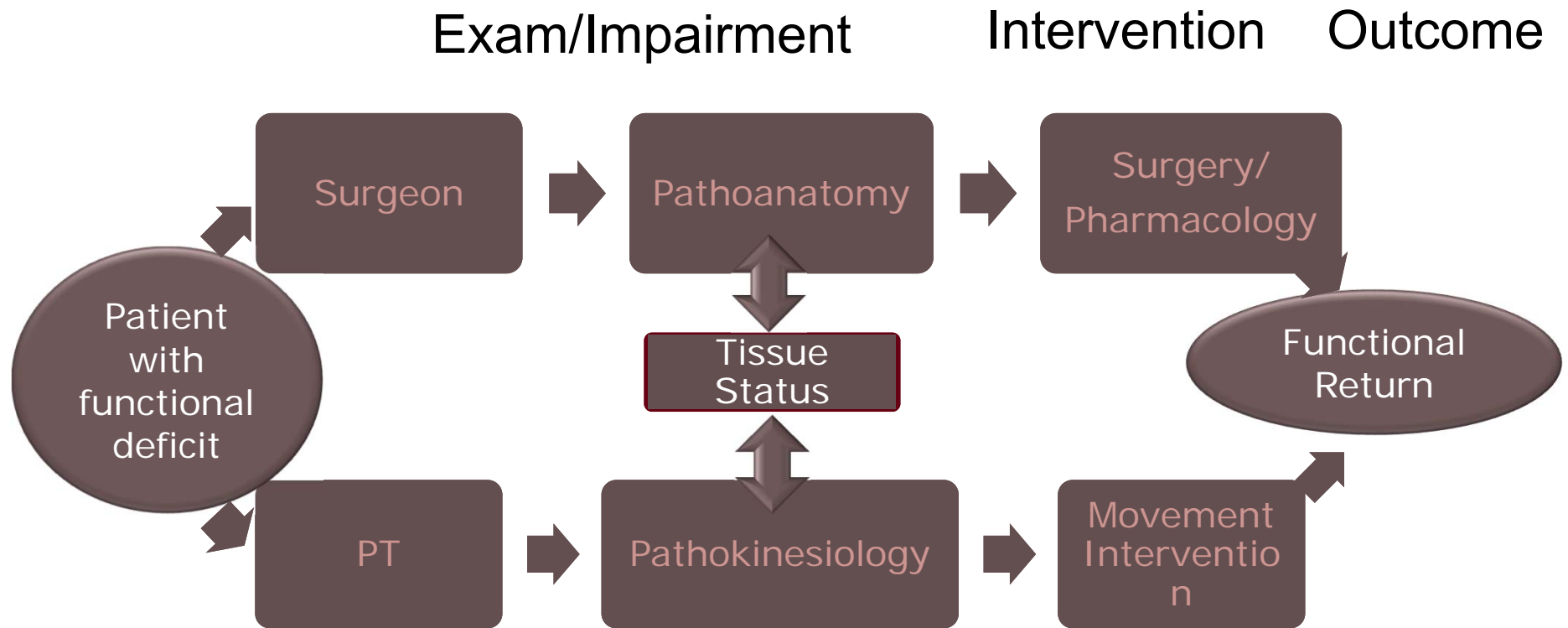
# Essential Components of Movement Analysis as basis for MS Exam

- Amazing consensus that there should be a standardized set of essential tasks
- Amazing consensus on tasks – was homework sent with examples
  - Locomotion, sit to stand, reverse, stepping up, standing, etc
- Need to formalize “what do you look for” during performance of these tasks?
- Need to describe the terminology to be used for the analysis
- Agreement on phases such as – initiation, execution, completion

# Movement System

- *...Resolved, APTA endorses the development of diagnostic labels and/or classification systems that reflect and contribute to the physical therapists' ability to properly and effectively manage disorders of the movement system.*
- *Reference (RC 16-15): APTA House of Delegates 2015*





P Ludewig, PT, PhD

# Pathoanatomic Diagnostic Labels

- Common and “Traditional”
- Communication with surgeons and other health care providers
- Focus on identifying **tissue pathology** as the basis for the patients pain or dysfunction
- Important to surgical decision making
- Important for PT decision making

Ludewig et al. JOSPT 2013

# Concerns with Pathoanatomic Labels

- Often do not adequately direct physical therapy intervention
- Disconnect between our diagnostic and treatment process
- Inconsistent use among providers confounds communication

