The Evidence for Complementary & Integrative Medicine for Low Back Pain

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Disclosures

• No relevant financial conflicts of interest to disclose
Main Points

• Morbidity, disability, and cost of LBP is enormous
• Patient-centered biopsychosocial model is essential
• Risk stratification for prognosis and treatment
• Recommend self-care and nonpharmacologic therapies first
• Opioids only after careful consideration of risks and benefits
The Burden of Low Back Pain

- Lifetime incidence approaching 90%
- 43-60% of Americans report spine pain in the past 3 months
- $100 billion annual direct costs
- Total annual costs >$500 billion
- Common cause for office visit
- Most common and most expensive cause of worker’s compensation claims
- Leading cause of global disability
Effect on Lives Can Be Profound

- Impact on function: work, physical, psychosocial, ADLs & IADLs
- Loss of activities that bring joy and meaning to life
- A sense of suffering, often in isolation
- Feelings of anger, depression, and guilt
- Impact on family
  - Emotional and physical energy caring for person in chronic pain
  - They experience the same anger, depression, and guilt
  - Pain controls their lives as well

Adapted from icer-review.org/material/back-and-neck-pain-final-report
Specific Causes of Back Pain
Acute (<4 weeks) and Subacute (4-12 weeks) Nonspecific Low Back Pain

• Common
• Mechanism: Injury to ligaments, facet joints, muscle, fascia, nerve roots, or disc
• 75-90% resolve spontaneously
Acute Pain Loop

Cerebral Cortex: identifies location, assesses severity, determines reaction

Limbic System: process the memory and emotional aspects

The brain sends the signals to react back down the spinal cord and out to the muscle fibers, causing a reaction.

Sensory signals travel first to the spine, and then up the spinal cord to the brain.

Nociceptors in the tissue pick up the sensory input.
Nonspecific Chronic Low Back Pain (>12 weeks)

- Complex poorly understood condition
- Different CNS patterns than acute LBP
- Contributes to most suffering and cost
- Pharmaceuticals can help but often not fully satisfactory
Chronic Pain

Cerebral cortex may overgeneralize location, interpret higher severity, and cause more of a reaction.

The brain sends signals causing a reaction that may not be proportional to the actual stimuli.

A stronger response from the limbic system may lead to more intense pain.

Sensory signals may be amplified.

Actual or perceived tissue damage may cause nociceptors to pick up more input.
Red Flags

- Malignancy
- Infection
- Fracture
- non-MSK cause
- Systemic inflammatory condition
- Progressive weakness, bowel or bladder changes, saddle anesthesia
Standard Therapies

- Acetaminophen
- NSAIDs
- Skeletal Muscle Relaxants
- Opioids
- TCAs
- SSRIs
- Anti-convulsants
- Duloxetine
- Topical analgesics
- Physical Therapy
- Epidural Steroid Injections
- Surgery

Physical Therapy
- Epidural Steroid Injections
- Surgery
Trends in Treatment of Back Pain

Imaging

Lumbar imaging in patients without indications of serious underlying conditions does not improve clinical outcomes

Chou et al. Lancet 2009
Imaging for Low Back Pain over Time

% LBP Visits


Plain X-ray  CT/MRI

p=0.61  p<.001

MRI does not correlate with pain

Correlation between MRI Index and pain score

Correlation between composite MRI score and pain score

Sowa et al. JAGS 2009
MRI Does Not Correlate with Pain

Sowa et al. JAGS 2009

R²=0.0242
Iatrogenic Imaging Disability

“An increase in pain, disability and suffering that directly results from the communication, from a respected health care practitioner, of benign imaging findings as if they were significant pathological conditions.”

– Donald Murphy, DC
A National Health Crisis

Every 13 minutes there is a death from opioid overdose\(^1\)

2.1M Americans suffer from an opioid use disorder\(^2\)

$504B estimated annual costs of U.S. opioid epidemic\(^3\)

From pain to overdose and death
Biopsychosocial Model of Chronic Pain

- **SPIRIT**
  - Hope
  - Life meaning

- **BODY**
  - Stiffness
  - Inflammation

- **SOCIAL**
  - Poverty
  - Isolation

- **MIND**
  - Depression
  - Catastrophizing
Yellow Flags

- Fear Avoidance Beliefs
- Maladaptive Coping, eg Catastrophizing
- Depression
- Anxiety
- Work dissatisfaction
- Substance Use Disorder
CONCLUSIONS Stratified care for back pain implemented in family practice leads to significant improvements in patient disability outcomes and a halving in time off work, without increasing health care costs. Wider implementation is recommended.
### STarT Back

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

**Not at all**: 0  **Slightly**: 0  **Moderately**: 0  **Very much**: 1  **Extremely**: 1

Psychologically Informed Physical Therapy (PIPT)

- Improve physical function through tailored stretching, strengthening, and aerobic exercises
- Address psychosocial obstacles to recovery through education, coaching, graded exercise
  - Fear Avoidance Behaviors and Beliefs
  - Catastrophizing
“You’ve been fooling around with alternative medicines, haven’t you?”
Definitions

• **Alternative Medicine**: in lieu of conventional care

• **Complementary Medicine**: as adjunct to conventional care

• **CAM**: “A group of diverse medical and healthcare systems, practices, and products that are not presently considered to be part of conventional medicine.”

