Integrating Pain Medicine Principles into Outpatient Orthopedic PT Practice

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To justify our services for patients with musculoskeletal complaints, we need to achieve outcomes superior to those associated with natural history.¹

Many studies have failed to show that physical therapy is better than general medical care in regard to many common musculoskeletal conditions.
Signs /symptoms analyzed

Pathology is determined

Treatment corrects pathology

Signs /symptoms disappear

Is this what is expected within an episode of care?

Medical Model: Sufficient to guide physical therapy practice?²
Primary Tissue in Lesion

Functional Testing
AROM/PROM/Resistive
Overpressures and Repeated

Special Tests
Selective Tissue Tensioning

Palpation
Segmental Testing
<table>
<thead>
<tr>
<th></th>
<th>Tendinopathy</th>
<th>Articular</th>
<th>Muscular</th>
<th>Nerve</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Onset</strong></td>
<td>• New/Repetitive Activity</td>
<td>• Gradual</td>
<td>• Specific Activity</td>
<td>• Acute or Gradual</td>
</tr>
<tr>
<td><strong>Subjective</strong></td>
<td>• Worse with ↑’d activity</td>
<td>• Stiff, achy</td>
<td>• Worse with ↑’d movement</td>
<td>• Burning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Better with movement</td>
<td></td>
<td>• Weak</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Pain with weight bearing</td>
<td></td>
<td>• Altered Sensation</td>
</tr>
<tr>
<td><strong>Objective</strong></td>
<td>• Pain with stretch</td>
<td>• Pain and stiffness @ end of ROM</td>
<td>• Pain with stretch</td>
<td>• Weak</td>
</tr>
<tr>
<td></td>
<td>• Pain with resistance</td>
<td>• Pain with compression/gliding</td>
<td>• Locally TTP</td>
<td>• Altered Sensation</td>
</tr>
<tr>
<td></td>
<td>• Pain with palpation</td>
<td>• Pain with movement</td>
<td>• Pain with movement often position dependent</td>
<td>• Easy to provoke/sensitize with movement or positioning</td>
</tr>
<tr>
<td><strong>Treatment</strong></td>
<td>• Taping</td>
<td>• Joint mobilization</td>
<td>• P.R.I.C.E.</td>
<td>• Positioning that minimizes symptoms</td>
</tr>
<tr>
<td></td>
<td>• Transverse STM</td>
<td>• AROM</td>
<td>• STM</td>
<td>• Traction</td>
</tr>
<tr>
<td></td>
<td>• Eccentrics</td>
<td>• Stretching</td>
<td>• Gradual strengthening</td>
<td></td>
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</tbody>
</table>

**Primary Tissue in Lesion**
Secondary Causative Factors

- Functional Movement Imbalance
- Adaptive and Maladaptive Behaviors
- Regional Interdependence
  - Pain mechanisms
    - Central facilitation
    - Peripheral Sensitivity
- Micro-trauma
- Macro-trauma
Tertiary Factors

- Biopsychosocial Factors
  - Neuroendocrine
  - Nutrition
  - Hydration
- Global Conditioning
Regional Interdependence

Diagram showing the interdependence of various dysfunctions:
- Sacroiliac Dysfunction
- Lumbar Dysfunction
- Intrinsic Lower Extremity Pain
- Knee Dysfunction
- Hip Dysfunction
- Foot Ankle Dysfunction

The diagram illustrates how these dysfunctions can affect and be affected by each other, highlighting the regional interdependence in physiotherapy.
• Wainer\textsuperscript{1} defines regional interdependence as:

  “the concept that seemingly unrelated impairments in a remote anatomical region may contribute to, or be associated with, the patient’s primary complaint.”

• Sueki\textsuperscript{3} further refines regional interdependence as:

  “patient’s primary musculoskeletal symptom(s) may be directly or indirectly related or influenced by impairments from various body regions \textbf{and systems} regardless of proximity to the primary symptoms.”
Musculoskeletal manifestation may involve other physiologic systems:

- Neurophysiologic
- Somatovisceral
- Biopsychosocial

Is NOT referred pain although this type of pain may be present.

