Relevant Rehab: Chronic Low Back Pain
A Multimodal Approach of Active Care

Donald C. DeFabio, DC, DACBSP, DACRB, DABCO

Relevant Rehab Seminars
908-771-0220
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Disclosures

- Speaker, Nexol Pharmaceuticals
- Speaker, NCMIC
- Speaker, Performance Health Academy
- Instructor Performance Health Rehab Certificate Course
- Speaker, Relevant Rehab courses

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Credentials

- NYCC Graduate: private practice since 1985
- Board Certified Chiropractic Orthopedics, Rehab & Sports
  - Plus: ART, Graston, MUA, SFMA, CES, PES, FM
- Former Team Chiropractic Doctor for Drew University & RU Track and Field
- Classifier IWAS 1996 -2017
- Relevant Rehab Seminars: The DeFabio Difference
- Chief of Chiropractic Services
  - DeFabio Spine & Sports Rehab, LLC
- 32K subscribers on You Tube
Objectives

- Review the global impact of chronic low back pain
- Understand the current neurology of pain perception
- Recognize the "yellow flag" patient and options for treatment
- Introduce a pain classification system based on YFRF
- Learn active care progressions for stability and mobility for the CLBP patient
- Learn walking & balance protocols to manage CLBP
- Introduce nutraceuticals & lifestyle as pain management options
Chronic Pain

- 126.1 million adults in the USA had some pain over the last 3 months
- 25.3 million adults are suffering from chronic pain


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Chronic musculoskeletal pain is the underlying diagnosis for 70% to 80% of chronic pain suffers.

MSK disorders cause over 1/3 of years lived with disability:
  - The leading causes of disability worldwide

Most common types of chronic MSK pain:
  - Low back
  - Neck
  - Hip
  - Knee osteoarthritis
  - Fibromyalgia

Because *no individual therapy has consistent benefit*, a multimodal treatment approach to chronic musculoskeletal pain is recommended.

Multidisciplinary rehabilitation may be effective for short- and at least intermediate-term improvement in pain and function for chronic low back pain and fibromyalgia.

Patients should be encouraged to engage in a variety of therapies aligned with their preferences and motivation.

Many clinicians were trained years ago, when little was known about pain. The rapid expansion of knowledge about pain mechanisms challenges health care practitioners to keep their knowledge base current. Myths, misconceptions, and the resulting fears often bridge gaps in this knowledge. Lack of knowledge limits treatment choices and may hinder desired patient outcomes by allowing pain hypersensitivity and progressive dysfunction to develop.
Where’s the Money?

- Arthritis: $140 billion in 2013
- $635 billion on pain management
- $88 billion on neck and back pain alone
- $14.9 billion for CAM chronic pain
Factors related to Pain

- Lower socioeconomic class
- Children to adults
  - Depends on coping mechanism
- Aging and functional loss
- Women more at risk due to hormonal changes
- Smoking, depression, insomnia
Acute vs. Chronic Pain

- Nociceptive input
- Tissue damage
- Acute inflammatory cascade

- Nociceptive input?
- Perceived as “Danger/Warning”
- Systemic inflammation
- HPA axis dysregulation
- Learning behaviors
  - Emotional amplification
  - Beliefs/thoughts
Chronic Pain

- Pain severity ➞ degree of tissue damage
- Pain location ➞ Site of tissue damage
- Feeling pain ➞ Nociceptive neurons firing
- Feeling pain a *Danger-Warning system*
- A Brain – Down effect

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Opioids & Chronic Pain

2/3 of all overdose deaths

Tripled from 1999 to 2016

88% increase annually since 2011

2016: Drug Overdose was the leading cause of death in adults under age 50

Although prescription opioid sales have increased 4X, American pain levels are the

76% of overdose deaths worldwide are a result of Pharmaceutically Produced Opioids

80% of heroin addicts reported that they began by using oxycodone and hydrocodone.


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“Patients dealing with chronic back pain or osteoarthritic pain in the hip and knee did not experience better pain-related function than those taking non-opioid medications which are far safer.”

JAMA Study: Opioids No Better Than Nonopioids in Improving Pain-Related Function, Intensity for Chronic Back Pain, Hip/Knee OA. APTA, 7 Mar. 2018,
“Physicians and patients should treat acute or subacute low back pain with non-drug therapies such as superficial heat, massage, acupuncture, or spinal manipulation.”

