The Pain and Disability Drivers Management Model

a structured and pragmatic approach to managing low back pain

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Conflict of interest

• None to declare
Learning objectives

1) Understand the relevance of the five domains of the model and identify the different elements related to pain and disability associated with low back pain.

2) To analyze the clinical profile of the patient based on the relative contribution of elements of the different domains affecting pain and disability.

3) Develop a structured, evidence-based intervention plan that focuses on the key elements affecting pain and disability.
Learning objective: Understand the relevance of the Pain and Disability Drivers Management model, and identify the different elements related to pain and disability associated with low back pain.

Could the model serve as a structure to guide and enhance pain and disability management for LBP?

You are most likely aware that stratified care (ie: the use of classification systems) in management of LBP is highly recommended. Yet none of the CS we have meet all ICF criteria.
What is the *Pain and Disability Drivers Management Model*??
Why would we need a model to better manage pain?

Clinicians now have many tools helping to structure their approach:

• **Classification tools:**
  • multiple mono-disciplinary classification tools designed to target patient-specific treatments (ie: Treatment-based classification, Mckenzie classification system, Movement system impairment classification system, etc)

• **Systematic reviews/meta-analyses on LBP.**
  • Provide with level of evidence on the effectiveness of interventions

• **Guidelines:**
  • 15 international multidisciplinary guidelines for the treatment of LBP

• **Clinical pathways of care:**
  • Clinical pathways of care propose more comprehensive solutions to merge real life clinical care with best practice.
Yet... facts show that:

• LBP is still a major public health problem...(Hoy 2014).
• The self-reported levels of disability in individuals with LBP have not improved in the last decade (GBD 2015).
• Using specific treatment approaches, it has been shown that PT treatment provide small to moderate treatment effect and little cost-effectiveness (Apeldoorn 2012)
What could possibly explain this?

- We don’t use Practice Guidelines??
- Systematic reviews/meta-analyses:
  - Only provide evidence for discreet interventions.
- Classification systems (CS):
  - Dominant paradigm = biomechanical/nociceptive
  - Very limited integration of social factors… even comorbidities!

Could it be that the multiple drivers of pain, disability, and their interaction require a model that is comprehensive enough to identify and address each related issue?
So what would be an ideal model?

We need precise tailoring that goes beyond aspects like mechanical or sensori-motor control deficits.

Most CS mainly focus on nociceptive influences.
Do we need a new perspective?

• Recently, Rabey et al. (2016) stated that we need “a flexible, biopsychosocial classification system that may allow profiling across multiple relevant dimensions, to facilitate targeted care based on the dominant factors present in individual profiles”
Where to start to improve things?
Could a structure based on the ICF model help?
Our model proposes to establish the profile of patients based on the known drivers of pain & disability.

Each domain contains elements grounded on the known mechanisms driving the presence of painful symptoms and/or disability in LBP.
In an attempt to quantify the severity of each domain, each domain includes two categories:

(A) implicates more common and modifiable elements,

(B) involves elements that are more complex, less modifiable and that will prompt more aggressive or interdisciplinary care to more effectively address the problematic issue.
Domain 1: Nociceptive Pain Drivers
What is nociceptive pain?

"pain that arises from actual or threatened damage to non-neural tissue and is due to the activation of nociceptors"
In the context of Low back pain

• PAIN: a deficit in relation to the ICF, is mostly somatic or inflammatory, and can come from many potential body structures
Nociceptive versus neuropathic pain

<table>
<thead>
<tr>
<th>NOCICEPTIVE PAIN</th>
<th>NEUROPATHIC PAIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOMATIC</td>
<td>PERIPHERAL NS</td>
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<tr>
<td>INFLAMMATORY</td>
<td>CENTRAL NS</td>
</tr>
<tr>
<td>VISCERAL</td>
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</tbody>
</table>
Step 1: confirm the presence of nociceptive pain

The PainDetect questionnaire

Screening Result
Final score

nociceptive  unclear  neuropathic

1-12: nociceptive
13-18: unclear (or mixed)
19-38: most likely neuropathic
The two sub-domains

**NON-responders** to the current classification systems

- (A) implicates more common and modifiable elements,
- (B) involves elements that are more complex, less modifiable or that will prompt more aggressive/interdisciplinary care to more effectively address the problematic domain.
NOCICEPTIVE PAIN DRIVERS DOMAIN:

Are your patient’s symptoms driven by nociceptive drivers??