Refers to treating patients not based solely on symptom location.

Refers to impairments present in proximal and distal structures that cause, contribute to, worsen or prevent healing of the “primary” problem.

Simply put, it means treating “why’s” rather than “what’s.”
Hip Dysfunction

- Cibulka et al.\textsuperscript{4} found unilateral internal rotation AROM loss in patients with supposed SI dysfunction.

- LBP clinical prediction rule notes internal rotation AROM discrepancy as one predictor.\textsuperscript{5-6}

- Ellison et al.\textsuperscript{7} (1990) found LBP patients had hip lateral rotation ROM greater than medial rotation while healthy controls had equal or medial > lateral.

- Almeida et al.\textsuperscript{8} found judo athletes with history of LBP had significant reduction of active/passive internal hip rotation and total hip rotation of both limbs, as well as, greater asymmetry of hip rotation ROM between limbs than judo athletes without history of LBP.
Hip Dysfunction

- Bullock-Saxton et al.\textsuperscript{9} found delayed glute max activation in subjects who had severe ankle sprain ≥ 4 months prior.

- Kulig et al.\textsuperscript{10} found females with Posterior Tibial Tendon Dysfunction demonstrated less hip extensor and abductor torque values.

- Carvalhais et al.\textsuperscript{11} found passive and active latissimus dorsi tensioning produced lateral rotation of resting hip position. Active LD tensioning increased stiffness into internal rotation as well.
Muth et al\textsuperscript{12} examined effect of thoracic spinal manipulation in subjects with rotator cuff tendinopathy.

- Pre- and post-manipulation (mid-thoracic and cervico-thoracic) measurement of pain, force production, provocative testing. Penn Shoulder Score/DASH 5-7 days after.

- \uparrow middle trapezius activity.

- \downarrow pain with empty can, Neer, Hawkins-Kennedy.

- Penn/DASH, strength/pain with shoulder flexion improved.
Lucado\textsuperscript{13}

- Symptomatic tennis players had:
  - Weaker wrist extension strength
  - Weaker lower trapezius strength
  - Higher shoulder internal/external rotation strength ratio
  - Higher upper/lower trapezius strength ratio
- Thoracic Outlet Syndrome
  • Non-specific very responsive to conservative rehabilitation.\(^{14}\)

- Complex Regional Pain Syndrome (RSD)
  • Evidence of responsiveness to thoracic manipulation.\(^{15}\)

- Lateral Epicondylalgia (Epicondylitis)
  • Evidence of significant proximal strength deficits.\(^{16}\)
  • Evidence of responsiveness with cervical mobilization\(^{17,18}\)
  • Evidence of responsiveness with elbow jt mobilization\(^{19}\)

- Carpal Tunnel Syndrome
  • Evidence of relationship with CROM SB deficits, C5-6 PPT\(^{20}\)
Feigenbaum et al\textsuperscript{21} performed a case-control study to examine association between abnormal foot arch postures and a history of shoulder/elbow surgery in baseball pitchers.

- Convenience sample of Division I and professional baseball pitchers.

- Subjects with history of shoulder or elbow surgeries were 3.4x more likely to have abnormal foot posture.

**Most common:** Pes planus in the stance foot

- Poor stabilization and ↑ compensation

**Second most common:** Pes cavus in the lunge foot.

- Decreased shock absorption
A comprehensive evaluation and treatment scheme based on the interdependence model has yet to be determined.\(^1\)

Two models often suggested:

- **Model 1:** Screen regions immediately above and below the area of the primary symptom location.

