FROM UNIVERSAL TO PARTICULAR

Clinical Pattern Recognition and Tissue Irritability in Orthopedic Diagnosis

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Disclosure Information

NHMI Fall symposium

I have no relevant financial relationships to disclose

I will not discuss off label use or investigational use in my presentation

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Learning objectives

1. Differentiate between pathokinesiologic and kinesiopathologic movement system diagnoses within the ICF framework.
2. Apply the SINSS model and clinical reasoning strategies to assess tissue irritability and guide safe, effective intervention planning.
3. Integrate red flag screening, movement system classification, and current clinical practice guidelines to develop evidence-informed treatment strategies.

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The Diagnostic Dilemma

- Many MSK conditions share overlapping symptoms
- Imaging often does not correlate with symptoms
- Pathoanatomy rarely changes early treatment plan
- Goal: Treat the person, not just the pathology

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When Pathoanatomy Matters

- Red flag symptoms: cancer, fracture, infection, neuro signs
- Post-op care protocols
- Progressive neurological compromise
- Persistent, unexplained pain or swelling

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Two Types of Movement Diagnoses

Every physical therapist should be able to identify the *type* of movement problem a patient has:

- **Is it caused by damage in the body?**
  → Pathokinesiologic diagnosis
- **Is it caused by poor movement patterns?**
  → Kinesiopathologic diagnosis

Therapists should also always keep the bigger picture in mind. Integrating patient values, social context, and emotional health, when planning care.

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Pathokinesiologic Model	Kinesiopathologic Model
Pathology ↓ Movement problem	Movement problem ↓ Pathology

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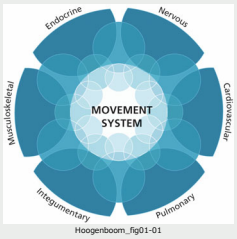

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Movement System Diagnosis

Instead of just focusing on medical labels like "arthritis" or "tendonitis," physical therapists now look at how movement is affected.

A **movement system diagnosis** helps us figure out *what's wrong with how someone moves.* Example: poor balance, weak muscles, or stiff joints.

This is the **clinical application** of Human Movement System

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Movement System Diagnosis: *How PTs Think About Problems*

- Instead of focusing only on medical conditions, PTs now ask: **"What movement dysfunction is present?"**
- For example, instead of just saying "shoulder pain," a PT might diagnose "impaired scapular coordination" or "limited thoracic mobility."

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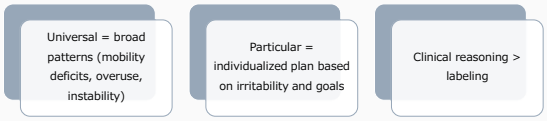
Universal to Particular: Clinical Reasoning Framework



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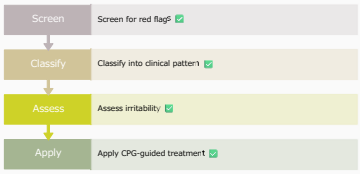
Decision Tree Slide



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Need to rule out Red Flags

Red flags to remember

Cancer – history of cancer, weight loss, no relief with rest

Cauda equina – urinary retention, saddle anesthesia

Infection – recent infection, fever, IV drug use

Fracture – trauma, osteoporosis, corticosteroids

Aneurism – pulsating abdominal mass, vascular history

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Movement System and the ICF Model

ICF Framework Components:

Health Condition: Medical diagnosis (e.g., ACL tear)

Impairments: Body issues (e.g., limited ROM, weakness)

Activity Limitations: Functional limits (e.g., can't walk)

Participation Restrictions: Role limits (e.g., can't play sports)

Environmental/Personal Factors: Supports or barriers (e.g., crutches, family help)

Goal: Treat the person, not just the injury.

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Movement system vs ICF diagnosises

- **Movement System Diagnosis** → names the **treatable movement problem** (PT-specific).
- **ICF Diagnosis** → documents the **impairments, limitations, and restrictions** in a standardized, global health language.
- They complement each other: MSD tells us *what to treat*, ICF tells us *how it affects the person's function and life*.