Annals of Internal Medicine February 14, 2017
Chronic Pain & Chiropractic

- Opioids are not an option
- Patient needs to participate in the long-term management
- A multimodal approach is the best.
  - Diet, rest, exercise, mental/spiritual, modalities, CMT
- *We have the tools to treat this demographic*

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Pain Perception Models

- Neuromatrix Model
- The CNS produces pain, not tissue damage
- Various parts of the central nervous system work together to produce pain
  - Sensory, emotional, cognitive, motor, behavioral, and conscious components

- Cartesian Model
- Equates nociception with pain
- CNS simply receives pain signals from the peripheral nervous system / site of tissue damage

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The Matrix

- Limbic and insular systems
  - emotional aspects of pain and its intensity
- Prefrontal cortex
  - how one makes sense of pain
- Somatosensory cortex
  - “Virtual body”
Neuromatrix 101

- Pain is an output from multiple systems and is individual specific
- No single pain center - wide variability exists within individuals in which cortical areas are activated to perceive pain
- Activated when the brain perceives tissue is in danger and that action is required
- Pain is experienced in the “virtual body”
All Better

- The condition was taken seriously
- A reassuring diagnosis
- Confidence in full recovery
- Transition from “alarmed” to “safety”
- Redirection

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Pain and Neuromatrix Model

- Brain determines degree of threat & pain function: recognize / block
- Pain: protection against threat of danger
- Perception of threat is the key
- Chronic pain: an unhealthy brain habit
Neuroplasticity Model

- Capacity of the nervous system to undergo functional and structural changes modulated by activity and reinforcement
- Capacity to create new links between previously unlinked concepts
- Extraordinary capacity of the nervous system to continue changing

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Bio-Neuroplasticity Model

- Compromised spinal movement patterns
- Compromised awareness & adaptability
- Compromised neurophysiology

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62 patients w/ CLBP & leg pain randomly received neuroplasticity or mechanical model explanation for pain

Treated w/ manual therapy technique to their lumbar spine, followed by OATS, ROM

– Oswestry, Fear-Avoidance-Beliefs Questionnaire, forward flexion & SLR

Results: **neuroplasticity explanation resulted in a measurable difference in SLR in patients with CLBP when receiving manual therapy.** No differences in LBP, leg pain, and forward flexion were significant.
CMT Directly Affects the Pre-frontal Cortex

Pain processing
The mechanisms behind pain relief following SMT in low level pain patients are likely due to improved SMI and appropriate motor control, as this is the key function of the prefrontal cortex.

Pain, Threat & Fear Avoidance

Manipulation and mobilization for treating chronic low back pain: a systematic review and meta-analysis. Spine, May 2018 Coulter ID

- Moderate-quality evidence that manipulation and mobilization are likely to reduce pain and improve function for patients with CLBP
- Manipulation appears to produce a larger effect than mobilization
- Both therapies appear safe
- Multimodal programs may be a promising option

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4 Pillars of Chiropractic Rehab

- Healthy lifestyle
- Healthy eating
- Positive emotions
- Regime
- Recreation
- Fitness
- Clear water

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Assessment

- History
- Acute vs. Chronic
- Ortho
  - Mechanical
  - Disc: Nerve tension/compression
  - SI and Hip
Mobility vs. Stability

- Restore mobility first
- Normal: Passive motion $\geq$ Active motion
- Beighton Score
Assessment

- Neurological
  - Nerve compression
  - Central vs. peripheral

- DTR’s

- Motor
  - Muscle length/ tension relationships and motor control

- Sensation

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Lumbar Pathomechanics

- Segmental and coupled motion
- Standing flexion
- Movement patterns
  - Overhead Squat
  - Hip abduction
  - Hip extension
  - Dynamic Trendelenberg
  - Active SLR
  - Gait
SI Dysfunction

- Gaenslens Test
- Compression
- Distraction Test
- Thigh Thrust
- Midline Thrust
- Three or more positive tests indicate SIJ

Evidence-based diagnosis and treatment of the painful sacroiliac joint, Laslett M, J Man Manip Ther, 2008;16(3):142-52.
Hip Dysfunction

- Groin pain 7X more likely to be hip or hip-spine than spine alone
- Buttock pain (71%) most common location for referred hip pathology followed by combined thigh and groin (55%)
- 47% hip OA report pain below knee
- Hip exam –internal rot and flexion, limping gait, night pain, Trendleberg gait
- Thomas test- hip contractures

Lumbar Stenosis & Neurogenic Claudication

- Age: >60
- Bilateral buttock or leg pain
- No pain when seated
- Worse standing/walking
- Improves with flexion
- Positive Romberg
- Wide stance gait
- Urinary disturbances common
Spondylolisthesis

- Pain w/ Extension
- Stork Test
- Age?
- Degenerative
- vs. Spondylosis
- vs. Apophysitis
Hip Joint

- Assess Gait, LLI
- ROM
  - Active: Passive: Joint Play
- Piriformis Tests
  - Prone (Freiberg)
  - Seated w/ resistance (Pace)
Greater Trochanteric Pain Syndrome

- 10-25% of population-higher in elderly, second leading cause of adult hip pain
- Risk factors – Older, female, ITB pain, obesity and LBP
- Deep palpation- jump sign
- Active and resisted abduction of hip
- Passive FABERE
- Trendelenberg sign- Standing one leg
- Lying on affected side- night pain

Sciatica vs. Hamstring vs. Hip

- SLR > 70°
- Piriformis
- SIJ
- Hip OA/ Dysfunction?
- Resisted hamstring strength?
Be Alert

- Peripheral Vascular Disease: 26% of Neurogenic Claudication PTS
- Cauda Equina: .04% LBP
- Metastasis
- Fractures
- Long tract signs
- Infection
- Spondylo-arthritis
Hip & Pelvis: Movement Patterns

- **Hip Extension**
  - 10° Isolated hip extension
  - Glut max fires early and completely
  - Pelvis remains level
  - LS remains neutral

- **Hip Abduction**
  - Glut Medius fires
  - Hips stay “stacked”
  - No hip flexion or LE external rotation

- **Hip Hinge**
Movement Pattern Treatment

Mobility or Stability issue?