CS involves providing patients with treatments matching their clinical characteristics and needs.

Can you classify your patient into a subgroup using a classification system?

- Yes
  - Symptom modulation
  - Movement control
  - Mobility+pain

- No
  - Your patient presents with an [active inflammatory process]?
  - Your patient does not present with a specific mechanical pattern
  - Your patient presents with a specific structural deficit (i.e., spondylolisthesis, fracture, post-surgery,...)

These treatments approaches mainly target nociceptive drivers of pain.
And what about non-responders with nociceptive pain?

*NON-responders* to the current classification systems

*Responders* to the current classification systems
NOCICEPTIVE PAIN DRIVERS DOMAIN:

Are your patient’s symptoms driven by nociceptive drivers??

- Can you classify your patient into a subgroup using a classification system?
  - Yes
    - Symptom modulation
    - Movement control
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  - No
    - Your patient does not present with a specific mechanical pattern
    - Your patient presents with a specific structural deficit (ie. spondylolisthesis, fracture, post-surgery,...)
**NOCICEPTIVE PAIN DRIVERS:**

B) Non-responders to classification systems

- Non-Responders, ie: patients with
  - post-surgical condition
  - Highly deconditioned patients
  ...are likely to have somatic or inflammatory pain

...they are likely to respond to general (non-specific) exercises

Analgesia through Exercise induced hypoalgesia
Domain 2: Nervous System Dysfunctions drivers
Nervous system dysfunction drivers

• Deficits arising from the nervous system itself can also drive the painful symptoms

• Alterations of the nervous system may take place at the peripheral, spinal and even supra-spinal levels of the nervous system and can lead to hypersensitivity, thus driving painful symptoms
Nervous system dysfunction (NSD) drivers

- Signs of nervous system hypersensitivity
- Peripheral or central sources of NSD
A) What are evidence of peripheral or central sources of NSD?

Clinical signs and symptoms suggesting peripheral hypersensitivity

- Tingling/paresthesia or burning/shooting pain
- **Radicular** pain pattern
- radiculopathy

Ever heard of neuropathic pain?

Learn on the use of the DN4 questionnaire
B) Evidence of nervous system hypersensitivity

How to assess CS in clinical settings?

The Central sensitization Inventory

Palpation
Von Frey monofilament
Qualitative Sensory Testing

Allodynia
Widespread pain location

Verbal reports
Pain drawings

Verbal reports
Behaviors

Hyperalgesia or disproportionate pain intensity in relation to injury

How to assess CS in clinical settings?

The Central sensitization Inventory
Central Sensitization Inventory

Establishing Clinically Relevant Severity Levels for the Central Sensitization Inventory

Randy Neblett, MA, LPC, BCB§; Meredith M. Hartzell, PhD§; Tom G. Mayer, MD§; Howard Cohen, MD§; Robert J. Gatchel, PhD, ABPP§

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Pain Practice, Volume 17, Issue 2, 2017 166–175
Domain 3: Comorbidity factors
Comorbidities: driving pain and disability?

Besides their diagnosis of LBP, patients can also present with certain physical and mental health comorbidities.

- Studies have shown that **physical comorbidities** tend to **worsen the severity of symptoms** of LBP (Ramond-Roquin, 2015)
- Mental health comorbidities have also been found to be quite prevalent among patients with LBP (Katz 2015)
  - Depression and anxiety disorders =20-50%
  - Personality disorders are also common psychiatric comorbidities observed among these patients

These can certainly influence symptom severity and treatment delivery
Impact of co-morbidities on resource use and adherence to guidelines among commercially insured adults with new visits for back pain

Sean D. Rundell DPT, PhD1,2, Laura S. Gold PhD3,5, Ryan N. Hansen PharmD, PhD7,8, Brian W. Branchan PhD5,6

FIGURE 1  Adjusted associations between chronic conditions and higher long-term back-related resource use. Odds ratios (OR) and 95% confidence intervals (CIs)
Physical comorbidities

Mental health comorbidities

Disorders of the DSM, ie: depression, generalized anxiety, sleep disorders

Painful physical comorbidities
COMORBIDITY FACTORS
Screen, assess and address!!!