• **Integrative Medicine**: Combines evidence-based CAM with evidence-based conventional care in a patient- and relationship-centered approach
In 2012, 33.2% of U.S. adults used complementary health approaches, many for pain.

10 most common complementary health approaches among adults:

- Natural Products*: 17.7%
- Deep Breathing: 10.9%
- Yoga, Tai Chi, or Qi Gong: 10.1%
- Chiropractic or Osteopathic Manipulation: 8.4%
- Meditation: 8.0%
- Massage: 6.9%
- Special Diets: 3.0%
- Homeopathy: 2.2%
- Progressive Relaxation: 2.1%
- Guided Imagery: 1.7%
### Use of CAM by U.S. Adults for Back Pain – 2012

<table>
<thead>
<tr>
<th></th>
<th>Any CAM n=3892</th>
<th>Acupuncture n=261</th>
<th>Chiropractic Manipulation n=1363</th>
<th>Massage n=1017</th>
<th>Yoga/Qigong/Tai chi n=905</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used for back pain, %</td>
<td>21.1</td>
<td>19.5</td>
<td>40.7</td>
<td>22.2</td>
<td>8.1</td>
</tr>
<tr>
<td>Perceived benefit (of those who used CAM for back pain), %</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Great</td>
<td>58.1</td>
<td>64.6</td>
<td>62.0</td>
<td>54.7</td>
<td>53.2</td>
</tr>
<tr>
<td>Some</td>
<td>29.1</td>
<td>16.4</td>
<td>27.2</td>
<td>30.8</td>
<td>36.8</td>
</tr>
<tr>
<td>Only a little</td>
<td>8.0</td>
<td>11.8</td>
<td>6.1</td>
<td>9.4</td>
<td>8.1</td>
</tr>
<tr>
<td>Not at all</td>
<td>4.8</td>
<td>7.2</td>
<td>4.8</td>
<td>5.2</td>
<td>1.9</td>
</tr>
</tbody>
</table>

*Data from NHIS Sample Adult, Alternative Health Supplement file 2012.*

Acupuncture
Acupuncture

49 Trials (n=7,958; range 16-2831)

**Acute low back pain**
- ↓ pain intensity cf: sham
- Greater likelihood of overall improvement cf: NSAIDs (5 trials: RR 1.11 [CI, 1.06 to 1.16]

**Chronic low back pain**
- ↓ pain intensity and ↑ function cf: sham
- Greater pain relief (−10.6 on a 0-100-point scale [CI, −20.34 to −0.78]) and better function (WMD −0.36 [CI, −0.67 to −0.04]) cf: NSAIDs, muscle relaxants

Cognitive Behavioral Therapy (CBT)

Thoughts create feelings

Behavior reinforces thoughts

Feelings create behavior
Mindfulness

**Definition:** Purposeful attention to your experience in the moment without judgement

**Mindfulness Based Stress Reduction (MBSR)**
- Developed by Jon Kabat-Zin at the UMASS Medical Center
- Standardized 8 week program
- Teacher certification
- Studied widely
- Weekly 2 hour session, daily homework, and daylong retreat
- Sitting meditation, walking meditation, & yoga
## Mindfulness-Based Stress Reduction (MBSR) vs. Cognitive Behavioral Therapy (CBT) vs. Usual Care for Chronic Low Back Pain