- **Model 2:** Divide the body into four quarters and screen from the center out.
“The Three H’s”

- “Did you pick your parents well or poorly?” \(\rightarrow\) Heritage
- “What have you done in the past: good, bad, ugly?” \(\rightarrow\) History
- “How are you treating yourself now?” \(\rightarrow\) Habits

“Only one of these do we have any control over.”
• “Never Trust the Patient”
  
  — Alarm signals (aka pain, location of discomfort) are common, but most of these fail to indicate any true pathology or help direct treatment.1

  — Even if the tissue likely responsible for symptom production can be deduced, treatment rarely ever encompasses just interventions targeted at a singular structure.

  — Why? Nervous system very efficient at telling us something is wrong, but fairly poor at telling us what “it” is.22
“Muscle, Joint or Nerve or what???”

- The answer should be yes....
- What we commonly label as a joint and/or tissue dysfunctions often have global and/or systematic effects beyond local irritation.
  - Facilitation
  - Inhibition
  - Compensation
- What we should likely communicate is that “several parts are likely contributing to your symptoms and we will have to understand all of them” vs. simply stating an easy answer.
“Don’t Ignore the Patient”

- Concordant Sign: movement or position that reproduces patient’s familiar pain.²³,²⁴

- Discordant Sign: symptom that is produced during testing seemingly unrelated to usual symptoms.²³-²⁴
  - Should we really ignore these?
  - The “Onion”
    - “Layers” of problems that commonly occur in symptomatic individuals often along the kinematic chain which are thought to contribute to the current development.
    - Primary role
    - Secondary role
    - Tertiary role
  - At worst, you may have improved kinetic chain performance
  - Concordant sign may simply be compensating, failing to compensate for or a result of the Discordant sign.
“Build Your Database.”

- What I know
  - Evidence
  - Experience

- Personal skill level
  - What I know how to do
  - What I am physically capable of doing

- Patients’ needs
  - Who am I working with?
  - What are their personal characteristics?

- Clinical Predictors\(^{25}\)
  - Identification of patient characteristics commonly responsive to a specific intervention
  - History
  - Subjective reports
  - Objective testing
Evaluation:

- Upper/Lower quarter clearing (even in the absence of apparent radiculopathy) should be able to discern proximally driven muscular inhibition.
  - Quite common for 4/5 to 5-/5 myotomal weakness with no pain provocation.
  - Fatigues quickly with repeated testing.
  - Even with report of pain, consider looking “elsewhere” for interdependent dysfunctional structures that are contributing to the symptomology.
How to Implement RI?

**Lower Quarter findings**
- Lower extremity musculature weakness without provocation of reported symptomatic structures.
- Decreased hip AROM.
- Poor lumbopelvic stabilization
- Spinal, sacroiliac impairments.

<table>
<thead>
<tr>
<th>ROM limitations</th>
<th>Inhibition</th>
<th>Facilitation/TTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ipsilateral trunk ext quadrant</td>
<td>Hip flexion</td>
<td>Iliopsoas</td>
</tr>
<tr>
<td>Ipsilateral hip internal rotation</td>
<td>Hip ab-/adduction</td>
<td>Lat Dorsi</td>
</tr>
<tr>
<td>Ipsilateral hip flex</td>
<td>Hip external rotation</td>
<td>QL</td>
</tr>
<tr>
<td>Ipsilateral ankle (df, inv, ev)</td>
<td>Knee flexion</td>
<td>Adductor</td>
</tr>
<tr>
<td>First MTP ext</td>
<td>Ankle df, inv, ev</td>
<td>IT Band</td>
</tr>
<tr>
<td></td>
<td>EHL</td>
<td>Popliteus</td>
</tr>
<tr>
<td></td>
<td>Toe flexion</td>
<td>Tibialis Posterior</td>
</tr>
</tbody>
</table>
### Upper Quarter findings:
- Postural issues and inability to stabilize shoulder girdle.
- Scapular musculature weakness