Ludewig et al. JOSPT 2013

# Concerns with Pathoanatomic Labels

P Ludewig, PT, PhD

- Often we cannot determine an anatomical source
- What about co-existing pathologies?
- Tissue pathology not consistently linked to pain and function
- Tissue pathology is typically an intermediate or end result

# Recommendations

P Ludewig, PT, PhD

- Need to target the right treatments to the right patients at the right dosages
- Why not identify movement impairment related diagnostic categories?
- There are clusters of patients with similar movement impairments who will likely benefit from similar treatments
  - Posterior capsule tightness
  - Microinstability

# The Path Forward – Shoulder Dx P Ludewig

- Create a new diagnostic language
- Use accurate terms
- Don't subcategorize under Impingement, reconsider the condition, restart the conversation
- Mechanical impingement is a mechanism not the only mechanism, and not an ideal diagnostic label
- Understand what a surgeon hears when you say "Impingement"

# The Time is Right

- Shoulder surgeons – recognizing that movement is a contributing factor not just structural impingement
- Hip structural variations – induced by intensive sports during growth periods
  - Escalating surgery
  - Parallel to shoulder impingement
- Presentations at 3 physicians meetings
  - Want to incorporate movement analysis items in their exams
  - How to find “good” PT
  - Emphasis on what is wrong with the tissues – how to treat with drugs and surgery
  - Not on how the tissues got that way

# Why are Diagnoses so Important?

- What is the difference between a novice and an expert?
  - Pattern recognition
  - Diagnoses are patterns
- The large majority of conditions diagnosed by MDs do not have a clear pathophysiology. - pattern recognition
  - That is why “critical thinking” of what is known in PT is not adequate
- No one will know we can figure anything out if we do not use labels
- Not considered a source of referral for diagnosis
  - My uncle
  - GTP
  - #choosePT