<table>
<thead>
<tr>
<th>Follow-up Week</th>
<th>Usual Care</th>
<th>Mindfulness-Based Stress Reduction</th>
<th>Cognitive Behavioral Therapy</th>
<th>P Value for Omnibus&lt;sup&gt;c&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roland Disability Questionnaire Results</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>27.3 (20.3-36.6)</td>
<td>34.5 (26.8-44.3)</td>
<td>24.7 (18.1-33.8)</td>
<td>.23</td>
</tr>
<tr>
<td>8</td>
<td>35.4 (27.6-45.2)</td>
<td>47.4 (38.9-57.6)</td>
<td>51.9 (43.6-61.7)</td>
<td>.04&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>26</td>
<td>44.1 (35.9-54.2)</td>
<td>60.5 (52.0-70.3)</td>
<td>57.7 (49.2-67.6)</td>
<td>.04&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>52</td>
<td>48.6 (40.3-58.6)</td>
<td>68.6 (60.3-78.1)</td>
<td>58.8 (50.6-68.4)</td>
<td>.01&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>Pain Bothersomeness Results</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>20.6 (14.6-28.9)</td>
<td>19.1 (13.3-27.4)</td>
<td>21.7 (15.3-30.6)</td>
<td>.88</td>
</tr>
<tr>
<td>8</td>
<td>24.7 (18.1-33.6)</td>
<td>36.1 (28.3-46.0)</td>
<td>33.8 (26.5-43.2)</td>
<td>.15</td>
</tr>
<tr>
<td>26</td>
<td>26.6 (19.8-35.9)</td>
<td>43.6 (35.6-53.3)</td>
<td>44.9 (36.7-55.1)</td>
<td>.01&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>52</td>
<td>31.0 (23.8-40.3)</td>
<td>48.5 (40.3-58.3)</td>
<td>39.6 (31.7-49.5)</td>
<td>.02&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Economic Evaluation of MBSR vs. CBT vs. Usual Care for Chronic LBP

301 patients

**Society:** Compared with Usual Care, mean incremental cost per participant to society of CBT was $125 and MBSR -$724

**Payer:** Incremental costs per participant to the health plan were $495 for CBT over UC and -$982 for MBSR

**Participant:** Incremental back-related costs per participant were $984 for CBT over UC and -$127 for MBSR. Statistically significant gains in QALYs over UC: 0.041 for CBT and 0.034 for MBSR

# Spinal Manipulative Therapy for Acute Low Back Pain: Pain Intensity

Paige et al, JAMA. 2017;317(14):1451-1460

<table>
<thead>
<tr>
<th>Study</th>
<th>Quality Score</th>
<th>Outcome Measure</th>
<th>Sample Size</th>
<th>Mean (95% CI)</th>
<th>Sample Size</th>
<th>Mean (95% CI)</th>
<th>Mean Difference (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Comparison group, sham</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hancock et al, 2007</td>
<td>9</td>
<td>ONRS</td>
<td>119</td>
<td>NR</td>
<td>120</td>
<td>NR</td>
<td>-2.00 (-7.00 to 3.00)</td>
</tr>
<tr>
<td>Hoiriis et al, 2004</td>
<td>3</td>
<td>VAS</td>
<td>34</td>
<td>17 (11 to 23)</td>
<td>40</td>
<td>22 (16 to 28)</td>
<td>-5.00 (-13.89 to 3.89)</td>
</tr>
<tr>
<td><strong>Comparison group, all other therapies</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skargren et al, 1998</td>
<td>2</td>
<td>VAS</td>
<td>172</td>
<td>NR</td>
<td>139</td>
<td>NR</td>
<td>-0.16 (-6.47 to 6.15)</td>
</tr>
<tr>
<td>Cherkin et al, 1998</td>
<td>6</td>
<td>ONRS</td>
<td>118</td>
<td>19 (16 to 22)</td>
<td>60</td>
<td>31 (25 to 37)</td>
<td>-12.00 (-18.65 to -5.35)</td>
</tr>
<tr>
<td>Grunesjö et al, 2004</td>
<td>7</td>
<td>ONRS</td>
<td>89</td>
<td>21 (16 to 26)</td>
<td>71</td>
<td>30 (24 to 36)</td>
<td>-8.90 (-16.61 to -1.19)</td>
</tr>
<tr>
<td>Blomberg et al, 1994</td>
<td>6</td>
<td>ONRS</td>
<td>53</td>
<td>17 (10 to 24)</td>
<td>48</td>
<td>34 (27 to 41)</td>
<td>-17.00 (-26.76 to -7.24)</td>
</tr>
<tr>
<td>Bergquist-Ullman et al, 1977</td>
<td>2</td>
<td>ONRS</td>
<td>50</td>
<td>30 (23 to 37)</td>
<td>44</td>
<td>31 (24 to 38)</td>
<td>-1.43 (-11.57 to 8.71)</td>
</tr>
<tr>
<td>Goertz et al, 2013</td>
<td>7</td>
<td>NRS</td>
<td>45</td>
<td>39 (32 to 46)</td>
<td>46</td>
<td>52 (45 to 59)</td>
<td>-13.00 (-23.27 to -2.73)</td>
</tr>
<tr>
<td>Hoiriis et al, 2004</td>
<td>3</td>
<td>VAS</td>
<td>34</td>
<td>17 (11 to 23)</td>
<td>36</td>
<td>22 (15 to 29)</td>
<td>-5.30 (-14.94 to 4.34)</td>
</tr>
<tr>
<td>Crusler et al, 2012</td>
<td>7</td>
<td>VAS</td>
<td>30</td>
<td>20 (15 to 25)</td>
<td>30</td>
<td>37 (28 to 46)</td>
<td>-17.70 (-27.74 to -7.66)</td>
</tr>
<tr>
<td>Farrell et al, 1982</td>
<td>3</td>
<td>ONRS</td>
<td>24</td>
<td>3 (-7 to 13)</td>
<td>24</td>
<td>3 (-7 to 13)</td>
<td>0 (-14.14 to 14.14)</td>
</tr>
<tr>
<td>Morton et al, 1999</td>
<td>3</td>
<td>VAS</td>
<td>15</td>
<td>2 (0 to 4)</td>
<td>14</td>
<td>25 (16 to 34)</td>
<td>-23.03 (-32.24 to -13.82)</td>
</tr>
</tbody>
</table>