- Mobility
  - Joint/soft tissue

- Stability
  - Core
  - Isolated Weakness
Hip Hinge

- Ball Squats
- Kneeling Hip Hinge
- Sit to Stand

Contingent on foot and ankle mechanics
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# Imaging

Systematic Literature Review of Imaging Features of Spinal Degeneration in Asymptomatic Populations

<table>
<thead>
<tr>
<th>Imaging findings for 3,110 asymptomatic individuals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Disk degeneration:</strong></td>
</tr>
<tr>
<td>- 37% of 20-year-old individuals.</td>
</tr>
<tr>
<td>- 96% of 80-year-old individuals.</td>
</tr>
<tr>
<td><strong>Disk bulge:</strong></td>
</tr>
<tr>
<td>- 30% of those 20 years of age.</td>
</tr>
<tr>
<td>- 84% of those 80 years of age.</td>
</tr>
<tr>
<td><strong>Disk protrusion:</strong></td>
</tr>
<tr>
<td>- 29% of those 20 years of age.</td>
</tr>
<tr>
<td>- 43% of those 80 years of age.</td>
</tr>
<tr>
<td><strong>Annular fissure:</strong></td>
</tr>
<tr>
<td>- 19% of those 20 years of age.</td>
</tr>
<tr>
<td>- 29% of those 80 years of age.</td>
</tr>
</tbody>
</table>

Imaging

Rationale?

The pathoanatomic model: poorly supported in the literature

Neuromatrix Model

– A multisystem output, activated by specific pain neuromatrix

– Activated when the brain concludes it is in danger and action is required

Butler D, Moseley, L Explain Pain, 2003

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Functional Assessment

- Gait
  - Dynamic posture
- Squat assessment
  - Hip Hinge
  - FTSST
- Single Leg Stance
- Breathing
- Trunk Muscle Endurance Ratios
  - Flexor : Extensors 1:1.3
  - Lateral Flexors 1:1

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Chronic low back pain and postural rehabilitation exercise: a literature review, Paolucci T, J Pain Res 2018 Dec

- 14 articles
  - Pilates, McKenzie, Feldenkrais, Global Postural Rehabilitation, PNF

- Examined for changes in pain/disability, QoL, psychological aspects and physical function (muscle strength, mobility, muscular activity and flexibility)

- All the techniques are effective with respect to the control groups....and maintaining benefits at follow-up
The effect of lumbar stabilization and walking exercises on chronic low back pain: A randomized controlled trial
SuhJE, 2019 Jun

- Compared the efficiency between individualized graded lumbar stabilization exercise (IGLSE) and walking exercise (WE)
- Randomized 4 groups: flexibility exercise, WE, stabilization exercise (SE), and stabilization with WE (SWE) groups. Duration 6 wks
- LBP during physical activity was significantly decreased in all 4 groups.
- Exercise frequency was significantly increased in the SE and WE groups;
- Exercise time was significantly increased in the SE group
- The endurance of supine, side lying, and prone posture were significantly improved in the WE and SWE groups.
- Lumbar SE and WE can be recommended for patients with chronic LBP: they relieve back pain & improve muscle endurance
Let’s Walk!

- Posture
- Equal Stride length
  - Arm Swing from shoulders
- 5-10° forward lean
- Stride width: 3-4”

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Treating Chronic Low Back Pain: Let’s Walk About It

Chronic low back pain (CLBP) is a leading cause of disability worldwide. With the current opioid crisis, chiropractic is in an excellent position to be the provider of choice by offering a multimodal approach that centers around the chiropractic adjustment, with exercise, soft-tissue work, lifestyle modification and nutrition rounding out our management toolbox.

Special Considerations for Chronic LBP Patients
Chronic low back pain is simply low back pain that has persisted for more than three months. The CLBP patient presents with special concerns that need to be considered.

Each CLBP patient needs individualized activity recommendations. For example, stenosis patients prefer flexion activities, whereas discogenic conditions may prefer...
Let’s Walk!

- Breathe
- Over 3 mi/hr
- Backwards?

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Hip Hinge & Squat Mechanics

- Overhead
- Deep
- Single Leg

*Sit to Stand*

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Squat: Upper Domain

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### Assessment Tools: The Overhead Squat

**Donald DeFabio, DC, DACBSP, DABCO**

**EDITOR’S NOTE:** Previous articles in this four-article series appeared in the January, March and August 2019 issues.

This is the fourth and final article in this series on squat mechanics, designed to give the DC a comprehensive understanding of the squat as a foundational exercise, its use as a functional assessment tool, and common deficits and corrective interventions that can be used in everyday practice.