### History of low back pain (often concurrent, but less severe at present)

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<tr>
<th>ROM limitations</th>
<th>Inhibition</th>
<th>Facilitation/TTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ipsilateral cervical ext quadrant</td>
<td>Shldr flex, int rot</td>
<td>Ipsilateral Lat Dorsi</td>
</tr>
<tr>
<td>Thoracic ext</td>
<td>Shldr hor abd</td>
<td>Ipsilateral Scalenes</td>
</tr>
<tr>
<td>Shldr flex</td>
<td>Shldr ext</td>
<td>Pec Major/Minor</td>
</tr>
<tr>
<td>Shldr Apley int rot</td>
<td>Elbow flex</td>
<td>Common wrist Extensor</td>
</tr>
<tr>
<td>Elbow ext</td>
<td>Elbow ext</td>
<td>Occasionally:</td>
</tr>
<tr>
<td>Forearm sup</td>
<td>Wrist ext</td>
<td>Bicep/Tricep</td>
</tr>
<tr>
<td>Wrist ext</td>
<td>Thumb ext</td>
<td>Ipsilateral Masseter, Medial Pterygoid</td>
</tr>
</tbody>
</table>
How to Implement RI?

Treatment pathway:

- Utilize manual therapy interventions on impairments proximal and distal to irritable knee structures.
- Work on dysfunctions thought to contribute to facilitation first and foremost. “Calm the area down”
- Avoid temptation to simply “rush at” most painful spot right away.
- Confirm and have patient acknowledge improvement in facilitation, ROM, inhibition and symptoms.
- Use test→treat→retest when appropriate to assess improvement in kinematic factors.
Manual Therapy Action

Therapeutic Benefit

↓ Nociception

↓ Hypertonus

↑ Recruitment

↑ Biomechanics

↑ Outlook
Lissek et al\textsuperscript{26}

- Few weeks of hand and arm immobilization by cast wearing significantly reduced hand use and impaired tactile acuity.
- Associated with \textit{reduced activation of the respective finger representations in the somatosensory cortex}, measured by functional MRI.
- Perceptual and cortical changes \textit{recovered in 2-3 weeks}.
- Compensatory effects of the contralateral, healthy hand:
  - Improved perceptual performance compared to healthy controls were found.
  - Tactile acuity improvements remained vs. the formerly immobilized side.
Simply put:

Most efficacious tool in the physical therapist’s toolkit to decrease pain, decrease inhibition, restore proper motor recruitment, increase focal/general mobility in order gain patient buy-in and, ultimately, success with active rehabilitation and education.
Tertiary Factors

**Biopsychosocial Factors**

- Neuroendocrine
- Nutrition
- Hydration
- Global Conditioning
Therapeutic Outcome

TREATMENT
- clear diagnosis, overt therapy, observational learning, patient-centered approach, global process of care, therapeutic touch

HEALTHCARE SETTING
- environment, architecture, interior design

PHYSIOTHERAPIST
- professional reputation, appearance, beliefs and behavior

PATIENT-PHYSIOTHERAPIST RELATIONSHIP
- verbal communication, non-verbal communication

PATIENT
- expectation, preferences, previous experience, musculoskeletal conditions, gender, age
Why do patients in pain come to see us?

• Is it because of the pain?

• Or is it fear of what the pain means in their life?

• Patients seek care because they are worried about their ability to ............

• Patients seek care because they are worried about .............
Do we make it a point to address the "real" reason they come in to see us?

What does this problem mean to you?

What is your understanding of your pain?

What can I clarify for you?
• Safani et al:\textsuperscript{28}

• Routine ENT visit

• 15/50 (30 \%) patients feared their pain was cancer

• 7/50 (15\%) feared it was still pain after the visit despite negative testing
• Are we adding to the problem?