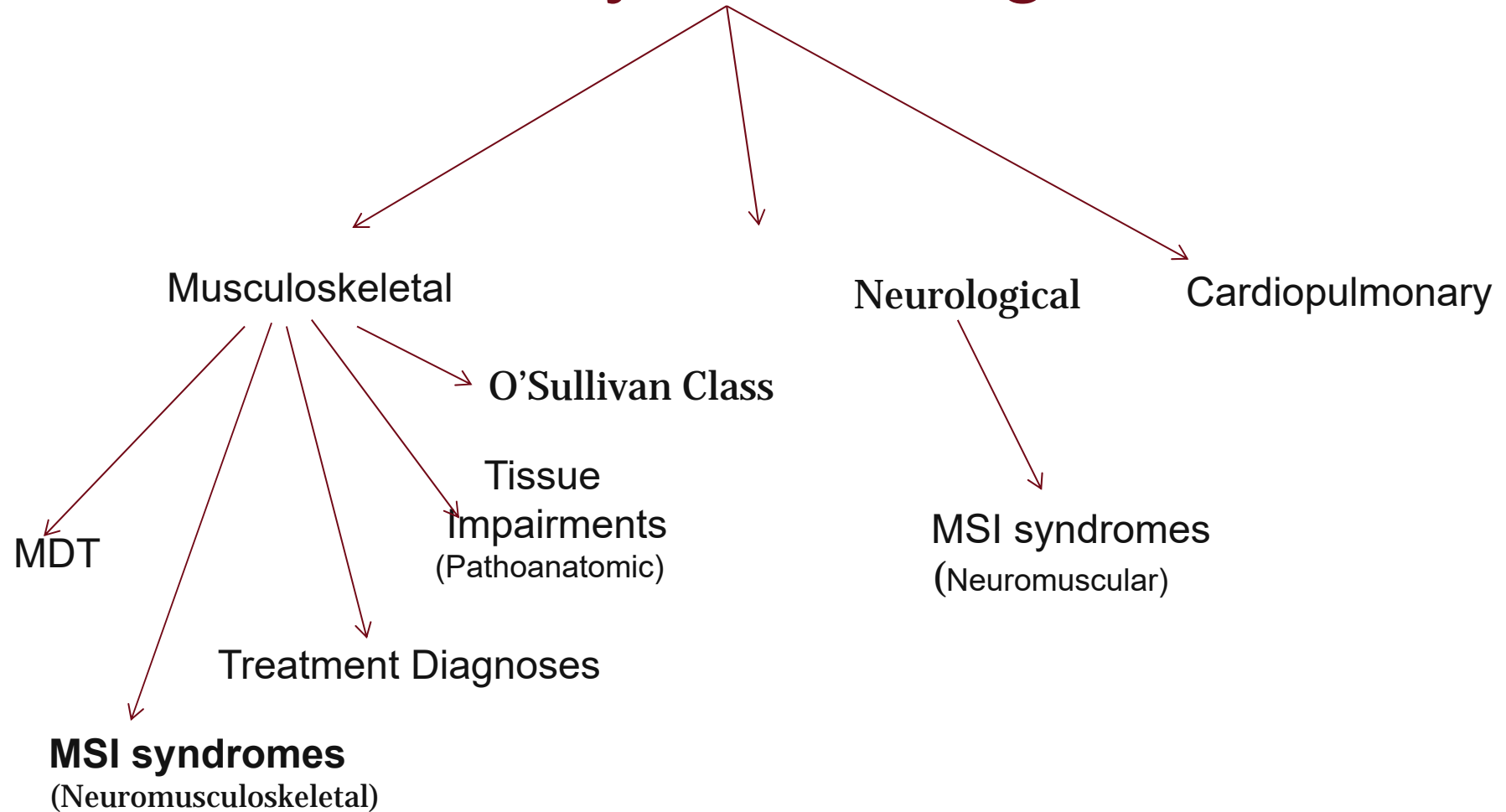
# Diagnostic Criteria from Summit

- Use recognized movement-related terms to describe the condition or syndrome of the movement system.
- Include, if deemed necessary, the name of the pathology, disease, disorder, anatomical or physiological terms and stage of recovery associated with the diagnosis.
- Be as succinct and direct as possible to improve clinical usefulness.
- Strive for movement system diagnoses that span all populations, health conditions and the lifespan.
- Whenever possible, similar movement related terms should be used to describe similar movements, regardless of pathology or other characteristics of the patient.