• Painful musculoskeletal comorbidities in LBP are common and worsen the severity of symptoms

  Pain management strategies for paroxysmal pain should be encompassed within your treatment plan, as their continuing presence might induce nervous system hypersensitivity.

• Mental health comorbidities:
  • Depression
  • Generalized anxiety disorders
  • Personality disorders
  • Patient reported sleep disorders...

• The treatment implications of chronic pain in the presence of this type of comorbidity are not clearly known, it should influence your goal setting and expectations of improvements, but most importantly, making sure that these patients receive proper medical attention.
Domain 4: Cognitive-emotional drivers
Cognitive-emotional drivers of pain

• As outlined by many studies, maladaptive cognitions and maladaptive behaviors are personal factors that:
  1) are clearly linked to enhanced pain perception,
  2) are predictors of long-term disability,
  3) can explain the transition from acute to chronic pain.
  4) can explain the persistence pain in chronic conditions.
Maladaptive Behaviors

Maladaptive Cognitions
Many maldaptive cognitive-emotional factors are known to influence pain perception and disability.

STEP 1: KNOW them!
Maladaptive behaviors

• Maladaptive behaviors, can be manifested in various ways:
  • “communicative” pain behaviors:
    • facial expressions (e.g., grimacing or wincing)
    • verbal/paraverbal pain expressions (e.g., pain words, grunts, sighs, and moans).
  • “protective” or “safety” behaviors:
    • bending/rubbing the back after performing an activity,
    • even completely avoiding to perform a task

When a patient shows maladaptive behaviors, you absolutely need to engage your patient in a behavior change. PTs are fully capable to adapt their approach to induce behavior change with their patients!
STEP 2: use a SCREENING tool to identify if you’ll need to focus your approach on addressing these factors – learn more

Start back screening tool

https://www.keele.ac.uk/sbst/matchedtreatments/

“Usual care”
(education, address concerns + self-management)

“Physio +”
(low-risk + active/functional PT + referral if needed)

Combined cognitive-behavioral + physical approach
(interdisciplinary rehab)
Specific “psychogenic” drivers and their assessment tools

STEP 3: for patients at risk, you might also want to assess specific potential factor with the proper ASSESSMENT TOOL

Psychological drivers

- Poor pain coping
- Negative expectations
- High illness perception
- Poor self-efficacy
- Negative mood
- Anxiety (pain related)
- Pain-related fears
- Fear of movement
- Pain catastrophizing

MALADAPTIVE COGNITIVE STRATEGIES

CONCEPTS OF FEAR-AVOIDANCE BELIEFS (Fear-avoidance components scale)
STEP 3: for patients at risk, you might also want (or need!) to assess specific potential factor in order to establish your patient’s profile...
Domain 5: Contextual drivers
Contextual drivers

• The social component of the biopsychosocial model is the *frailest* component of all current CS for LBP and is barely mentioned in practice guidelines, as both are mainly oriented towards drivers of pain.

• Yet, it is one that has a significant influence on outcomes (O’Sullivan 2016)…
Social context

Occupational context
A) OCCUPATIONAL CONTEXT  
(modifiable)
- Low RTW expectations
- Low Job satisfaction
- Perception of heavy work
- High job stress
- Job flexibility (low...as in non-modifiable work or hours)

B) SOCIAL CONTEXT  
(harder to modify)
- Poor attitudes of:
  - employer,
  - family
  - health care professionals
- Low access or non-access to care
- Communication barriers

We need to take these factors into consideration...  
Besides a comprehensive interview, how can you assess these factors?
How to screen if you’ll need to address these?

Source of information

My recommendation:
The Work Assessment Triage Tool

- the WATT captures 18 variables related to injury duration, job, working status and availability of modified work
- According to the responses, it suggests best rehabilitation options
- Although at early stages of validation, it appeared more likely than clinicians to recommend treatments supported by evidence.

Gross and collaborators found interesting tools...
Can it help to target the problematic domains influencing pain and disability??