• What do these words mean to the patient?
  – Degenerative Disc Disease
  – Spondylitic Changes
  – Nerve Impingement
  – Degenerative Changes
  – Arthritis
Jarvik et al: ²⁹

- Annular, tears, disk degeneration, and facet joint arthrosis did not predict LBP
- The strongest predictor of LBP is depression-not MRI findings
- Disk bulges were associated with a 2.5x lower risk for LBP

McCullough et al: ³⁰

- Prevalence of MRI findings in patient without LBP:
  - Disc degeneration 91%
  - Disc height loss 56%
  - Disc bulges 64%
  - Disc protrusion 32%
  - Annular tears 38%
Credible evidence of safety

- Reassurance
- Treatment is available
- Normal part of aging
- Your pain is real*
- Movement is good
- Good family support
- Many other people have this

Credible evidence of danger

- I can’t do life because of my pain
- You can end up in a wheelchair
- Your pain is not real
- It is unsafe to...
- Lack of understanding
- Progressive
- The rest of my life
- Younger partner
• Patients want to know...
  • What is wrong with me?
  • How long will it take?
  • What can I (the patient) do for it?
  • What can you (the clinician) do for it?
  • How much will it cost??
Harmful / Helpful Language

Negative language and beliefs
Undue focus on structure
Belief that pain = harm
Belief that activity is harmful

Positive language and beliefs
Simple language/metaphors
Reduce fear and catastrophizing
Promote hope and confidence
Belief that pain does not equal harm
Beliefs that activity is helpful
Self-Awareness

- What are your own biases?
- What are your own prejudices?
- What is your comfort level with “different” patients?
- How do you think you are perceived by your least favorite patient?
- What is your delivery style?
- What does your body language say when you are uncertain, confused, uncomfortable?
• **Step 1:** At IE, get that patient into a coachable mode by your demonstrating understanding of their condition and tying this to their impairments.

• **Step 2:** Resolve to decrease their stress and anxiety by their gaining understanding of the above and to assure them that they are helpable.

• **Step 3:** Follow that up with some tangible improvement in some (if not many) of their limitations/pains right off the bat. Lends credence to Steps 1 and 2.
Instructions: In the next set of items are sentences that describe different ways a person might think or feel about his or her counselor or therapist. We realize that your thoughts or feelings may undergo changes over a period of time, but we would like to know your views or feelings as of right now. Please use the following response scale:

1 strongly disagree  2 disagree  3 neutral  4 agree  5 strongly agree

1. My therapist and I understand each other.
2. We have established a good understanding of the kind of changes that would be good for me.
3. I feel that my therapist appreciates me.
4. I believe the time my therapist and I are spending together is not spent efficiently.
5. I believe my therapist likes me.
6. What I am doing in therapy gives me new ways of looking at my problem.
7. I feel my therapist cares about me even when I do things that he/she does not approve of.
8. My therapist does not understand what I am trying to accomplish in therapy.
9. I am confident in my therapist's ability to help me.
10. I feel that the things I do in therapy will help me to accomplish the changes that I want.
11. My therapist and I trust one another.
12. I disagree with my therapist about what I ought to get out of therapy.
13. I believe my therapist is genuinely concerned for my welfare.
14. We agree on what is important for me to work on.
15. My therapist and I respect each other.
16. The things that my therapist is asking me to do don't make sense.
Treatment pathway:

- Initiate low-level exercises with focus on improving recruitment/flexibility of proximal structures.
- Quickly progress: Focus on balance, perturbation and strengthening of whole lower extremity kinetic chain.
- Depending on patient need, these proprioception type exercises will build from low→very high level.
Further Education and Treatment Recommendations

Treatment Pathway:

- Educate patient in proper form during functional tasks
  - Running: mid-foot strike vs. heel-toe
  - Step up/down performance.
- Fear-avoidance = improper execution.

"Fear is the path to the dark side. Fear leads to anger. Anger leads to hate. Hate leads to suffering."
- Yoda

2. Cleland J. Evidence based evaluation and treatment of neck pain in the performing artist. Program of the American Physical Therapy Association Combined Sections Meeting; February 6-8, 2008; Nashville, TN.