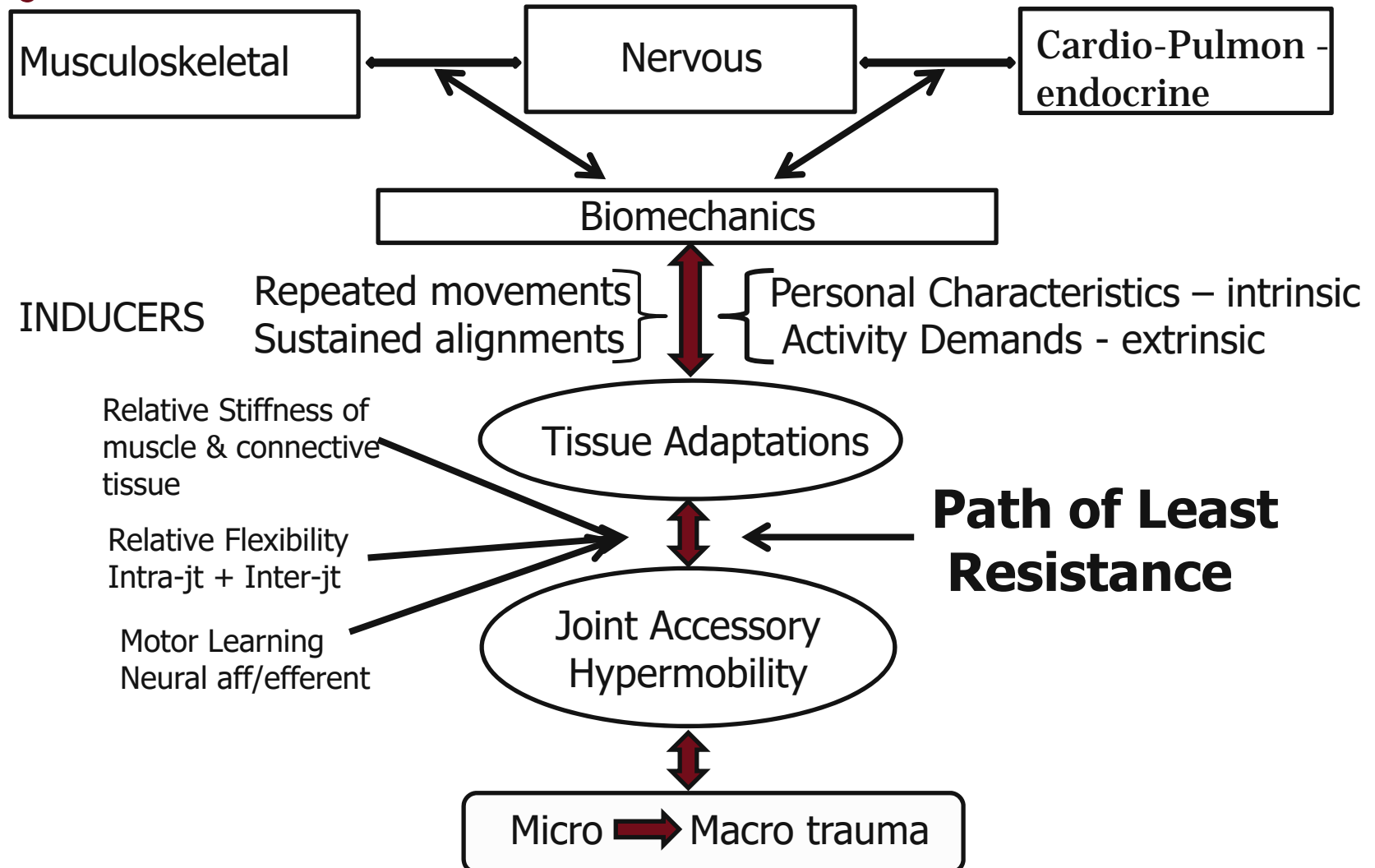
# **EXAMPLES OF MOVEMENT SYSTEM DIAGNOSES**

Movement System Impairment  
Syndromes - not APTA endorsed

# Movement System Diagnoses



# Kinesiopathologic Model of Movement System



# Working Theory

- Musculoskeletal pain is
  - Related to **lifestyle** similar to many other health conditions
  - A progressive condition
    - Starting with acute pain – first indication of tissue damage
    - High reoccurrence rate - leading to chronic problem
  - The result of tissue changes associated with
    - Aging related degeneration and
    - Activity induced tissue injury from impaired joint movement

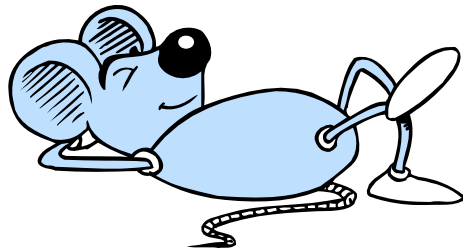
# The Challenge: Keeping the Acute Problem From Becoming Chronic

- Acute symptoms subside
  - With time
  - With variety of interventions addressing symptoms
- Recurrence is common
  - Pathoanatomic structures considered the cause
  - The impaired movement not considered as cause
    - Therefore has not been identified & addressed.
- To minimize recurrence –
  - identify the movement cause & contributing factors
- Develop a treatment program that includes
  - Patient specific exercises
  - Correction of performance of basic daily activities
  - Correction of performance of work, recreation, fitness, & sports activities

**REPETITION OF IMPAIRED  
MOVEMENT MAY  
ACCELERATE THE  
DEVELOPMENT OF  
OSTEOARTHRITIS**

# Experimentally Induced OA

- Osteoarthritis development in novel experimental mouse models induced by knee joint *instability*
- Kamekura et al.
- OsteoArthritis and Cartilage (2005) 13, 632-641
- The surgical *destabilization* of the medial meniscus (DMM) model of osteoarthritis in the 129/SvEv mouse
- Glasson et al.
- OsteoArthritis and Cartilage (2007) 15, 1061-1069





# Key Concepts

- Path of Least Resistance for Motion
- Relative Stiffness and Relative Flexibility
- You get what you train (many strategies to create moments at a joint or within a limb; varying motor patterns)
- Presence of a muscle does not mean that it is being appropriately used
- No magic in an exercise except if the desired motion is evident
- The way everyday activities are performed is the critical issue
- Hypermobility (accessory/arthrokinematic motion) causes degeneration & pain

# Movement System Impairment (MSI) Syndromes

- Named for movement direction that causes symptoms and that is impaired. Correction of the movement usually decreases the symptoms.
- Identify the cause of the dysfunction & contributing factors
  - neuromusculoskeletal impairments
- Organize & cluster specific tissue and movement impairments
- Provide a direction for treatment
  - does not require identification of a specific pathoanatomical structure (**source**)
- Based on anatomy and kinesiology