Could it facilitate the integration of a comprehensive rehabilitation program for patients with pain and disability.
Interactive workshop:

Analyze the clinical profile of case studies based on the relative contribution of elements of the different domains of the PDDM.

Leader: Geneviève Beaudoin
The role Physical Rehabilitation Therapists and Physiotherapy Assistants in this approach

• The importance of Therapeutic Alliance
  • Empathy, active listening

• The importance your Attitude:
  • Between therapists: PTA/TRP versus PT  TRP/PTA with PT
  • Between therapist and patient:
    • NO confrontation - Partnership... vs police
The role *Physical Rehabilitation Therapists* and *Physiotherapy Assistants* in this approach

• The importance of *team work*
  • for patients and professionals!

• The importance of your *observations*
Explanations regarding the rating scale

- [https://www.dropbox.com/s/0g1mxq3wvz5xybj/Pain%20and%20Disability%20Driver%20Rating%20scale%20Beta%20version6%29.docx?dl=0](https://www.dropbox.com/s/0g1mxq3wvz5xybj/Pain%20and%20Disability%20Driver%20Rating%20scale%20Beta%20version6%29.docx?dl=0)

- Underlying principle:
  - The score of one domain does not mean its
  - For each domain, higher score = « therapist will have to work harder to achieve good outcomes...maybe suggestive of multi or interdisciplinary approach »
Using the tool (scale), please try to establish the profile (rate each domain) for each case
Details for PollEverywhere

• On your smartphone:
  • text “yannicktousi232” at number 37607
  • Open browser: pollev.com/yannicktousi232

• On your laptop or tablet
  • Open your internet browser (Safari/Chrome) at this address: pollev.com/yannicktousi232
**Practical integration of the model into practice CASE #1**

- John Smith: **42 yo mechanics**
  - Pain in low back + L leg, nociceptive, mild (2-6/10), disturbs his sleep
  - Centralization of symptoms with repeated lumbar extension ex’s
  - Radiculopathy ??
    - ↓ endurance in both legs (due to pain??)
    - Marked weakness L dorsiflexors
  - 5’8” 245lbs (high BMI)
  - Had a MRI: “it says on the reports that there’s a big disk bulging at L4-5”
  - He reports that his mood is good 😎
  - He does not see the day when he’ll be ready to return to work, although his employer is willing to accommodate him
  - Start Back questionnaire – see next slide
**The Keele STarT Back Screening Tool**

Patient name: ___________ John Smith ___________    Date: ___________ November 1st 2018 ___________

Thinking about the **last 2 weeks** tick your response to the following questions:

<table>
<thead>
<tr>
<th></th>
<th>Disagree</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>My back pain has <strong>spread down my leg(s)</strong> at some time in the last 2 weeks</td>
<td>[ ] [ ]</td>
</tr>
<tr>
<td>2</td>
<td>I have had pain in the <strong>shoulder or neck</strong> at some time in the last 2 weeks</td>
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</tr>
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<td>3</td>
<td>I have only <strong>walked short distances</strong> because of my back pain</td>
<td>[ ] [ ]</td>
</tr>
<tr>
<td>4</td>
<td>In the last 2 weeks, I have <strong>dressed more slowly</strong> than usual because of back pain</td>
<td>[ ] [ ]</td>
</tr>
<tr>
<td>5</td>
<td>It’s not really safe for a person with a condition like mine to be physically active</td>
<td>[ ] [ ]</td>
</tr>
<tr>
<td>6</td>
<td>Worrying thoughts have been going through my mind a lot of the time</td>
<td>[ ] [ ]</td>
</tr>
<tr>
<td>7</td>
<td>I feel that my back pain is terrible and it’s never going to get any better</td>
<td>[ ] [ ]</td>
</tr>
<tr>
<td>8</td>
<td>In general I have <strong>not enjoyed</strong> all the things I used to enjoy</td>
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9. Overall, how **bothersome** has your back pain been in the **last 2 weeks**?