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Example 1: Force Production Deficit (MSD)

ICF – Body Function/Structure: Weakness of quadriceps (b7301: decreased muscle power in lower extremity)

ICF – Activity Limitation: Difficulty rising from a chair (d4103)

ICF – Participation Restriction: Unable to return to recreational basketball (d9201)

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Example 2: Movement Coordination Deficit (MSD)

ICF – Body Function/Structure: Impaired motor control of trunk stabilizers (b760: control of voluntary movement functions)

ICF – Activity Limitation: Difficulty maintaining balance when walking (d450)

ICF – Participation Restriction: Limited community ambulation and social outings (d469, d9205)

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Example 3: Joint Mobility Deficit (MSD)

ICF – Body Function/Structure: Decreased ankle dorsiflexion ROM (b710: mobility of joint functions)

ICF – Activity Limitation: Difficulty descending stairs (d4551)

ICF – Participation Restriction: Cannot participate in hiking with family (d9201)

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Patient Case Example	Movement System Diagnosis (APTA Movement System)	ICF Diagnosis (Function/Participation)	Pathoanatomical / Medical Diagnosis
Low back pain with poor core control	*Movement coordination deficit of lumbar spine*	Activity limitation: difficulty bending to lift objects; Participation restriction: unable to perform work duties	Lumbar disc herniation
Elderly patient after hip fracture repair	*Force production deficit of hip musculature*	Activity limitation: unable to walk >10 m without assistance; Participation restriction: cannot live independently	Status post left hip fracture ORIF
Young athlete with recurrent ankle sprains	*Ankle stability and movement coordination deficit*	Activity limitation: difficulty running/jumping; Participation restriction: unable to return to competitive soccer	Lateral ankle ligament sprain
Stroke survivor with right hemiparesis	*Fractionated movement deficit of R UE/LE*	Activity limitation: unable to dress independently; Participation restriction: unable to return to work	Left MCA ischemic stroke
Middle-aged office worker with chronic neck pain	*Cervical mobility deficit*	Activity limitation: difficulty turning head to drive; Participation restriction: limits community engagement	Cervical spondylosis
Patient with knee osteoarthritis	*Knee mobility deficit and pain*	Activity limitation: difficulty climbing stairs; Participation restriction: unable to participate in recreational walking group	Knee osteoarthritis

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Cases Example 1

Patient: 35-year-old recreational soccer player, 8 weeks post–ACL reconstruction.

Presentation:

Difficulty controlling knee position during single-leg squat (valgus collapse).

Hesitant gait with uneven loading of the surgical limb.

Recurrent “giving way” episodes when pivoting.

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Case Example 2

- **Patient**: 72-year-old woman with knee osteoarthritis.
- **Presentation**:
- Marked quadriceps weakness; unable to rise from a chair without use of arms.
- Slow walking speed, fatigues quickly with stair climbing.
- Falls risk due to inability to generate sufficient lower-extremity power.

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Case Example 3

- **Patient**: 44-year-old office worker with low back pain.
- **Presentation**:
- Sharp low back pain radiating down the posterior thigh and into the lateral calf and foot.
- Reports numbness in the lateral toes; occasional foot drop with fatigue.
- Positive straight-leg raise and slump test.

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Case Example 4

- **Patient**: 56-year-old male with **adhesive capsulitis (frozen shoulder)**.
- **Presentation**:
- Insidious onset of shoulder pain and progressive stiffness over the last 3 months.
- Significant loss of **external rotation** and **abduction**, both active and passive.
- Sleep is disturbed due to pain when lying on the involved shoulder.
- **Clinical Findings**:
- Glenohumeral joint hypomobility in multiple planes.
- Firm and hypomobile end-feel on PROM testing.
- Strength relatively intact but limited by restricted range.

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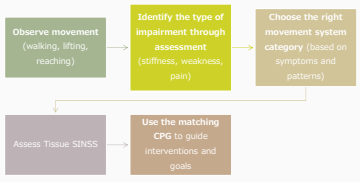
Clinical Steps to Classify a Movement Pattern



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SINSS

- Severity
- Irritability
- Nature
- Stage
- Stability

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Clinical Integration

Use SINSS to:

- Prioritize safety
- Guide intervention choice
- Determine progression readiness
- Communicate patient status clearly

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SINSS Clinical Reasoning Framework

Component	Description
Severity	How much the condition affects function
Irritability	How reactive tissues are to passive testing (e.g., MLT, PROM, palpation)
Nature	Type/source of symptoms: MOI, contractile/inert tissue, nerve, psychosocial
Stage	Acute, subacute, chronic: informs healing status
Stability	Is the condition better, worse, or the same over time?

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S – Severity
Determines how much the condition affects function.

Severity Level	Description
High	Unable to perform regular activities due to pain
Moderate	Performs activities with pain during activity
Low	Performs regular activities with mild pain at end

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I-IRRITABILITY
DETERMINES HOW REACTIVE TISSUES ARE DURING PASSIVE TESTING.