# Movement System Impairment Syndromes

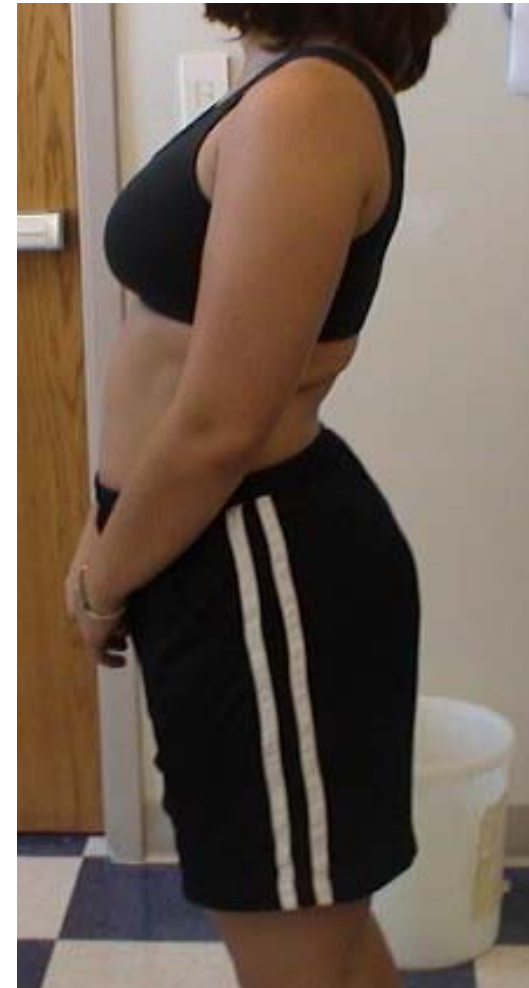
- Low Back
  - Extension
  - Extension-rotation
  - Rotation – primary & secondary
  - Flexion
  - Flexion-rotation

# Extension Syndrome

## Test = Standing Alignment

Why does she stand this way?

- Lordosis with swayed upper back
- Anterior pelvic tilt
- What is her sport?
- What are the tissue impairments?



# Low Back Pain: Case Presentation

- Pain with standing worse than sitting
- Age 45
- Height 5' 3" (160.5 cm)
- Weight 140 lbs (63.5 kg)
- Lordosis with anterior pelvic tilt
- Piano teacher



# Low Back Pain: Case Presentation

## Physical Exam:

- Forward bending decreased pain  
barely reverses lumbar curve
- Return with lumbar extension  $>$  hip extension
- Extension - increased pain



# Sitting Posture when Teaching & Playing the Piano



# Low Back Pain: Case Presentation

- Age 23
- Weight 175 lbs (80 kg)
- Height 6 ft (183 cm)
- Student
- Competitive cyclist
- Flat lumbar spine
- Tentative MSI diagnosis?





# Low Back Pain: Case Presentation

- Excessive lumbar flexion
- Decreased hip flexion
- Low back pain is increased



Lumbar spine flexed  
Hips not flexed to 90 deg

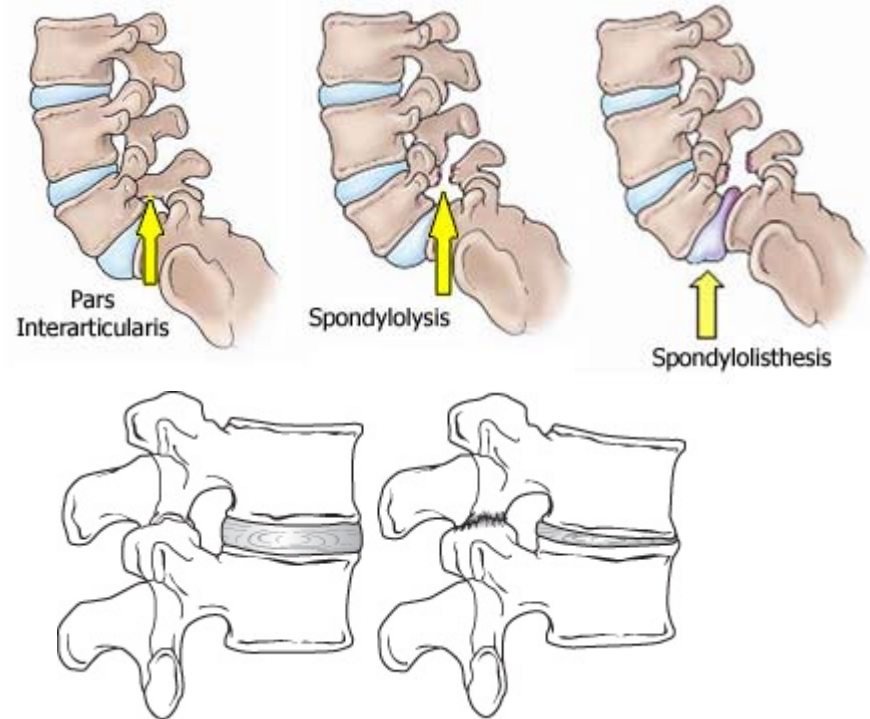
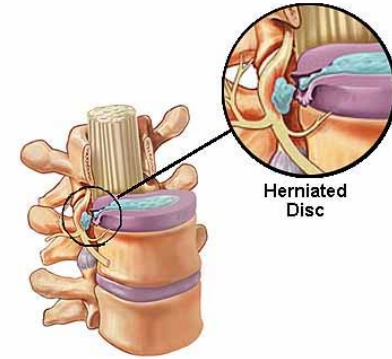