The overhead squat positions are for the patient to squat to chair height or up to parallel (not below, as this is not a deep squat) in the following sequence:

<table>
<thead>
<tr>
<th>Deficit</th>
<th>Probable Right Muscle &amp; Joint Restrictions (OMT Needed)</th>
<th>Probable Muscle Viscera</th>
<th>Suggested Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frontal Plane Relative Shift</td>
<td>Adductors, TFL</td>
<td>Lateral flexion; Sacroiliac joints</td>
<td>Hip flexion, abduction, external rotation</td>
</tr>
<tr>
<td>Opposite Side of Shift</td>
<td>Piriformis, Gluteus medius, Biceps femoris</td>
<td>Hip flexion, abduction, external rotation</td>
<td></td>
</tr>
<tr>
<td>Hip Drop in 1/2 Squat</td>
<td>Opposite Side of Drop: Quadratus lumborum</td>
<td>Hip flexion, abduction, external rotation</td>
<td></td>
</tr>
<tr>
<td>Opposite Side of Drop: Gluteus medius</td>
<td>Hip flexion, abduction, external rotation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hip Hinge in 1/2 squat</td>
<td>Side of Drop: Quadratus lumborum</td>
<td>Hip flexion, abduction, external rotation</td>
<td></td>
</tr>
<tr>
<td>Opposite Side of Drop: Gluteus medius</td>
<td>Hip flexion, abduction, external rotation</td>
<td></td>
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</tbody>
</table>

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Squat: Lower Domain
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Flexibility

- Knee to chest
  - Single & Double
- Hamstring
- Star
- Cobra
- Cat/ Camel

- 30-60 second hold
- Breathe
- 3-5 reps
- 2 -8X/day
- Avoid peripheralization of pain

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Flexibility
Monitoring Chronic Pain

OATS

- Oswestry
- Roland Morris
- Yellow Flag Risk Form
- Waddell’s Non – Organic Signs
- Hendler 10 Minute Screen - online
- Activity Questionnaires

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Pain Mechanism Classification System: O’Connor

Pain Mechanisms
18,808 patients
First Visit

PNS – 60%
- Nociceptive
- Inflammatory
- Ischemia

CNS – 40%
- Central Sensitization
- Affective
- Motor / Autonomic

✓ Yellow Flag Risk Form – Low < 50
✓ Mechanical / Functional Subgroup
✓ Wheelchair Seating & Positioning
✓ Progression of Forces
✓ Remodel for Function

✓ Yellow Flag Risk Form – Mod-High > 51
✓ Readiness Assessment
✓ Refer to Psychology – PHQ / PASS
✓ Pain Mechanism Education
✓ Traffic Light to Movement Safe Pain
✓ Gradual Exposure: Fear or Pleasure
✓ Sensorimotor Exercise
Pain: It is in Your Brain

- More than just mechanical
- Pain Journal is a must
  - Self awareness is the first step to recovery
- When / Why
- Where / Who
- Now do you feel?

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3-Dimensional Pain Journal:

**Instructions:** Identify your worst/intolerable number on the pain scale. Use that level of pain for your journal entries. For example, if your worst pain is a 7/10, anytime your pain is at a 7 you would want to record a journal entry. Each time you make a journal entry, record the mechanical, social and emotional dimensions related to your pain. In addition to journaling your worst/intolerable pain at the moment, it is also helpful to record the three dimensions three hours prior. For example, if your intolerable/worst pain is at 12 noon, then you will also journal the three dimensions three hours prior (9 am – 12 noon). The three dimensions of the journal are mechanical, social, and emotional.

1. **Mechanically**—What are you doing?
   Example: Sitting, standing, walking, doing stairs, etc

2. **Socially**—Where are you? Who are you with?
   Example: At grocery store with my sister

3. **Emotionally**—How are you feeling?
   Example: Excited, Tender, Scared, Angry, Use the following descriptions below
1. **Mechanically**—What are you doing?  
   Example: Sitting, standing, walking, doing stairs, etc

2. **Socially**—Where are you? Who are you with?  
   Example: At grocery store with my sister

3. **Emotionally**—How are you feeling?  
   Example: Excited, Tender, Scared, Angry, Use the following descriptions below