Tests used: MLT, PROM, palpation

Irritability Level	Description
High	Cannot reach end-range due to pain
Moderate	Reaches end-range but painful during the movement and at end
Low	Full ROM with mild at end or no pain

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N- Nature of the Condition

Helps determine the type and source of the patient's symptoms.

•MOI (Mechanism of Injury)

•Symptom generator

- Contractile tissue (muscle/tendon)
- Inert tissue (joint capsule, ligament)
- Nerve involvement
- Psychosocial factors

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S-STAGE OF CONDITION

Stage	Description	Treatment Focus
Immediate	Just happened, acute signs	Protection, reduce swelling (POLICE)
Acute	Worsening, inflammation present	Control pain/inflammation, protect tissue
Subacute	Improving but vulnerable tissue	Restore mobility and strength without overloading
Settled	Stabilized (approx. 6+ weeks)	Restore function, advance activity
Chronic	>12 weeks; persistent pain	Pain education, gradual progress

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S-Stability

Ask at every visit:

- **Is the condition better, worse, or the same?**
- **Tie response to functional progress, not just symptoms.**

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Case 1

A 24-year-old recreational soccer player reports a sudden sharp pain in the posterior thigh while sprinting during a game 3 days ago. Currently they are unable to run, walking is painful. Your passive assessment has an empty end feel, unable to fully lengthen the muscle, and denies numbness and tingling discomfort.

SINSS Breakdown:

Severity:

Irritability:

Nature:

Stage:

Stability:

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Case 2

Case: A 42-year-old presents with a 2-month history of gradually increasing anterior knee pain. Symptoms are aggravated by running hills and prolonged sitting. Current pain is rated **5/10**, interfering with the ability to run more than two miles. Symptoms typically ease within 30 minutes of rest. On examination, there is mild swelling around the patella and pain with limited terminal knee extension.

Severity:

Irritability:

Nature:

Stage:

Stability:

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Case 3

A 55-year-old recreational tennis player presents with a 6-month history of lateral epicondylalgia. The patient reports discomfort only after approximately 30 minutes of play or with repeated backhand strokes. Pain is rated **2/10** and resolves within a few minutes of rest. On examination, there is mild tenderness at the lateral elbow. Range of motion is full, with pain noted on resisted wrist extension, though overall strength remains within normal limits.

Severity:

Irritability:

Nature:

Stage:

Stability:

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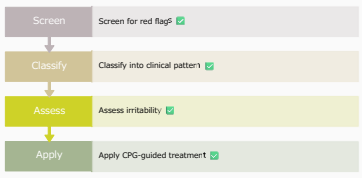
Decision Tree Slide



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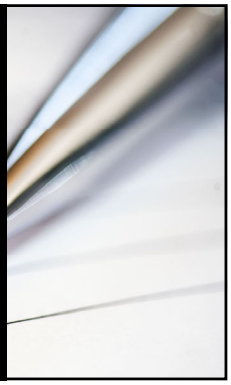
CPG

evidence-informed intervention planning



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CPG Treatment Recommendations (From Strongest to Weakest Evidence)

A-level = strong evidence
B-level = moderate evidence
C-level = weak evidence
D-level = conflicting evidence

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Clinical Heuristic for Decision-Making

Ask: *"Do I need a specific tissue diagnosis to treat this patient effectively?"*

If no → pattern + irritability + function

If yes → refer, image, clarify

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Take home Clinical Pearls

- Always rule out red flags
- Clinical patterns guide classification
- Irritability determines how and when to intervene
- Avoid diagnostic paralysis

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This model represents a major shift in physical therapy:

Away from: Focusing solely on anatomy or imaging (e.g., "disc bulge")

Toward: Understanding *how* the person moves, and how that may be **causing or worsening their pain**

Movement system diagnoses are not the only tool in a therapist's toolbox, but they serve as a strong foundation to move the profession forward, toward more consistent, effective, and individualized care

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What Is the APTA Saying?

The **American Physical Therapy Association (APTA)** says that:

Movement is key to **health, independence, and quality of life**

PTs should use a **common language** (like "movement diagnosis") so people understand what they do

PT education, research, and treatment should all be centered around this **movement system idea**

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Final thoughts

Clinical excellence isn't about naming the structure; it's about knowing how to help the person in front of you

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ANY QUESTIONS

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THANK YOU

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