# Pts with LBP – Clustering of Potential Findings

	Flexion	Extension
Characteristics	Young/tall	Old/short
Abdominals	Strong/stiff	Weak/long
Back extensors	Weak/long	Strong/stiff
Hip flex length	Long	Short/stiff
Hip ext length	Short/stiff	Long
Activities	Sit flexed	Sit extended

# Spinal Pathology and Movement

- **Disc herniation** – offending motions
  - Flexion and rotation
- **Spondylosis** - degenerative osteoarthritis of the joints between the centra of the spinal vertebrae and/or neural foraminae.
- **Spondylolysis** is a defect of a vertebra. More specifically it is defined as a defect in the pars interarticularis of the vertebral arch
- **Spondylolisthesis** - anterior or posterior displacement of a vertebra or the vertebral column in relation to the vertebrae below.
  - All extension induced
- **Spinal stenosis**
  - extension induced

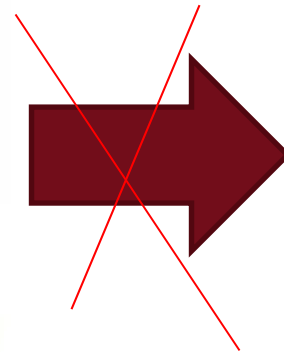


# Spinal Changes – Can be Prevented

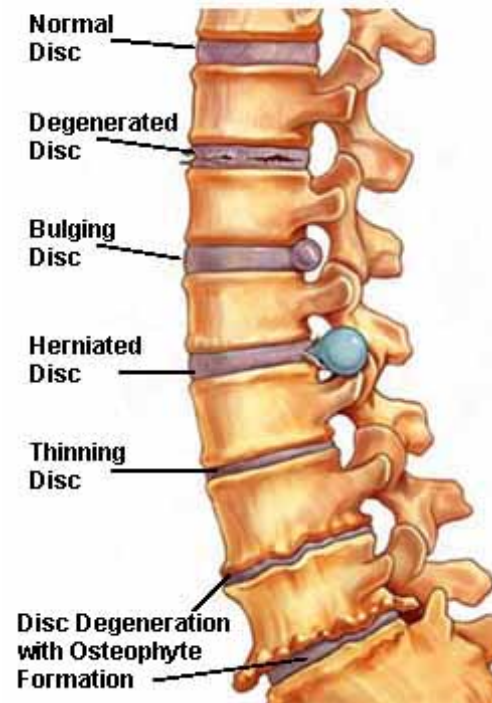
Young



Activity and Aging



Examples of Disc Problems



# Key Concepts II

- The way everyday activities are performed is the critical issue
  - Repeated movements and
  - Sustained alignments