<table>
<thead>
<tr>
<th>HAPPY</th>
<th>EXCITED</th>
<th>TENDER</th>
<th>SCARED</th>
<th>ANGRY</th>
<th>SAD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delighted</td>
<td>Aroused</td>
<td>Affectionate</td>
<td>Worried</td>
<td>Uptight</td>
<td>Discouraged</td>
</tr>
<tr>
<td>Elated</td>
<td>Nervous</td>
<td>Loving</td>
<td>Nervous</td>
<td>Hot-tempered</td>
<td>Depressed</td>
</tr>
<tr>
<td>Jolly</td>
<td>Thrilled</td>
<td>Compassionate</td>
<td>Frightened</td>
<td>Bitter</td>
<td>Dissatisfied</td>
</tr>
<tr>
<td>Complete</td>
<td>Spirited</td>
<td>Warmhearted</td>
<td>Apprehensive</td>
<td>Infuriated</td>
<td>Down</td>
</tr>
<tr>
<td>Satisfied</td>
<td>Chipper</td>
<td>Kind</td>
<td>Horrified</td>
<td>Mad</td>
<td>Heartbroken</td>
</tr>
<tr>
<td>Optimistic</td>
<td>Enthusiastic</td>
<td>Sensitive</td>
<td>Anxious</td>
<td>Irritated</td>
<td>Dejected</td>
</tr>
<tr>
<td>Pleased</td>
<td>Frenzied</td>
<td>Congenial</td>
<td>Jittery</td>
<td>Outraged</td>
<td>Troubled</td>
</tr>
<tr>
<td>Upbeat</td>
<td>Antsy</td>
<td>Sympathetic</td>
<td>Intimidated</td>
<td>Resentful</td>
<td>Blue</td>
</tr>
</tbody>
</table>
Yellow Flag Risk Form

Name:______________________________  Primary Complaint:______________________________

1. Please indicate your usual level of pain during the past week.
   No Pain
   | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

   Worst pain possible
   | 10| VAS/Threat scale |

   2. Does pain, numbness, tingling, or weakness, extend into your leg (from back) &/or arm (from neck)?
   None of the time
   | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

   All of the time
   | 10| Nerve Pain |

   3. How would you rate your general health?
   Poor
   | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

   Excellent
   | 10| Confidence/Mortality |

   4. If you had to spend the rest of your life with your condition as it is right now. How would you feel about it?
   Delighted
   | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

   Terrible
   | 10| Confidence/Mortality |

   5. How anxious (eg. tense, uptight, irritable, fearful, difficulty in concentrating / relaxing) have you been feeling during the past week?
   Not at all
   | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

   Extremely anxious
   | 10| Emotional/Anxiety |

   6. How much have you been able to control (ie. Reduce / help) your pain / complaint on your own during the past week?
   I can reduce it
   | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

   I can’t reduce it at all
   | 10| Confidence/Self Efficacy |
Scoring

- Total: 130
- Low Risk = < 50
- Moderate Risk = 51-64
- High Risk = > 65
- Measures, pain, sleep, neuropathic pain, depression, anxiety, fear avoidance, confidence

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YFRF High Question Patterns: O’Connor

High questions: 1, 2, 9, 10, 11, 12, 13
- Central Sensitivity
- Thalamus, Amygdala, Hippocampus

High questions: 3, 4, 5, 6, 7, 8, 10
- Affective Pain Mechanism
- Insular cortex, Prefrontal cortex, Anterior cingulate, Lateral orbital frontal cortex

High questions: 1, 2, 6, 10, 12
- Peripheral Neurogenic Nociception Nerve Pain

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Case Study

- MVA 7/2019, post concussion syndrome
- Junior College, unable to return for winter semester 2020
  - Total Score 57/130
  - Highest: Fear Avoidance and central sensitization
- 6 weeks later
  - 34/130: Pain 2/10
  - Fear Avoidance factors : 16/34

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16 YO w/ Pain “Forever”

- 76/130 = High Risk
- Central Sensitivity : 40
- Affective Pain Mechanism : 38
- Peripheral Neurogenic: 29

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Re-Direction

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Yellow Flags: Treatment

- Re-direction!
- CBT needed?
- CBD needed?
- Brisk Walk
  - Corrected
- Avoid patho-anatomic Dx
Pain Mechanism Classification System

PMCS

Central Nervous System

Central Sensitization  Affective  Motor / Autonomic

Butler 1997, Kolski O’Connor 2016
CNS Pain Mechanisms

- Central Sensitization: overprotection / cognitive
  - Cardio, nerve flossing, CBT

- Affective: emotional / coping mechanisms
  - Breathing, mindfulness, CBT

- Motor / Autonomic
  - Motor repatterning, sensorimotor
Motor/ Autonomic Dysfunction

- Reduced mind/body connection
- Get’s the patient moving, pain free, allowing progressive return to ADL’s
- Evaluate walking, marching, jumping,
- AK’s *Cross Crawl*
  - Alternate reciprocal movements
- Sensorimotor training

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Motor/Autonomic Dysfunction

VIDEO

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Peripheral Pain Mechanisms

- **Nociceptive - Inflammatory**
  - CMT, nutraceuticals

- **Nociceptive - Ischemic**
  - Tissue repair/remodel: isotonic TherEx

- **Neurogenic**
  - Peripheral entrapments: release

O’Connor, Kolski, World of Hurt: A Guide to Classifying Pain
Mechanoreceptor Stimulation

- Suboccipital
- SI
- Subtalar
- T-4 mobility
  - Affects CS
  - Affects LS
  - Affects UE & LE