<table>
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<tr>
<th></th>
<th>Not at all</th>
<th>Slightly</th>
<th>Moderately</th>
<th>Very much</th>
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<tr>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
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Total score (all 9): ___________   Sub Score (Q5-9): ___________
Focus treatment on the most important drivers of pain, not only the painful symptoms
<table>
<thead>
<tr>
<th>Treatment Approach</th>
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<tr>
<td>Self-management strategies</td>
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<tr>
<td>Reassurance/Education</td>
</tr>
<tr>
<td>McKenzie (direction specific exercises)</td>
</tr>
<tr>
<td>Graded activity</td>
</tr>
</tbody>
</table>
The main idea here...

Reduce the taught that pain is a threat

Increase the CONTROL that patient has on his pain

Graded activity
Reassurance/Education

Specific exercises (directional preference)
Self-management strategies

Less fear...

Better control...

SYNERGY 1+1 > 2
Practical integration of the model into practice  CASE #2

Steve Goldfinger: 49-year-old welder
  • Currently at work but on modified (light) duty
  • pain located in the low back and posterior aspect of both thigh (lancinating); worst with walking - has stopped all physical activities outside of work
  • Also pain in his upper back and neck along with sleep disturbances,
  • Pain intensity between 2-6/10; painDetect = 15 (mixed)
  • CSI questionnaire = 42/100 (moderate)
  • No directional preference
  • Segmental hypomobility upon manual testing …but full ROM and no change in his symptoms.
  • concomitant “severe” bilateral knee OA pain
  • Shows pain behaviors in the clinic (grimaces, guarding)
  • Has poor expectations regarding recovery; awaiting MRI results: feels anxious about that... Thinks its never going to go away... And worst than ever
The Keele STarT Back Screening Tool

Patient name: Steve Goldfinger Date: November 1st 2018

Thinking about the last 2 weeks tick your response to the following questions:

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</table>

Total score (all 9): 7 Sub Score (Q5.9): 4
Focus treatment on the most important drivers of pain, not only the low back pain

Steve Goldfiner
Does it make sense?

What would you do with this patient?
<table>
<thead>
<tr>
<th>Treatment Approaches</th>
<th>Rank Order</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic aerobic exercises (...exercise-induced analgesia)</td>
<td>1</td>
</tr>
<tr>
<td>Manual therapy (segmental hypomobility)</td>
<td>2</td>
</tr>
<tr>
<td>Initiate Pain neuroscience education (high CSI... better start now!)</td>
<td>3</td>
</tr>
<tr>
<td>Back specific exercises (core stabilization) + walking program (it’s a given)</td>
<td>4</td>
</tr>
<tr>
<td>Pacing/gradual exposure (he going to have to get moving ...better do it slow)</td>
<td>5</td>
</tr>
<tr>
<td>Provide tips to implement relaxation techniques into his daily routine (stressed about MRI results)</td>
<td>6</td>
</tr>
<tr>
<td>Nothing until MRI results are negative (better be safe than sorry)</td>
<td>7</td>
</tr>
</tbody>
</table>
Which questionnaire might help you identify which cognitive-affective components that are problematic?

<p>| | |</p>
<table>
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</tr>
</thead>
<tbody>
<tr>
<td>BECK (depression)</td>
<td>A</td>
</tr>
<tr>
<td>HADS (anxiety and depression scale)</td>
<td>B</td>
</tr>
<tr>
<td>TSK (kinesiophobia)</td>
<td>C</td>
</tr>
<tr>
<td>FABQ (beliefs)</td>
<td>D</td>
</tr>
<tr>
<td>Revised Illness Perception Questionnaire adapted for Work Disability (IPQR – WD)</td>
<td>E</td>
</tr>
</tbody>
</table>
• http://qrit.recherche.usherbrooke.ca/en/home
Conclusion

What are the advantages of this integrative model and implications for rehabilitation?

• Inspired on the ICF framework, adopted by the PT profession more than 15 years ago
• It is mechanistically driven and reflects the multiple domains driving pain and disability
• It has the potential to allow the therapist to appreciate the relative contribution of each domain driving pain and disability, while providing clinicians with specific targets on which to focus their treatment approach
Conclusion

Rehabilitation management of low back pain – it’s time to pull it all together!

https://doi.org/10.2147/JPR.S146485
Thank you for your attention...

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