# Changes in Oswestry Disability Index

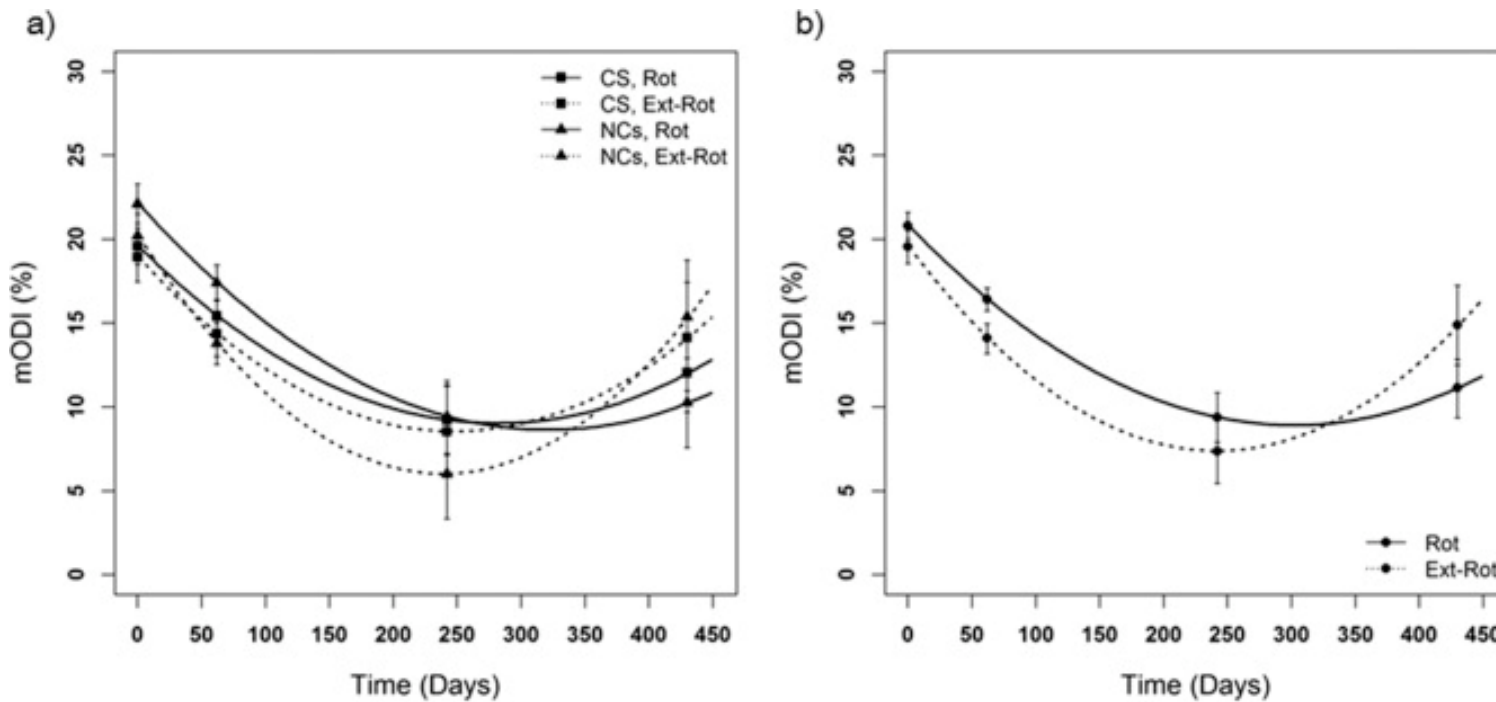


Fig. 2. a. Predicted values and 95% confidence intervals based on hierarchical linear modeling analyses of the modified Oswestry Disability Index (mODI) scores for the classification-specific (CS) rotation (Rot) and extension-rotation (ExtRot) groups and the n...

Linda R. Van Dillen, Barbara J. Norton, Shirley A. Sahrmann, Bradley A. Evanoff, Marcie Harris-Hayes, Gregory W. Holtzman, Jeanne Earley, Irene Chou, Michael J. Strube

**Efficacy of classification-specific treatment and adherence on outcomes in people with chronic low back pain. A one-year follow-up, prospective, randomized, controlled clinical trial**