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Stability Lab: Bird-dog

Progressions:
- Single arm
- Single Leg
- Opposite arm/leg
- Add resistance
- Add multiplanar motion
- Add unstable surface
# The Worst Exercises for CLBP

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Compression Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sit-up (Bent knee)</td>
<td>3,300N (730 lbs)</td>
</tr>
<tr>
<td>Sit-up (Straight leg)</td>
<td>3,506</td>
</tr>
<tr>
<td>Curl-up feet anchored</td>
<td>2,009</td>
</tr>
<tr>
<td>Curl-up feet free</td>
<td>1,991</td>
</tr>
<tr>
<td>Quarter sit-up</td>
<td>2,392</td>
</tr>
<tr>
<td>Bent leg raise</td>
<td>1,767</td>
</tr>
<tr>
<td>Hanging straight leg raise</td>
<td>2,805</td>
</tr>
<tr>
<td>Hanging bent knee raise</td>
<td>3,313</td>
</tr>
<tr>
<td>Isometric side bridge</td>
<td>2,585</td>
</tr>
<tr>
<td>Roman chair extension</td>
<td>4,000</td>
</tr>
<tr>
<td>Back extension</td>
<td>6,000</td>
</tr>
<tr>
<td>Bird dog</td>
<td>2,000</td>
</tr>
</tbody>
</table>

McGill SM, Low Back Disorders, Evidenced Based Prevention and Rehabilitation, Human Kinetics 2002
Core Stability
Stability Lab: Curl-up’s

- Brace in supine hooklying
- Elevate head and shoulders 1”, w/ chin tuck
- Lift arms 1” towards feet
- Cross arms on the chest
- Place hand behind head
- Add pre-brace
- Add unstable surface
- Avoid lumbar spine flexion

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Topicals & Taping

- Kinesiology tape
  - Neuro Sensory Effects
  - 10-25% stretch
  - No tension on ends

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Taping
Topicals

Counterirritants

- Menthol
  - Cooling sensation: doesn't influence the underlying cause or inflammation

- Methyl salicylate
  - Warming sensation. Contraindications: salicylate allergy, blood thinners, CVD

- Capsicum
  - Heating sensation, overloads sensory neurons. Poor absorption
Topicals

- Homeopathic topicals
- Arnica
- Clove oil
- Eucalyptus oil
- CBD Topicals
  - Oil Based; needs penetration
  - Emollients?
  - Counterirritants?

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Bridges

- Supine, arms overhead
- Brace w/ bridge
- Single Leg
- On Toes
- Single leg on toes
- Add resistance
- Add unstable surface
Remember.....
Myofascial Trigger Points
Myofascial Trigger Points

- Ischemic compression
- Spray and Stretch?
- Myofascial release;
  - passive or active
- Foam roll
- IASTM
- Heat
Fascial System Discussion

- Anterior Oblique
- Posterior Oblique
- Lateral System
- Deep Longitudinal

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Stability: Front Plank Progression

- Elbows, from knees
- Push-up position
- Elbows and toes
- Single leg
- Single arm
- Alternate arm/ leg
- Unstable surface

Be sure to pre-brace and feel the gluts tighten
Front Plank Progression
Mechanical Models

- Mobility
  - Mechanical Blockage
  - LPHC

- Stability & strength
  - Strength & endurance ratio AP & Lat

- Balance / Sensorimotor

- Feet?

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Sleep

- Sleep Hygiene
- Sleep quality & quantity
- Often requires resetting the HPA axis
  - Adrenal support, balance cortisol levels
  - Herbals
  - Calmatives
- GI Health
- Neurotransmitter precursors
  - Glycine, 4-HTTP, GABA, Taurine

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HPA Dysfunction (too much stress)

- Amygdala Hyperactivity
- Chronic Stress
- Prefrontal Cortex Degradation
- Chronically Elevated Stress Hormones
- Cortisol
Cortisol – Diurnal Trend

Median Cortisol Values During the Day

Data from 15 studies with 104,623 salivary cortisol samples of 18,698 individuals by Miller et al in ‘The CIRCORT database: Reference ranges and seasonal changes in diurnal salivary cortisol derived from a meta-dataset comprised of 15 field studies’, Psychoneuroendocrinology, Nov 2016, 73, pages 16-23.

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The pineal gland begins producing melatonin in the evening. Melatonin levels peak in the middle of the night. Melatonin levels decline to low daytime amounts.
Sleep Assessment

- Labs
- Epworth Sleep Scale
- Symptom survey form
TAKE A BREAK!

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- Rehab Tips & Patient Tear Sheets
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Stability Lab: Dead Bug

- Lumbar Flexion or neutral spine?
- Supine, arms only
- Supine, legs only
- Alternate arms and legs
- Add resistance
- Add unstable surface

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Stability in Lumbar Flexion

- Lumbar stenosis
- Spondylolisthesis
- Lumbar Hyperlordosis
- Hypertonic LS erectors
Da’ Feet

- Foundation for standing movements
- Requires support of all 3 arches
- Janda’s “short foot”
- Yoga “rooted” foot
- Build strength of intrinsic foot muscles

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Stability Lab: Extension

- Prone, arms at the side, elevate head
- Reach overhead and elevate
- Lift one leg
- Lift alternate arms and leg
- Add resistance
- Add unstable surface

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Prone Extension
Micro-trauma = Chronic Pain
Finding the Fix

- Functional Assessment: w/ Deconstruction
  - Global movement & firing patterns
- Stabilization
  - Endurance & strength
- Aerobic capacity
- Breathing
- Fascial Slings & intramuscular matrix

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Balance and CLBP

- Semi-tandem and one-legged stance are sensitive tasks to determine postural control deficit in CLBP.
- Balance assessment should be included during rehabilitation.

People with chronic low back pain have poorer balance than controls in challenging tasks, da Silva RA, Disabil Rehabil. 2018 Jun.
Balance

- Single leg stance
- Eyes open & closed
- Add unstable surface
- Be attentive:
  - Core? LE? Feet?
  - Visual? Vestibular?

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Sensorimotor
Diet

- Anti-inflammatory diet
- Reduce chronic non-communicable disease
  - Metabolic syndrome
  - Central obesity
- Dysglycemia

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Triggers Chronic Inflammation

- Viruses, parasites, bacteria
- Toxins (Environmental, chemical, emotional)
- Food Allergies/Sensitivities
- Poor Sleep
- Stress
- Lecthins
- Dysglycemia
- Fatty acid imbalances
Glycemic Control

- Post-prandial hyperglycemia
  - Drives pro-inflammatory cytokines via Advanced Glycation End Product: sugars bind to proteins and fats

- Caused by a meal OR a sugary snack

- Eat low glycemic foods
- Eat greens (fiber) with high glycemic foods
- Avoid omega-6 fatty acids
Glycemic Index vs. Load

- **Index**: How quickly a food raises blood sugar levels
- **Load**: how high a food raises blood glucose
- **Balance high glycemic foods with green vegetation and protein**
  - Sweet potato with lean meat
  - Rice with asparagus
### Food Values: Glycemic Index/Glycemic Load

<table>
<thead>
<tr>
<th></th>
<th>Low GI</th>
<th>Med GI</th>
<th>High GI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low GL</strong></td>
<td>All-bran cereal (8,42)</td>
<td>Beets (5,64)</td>
<td>Popcorn (8,72)</td>
</tr>
<tr>
<td></td>
<td>Apples (6,38)</td>
<td>Cantaloupe (4,65)</td>
<td>Watermelon (4,72)</td>
</tr>
<tr>
<td></td>
<td>Carrots (3,47)</td>
<td>Pineapple (7,59)</td>
<td>Whole wheat flour bread (9,71)</td>
</tr>
<tr>
<td></td>
<td>Peanuts (1,14)</td>
<td>Sucrose, i.e. table sugar (7,68)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Strawberries (1,40)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sweet Corn (9,54)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Med GL</strong></td>
<td>Apple juice (11,40)</td>
<td>Life Cereal (16,66)</td>
<td>Cheerios (15,74)</td>
</tr>
<tr>
<td></td>
<td>Bananas (12,52)</td>
<td>New potatoes (12,57)</td>
<td>Shredded wheat (15,75)</td>
</tr>
<tr>
<td></td>
<td>Fettucine (18,40)</td>
<td>Wild rice (18,57)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Orange juice (12,50)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sourdough wheat bread (15,54)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>High GL</strong></td>
<td>Linguine (23,52)</td>
<td>Couscous (23,65)</td>
<td>Baked Russet potatoes (26,85)</td>
</tr>
<tr>
<td></td>
<td>Macaroni (23,47)</td>
<td>White rice (23,64)</td>
<td>Cornflakes (21,81)</td>
</tr>
<tr>
<td></td>
<td>Spaghetti (20,42)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Source:** Revised International Table of Glycemic Index (GI) and Glycemic Load (GL), *The American Journal of Clinical Nutrition*, July 2002
Low Glycemic Energy Foods

- Complex carbohydrates
  - Vegetables, fruit, red & sweet potatoes
- Raw nuts
- Lean Meat
- Wild caught fish
- Grass fed milk products
Obesity & Chronic Inflammation

**Fat Cells:** Store hormones AND pro-inflammatory cytokines
  - Adiposopathy

**Visceral fat** is thought to produce 300% more IL-6 than fat located elsewhere

**Address your waist hip ratio**
  - Less than .9 in men and .85 in women

Trayhurn et al. 2005; Schrager et al. 2007
Omega 3 Fatty Acids

- Drive the biochemistry of anti-inflammation
- Cold water fish, (salmon, mackerel, cod),
- Plant oils: flax seed, borage seed, black currant seed, olive, evening primrose oil downgrade to EPA/DHA
- Green vegetation, plankton, seaweed and algae
- Macadamia nuts
- Flax, hemp and chia seeds
The Trend: Imbalance of n-6 and n-3 fats