Manual Therapy, Volume 24, 2016, 52–64

# Adherence to Performance Training

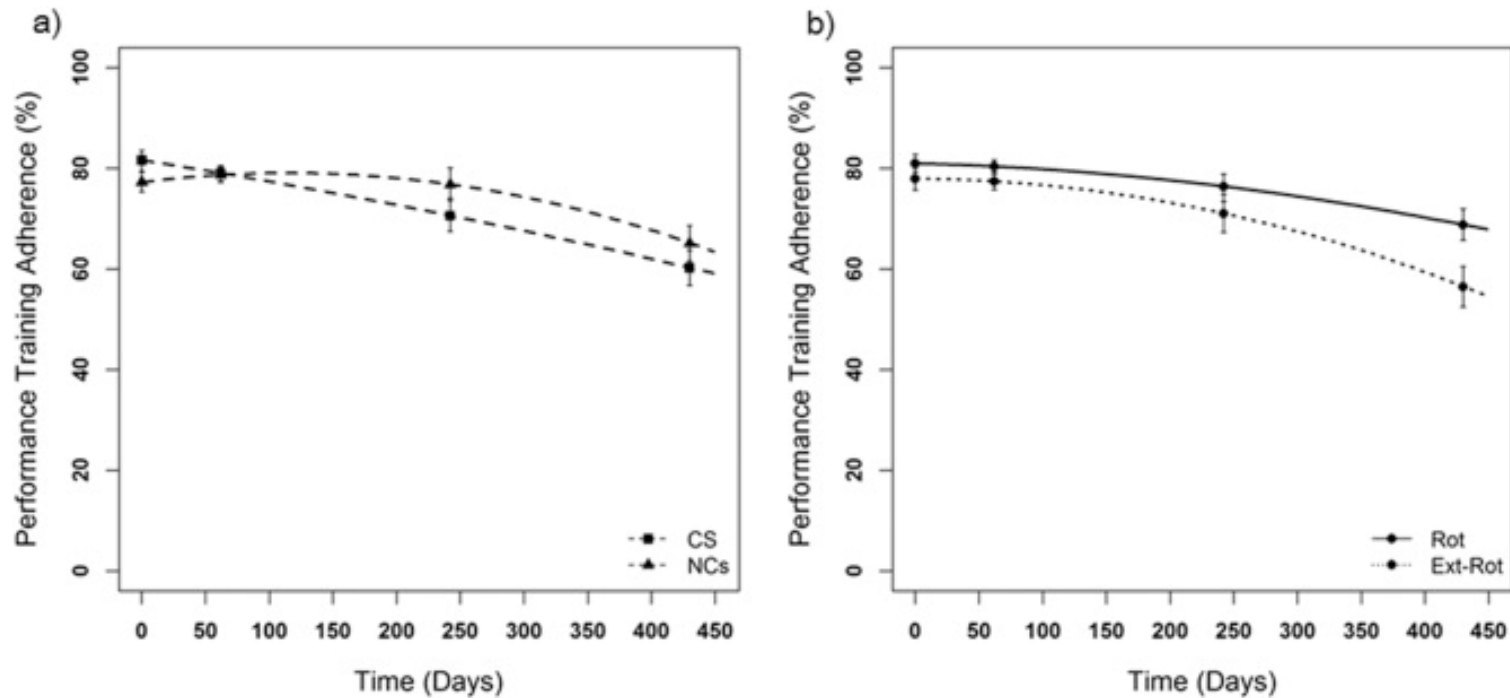


Fig. 3. a. Predicted values and 95% confidence intervals based on hierarchical linear modeling analyses of the adherence to performance training for the classification-specific (CS) group and the non classification-specific (NCs) group at the 2nd treatment visit...

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# Adherence to Exercise

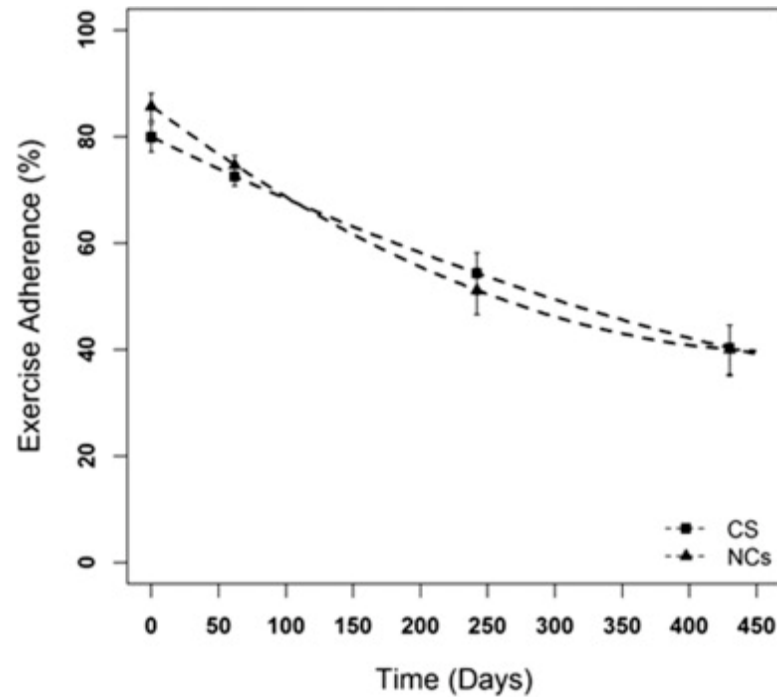


Fig. 4. Predicted values and 95% confidence intervals based on hierarchical linear modeling analyses of the adherence to exercise for the classification-specific (CS) group and the non classification-specific (NCs) group at the 2nd treatment visit, post-treatm...

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# Summary – Need your Help

- Promote the movement system
- Development of a basic movement system exam
  - Emphasis on movement analysis of fundamental tasks
  - Developing terminology for “what do you look for?”
- Develop and use diagnostic categories
- Emphasize lifespan practice
- Develop and implement treatment programs based on the diagnosis and contributing factors
  - Address the way daily activities are performed.