From 1909 to 1985

- Omega-6 fat intake has increased from 1 kg per year to 12 kg per year (due to increased vegetable oil intake)

- The ratio of dietary n-6:n-3 fats has also increased from 4:1 to 25:1
Contributing “causes” of Fatty Acid Imbalances

- Diet high in n-6 fats & low in n-3 fats
- Biochemical individuality
  - altered delta-6 desaturase activity
  - micronutrient deficiencies (B₃, B₆, biotin, C, Zn, Mg)
- Environmental endotoxins
- Insulin dysregulation
  - high carbohydrate/ low protein /low fiber diet
  - chromium, vanadium, magnesium
Symptoms of n-6 fat Imbalance

- bumps on the backs of the upper arms ("chicken skin")
- red, scaly, eczematoid dermatitis
- excess thirst with or without excess urination
- coarse, dry hair; alopecia
- brittle nails
- slow wound healing
Anti-inflammatory Herbs

- Rosemary
- Turmeric - curcumin
- Boswellia
- Garlic
- Papaya and pineapple
Boswellia and Osteoarthritis

After 8 weeks of treatment:

- Pain index 2.7 → 0.26
- Loss of movement 2.8 → 0.30
- Swelling index 1.1 → zero

Results were highly statistically significant and clinically relevant (p<0.001)

All patients chose to continue with the Boswellia following the completion of the trial!

What to Eat?

- Low Glycemic foods
- Green Vegetation
- Meat & Fish
- Anti-inflammatory herbs
- Nuts
- Water
- Herbal teas
TAKE A BREAK!

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Nutraceuticals

- Omega 3’s
  - 2-4,000 mg EPA + DHA/day
  - Purified

- Curcumin
  - 1-3 g/day

- Boswellia
  - 300 – 500mg/day

- CBD
  - Oral
  - Dosing Guide w/symptom chart

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Nutraceuticals

- White Willow Bark
  - Salicylic Acid
  - 350-500 mg/day
- MSN: 2.25 to 6.0 g/day
- Cat’s Claw: 100 mg/day
- Ginger: 510 mg/day
- SAMe: 200-1200 mg/day
- Systemic Enzymes: 500-2,000 mg/day
  - Papain, Trypsin, Bromelain
  - Enteric Coated

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Medical Cannabis

- Inhaled (smoked or vaporized) cannabis is consistently effective in reducing chronic non-cancer pain.
- Oral cannabinoids seem to improve sleep, general quality of life, & chronic cancer pain: they do not seem effective in acute postoperative pain, abdominal chronic pain, or rheumatoid pain.
- Inhaled cannabis seems to be more tolerable & predictable than oral.
- Cannabis or cannabinoids are not universally effective for pain.

Documentation

- Establish treatment plan
  - Procedures, rationale, phases of care

- Based on objective measures
  - OATS
  - Imaging
  - ROM

- Create care plan of frequency and duration

- Establish a patho-anatomic diagnosis
Pt. cannot lift a case of water from the floor.
Lifting 12 pack from the countertop is okay
The case weights 25 pounds
Functional End Points

- Long term: Enable lifting 25 pounds from the floor and carry 100 ft
- Short term: Enable lifting 8 lbs to 25 lbs from the floor

Document improvement in function
- Able to lift 9 lbs 15 times – red CLX TheraBand
- Able to lift 11 pounds 10 times – green CLX TheraBand

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Side Plank Progression

- From hips
- From knees
- Split stance
- Open top arm to ceiling
- Single leg
- Unstable surface

*Be sure to keep the spine stiff and aligned*
Breathing

- Abdominal breathing strengthens deep core muscles
- Learn to keep the chest quiet
- “Bellows effect”

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Be Thoughtful

- Periodization of current exercises
- Stimulated all major proprioceptive centers?
- T4 mobility checked? C1-O?
- Feet?
- Stability vs. Mobility?

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Mobility Review

- Hip and Hamstring
  - Posterior Fascial line
- Hip Flexors
  - Anterior fascial line
- Passive and active assisted stretches
- Massage Stick & foam roller

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The Bunkie Tests

Posterior Power Line
The Bunkie Tests

Posterior Stabilizing Line
The Bunkie Tests

Anterior Stabilizing Line
The Bunkie Tests

- Lateral Stabilizing Line
The Bunkie Tests

Medial Stabilizing Line
Stability Review
Progressions

- Curl-up
- Bridges
- Dead Bug
- Front plank
- Side plank
- Bird-dog
- Prone extension
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    • Rational & Redefined
    • One on One Consulting
    • www.DeFabioDifference.com
• TheraBand: www.TheraBand-Academy.com
• NCMIC
• PhytoZol: Attendee Promo: Kevin
• You
Additional Resources

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- Relevant Rehab Seminars: Promo Code 20
  - One on One Consulting
  - 36 Hour Rehab Certificate Course
  - www.DeFabioDifference.com
- TheraBand: www.TheraBand-Academy.com
- NCMIC
- PhytoZol: Promo: Kevin 833-639-9651
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Thank You!

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