**Random-effects model**

-9.95 (-15.63 to -4.27)
Massage Therapy

- 26 trials ($n = 3239$, range 15-579)
- Massage had better effects on short-term pain in 8 of 9 trials and function in 4 of 5 trials cf: to manipulation, exercise, relaxation therapy, acupuncture, PT, and TENS

Two Forms of Massage vs. Usual Care for Chronic LBP

Cherkin et al, Ann Int Med 2011
Yoga

Postures
Asanas

Breathing
Pranayama

Meditation
## Meta-analysis of Yoga for LBP

<table>
<thead>
<tr>
<th>Follow-up duration</th>
<th>Outcomes</th>
<th>Number of trials (n)</th>
<th>Standardized mean difference (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-term</td>
<td>Pain</td>
<td>6 (584)</td>
<td>−0.48 (−0.65 to −0.31)</td>
</tr>
<tr>
<td></td>
<td>Back-specific disability</td>
<td>8 (689)</td>
<td>−0.59 (−0.87 to −0.30)</td>
</tr>
<tr>
<td>Long-term</td>
<td>Pain</td>
<td>5 (564)</td>
<td>−0.33 (−0.59 to −0.07)</td>
</tr>
<tr>
<td></td>
<td>Back-specific disability</td>
<td>5 (574)</td>
<td>−0.35 (−0.55 to −0.15)</td>
</tr>
</tbody>
</table>

Yoga, PT, or Education for Chronic Low Back Pain:

a randomized noninferiority trial

I felt good because I was doing something, not sitting around waiting for a diagnosis, not taking another pill. I was involved in my treatment.

It’s going to have to be something that’s part of my life... I’m looking at it as a medical treatment—it’s not just a yoga class.

People can push those buttons as they used to, they can’t make you angry, because now you have something that keeps you calm regardless.

ACP Recommendations
Qaseem et al, Ann Int Med 2017

Acute/subacute LBP
Use nonpharmacologic treatment first
- Heat
- Massage
- Acupuncture
- Spinal manipulation

If pharmacologic treatment desired, select NSAIDS and/or muscle relaxants
ACP Recommendations
Qaseem et al, Ann Int Med 2017

Chronic LBP

Use nonpharmacologic treatment first

• Exercise (self-care or PT)
• Spinal manipulation (Chiro or PT)
• Acupuncture
• Yoga
• MBSR
• CBT
• Tai chi
ACP Recommendations
Qaseem et al, Ann Int Med 2017

Chronic LBP (continued)
If inadequate response, consider pharmacologic treatment
1. NSAIDS
2. Tramadol or duloxetine
3. Opioids only for patients who have failed above, not at high risk for substance use disorder, potential benefits outweigh risks, and discussion with patient of known risks and realistic benefits.
ACP Recommendations

• Reassure patients that acute or subacute LBP usually improves over time
• Advise patients to remain as active as tolerated
• Avoid prescribing costly and potentially harmful imaging and treatments
• Avoid ineffective treatments, such as acetaminophen, systemic steroids, TCAs and SSRIs
• Base treatment recommendations on patient preferences that also minimize harms and costs

Qaseem et al, Ann Int Med 2017
# Opioid Risk Tool (ORT)

Mark each box that applies

<table>
<thead>
<tr>
<th>Mark each box that applies</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Family Hx of substance abuse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Illegal drugs</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Prescription drugs</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>2. Personal Hx of substance abuse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Illegal drugs</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Prescription drugs</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>3. Age between 16 &amp; 45 yrs</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>4. Hx of preadolescent sexual abuse</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>5. Psychologic disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADD, OCD, bipolar, schizophrenia</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Depression</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

**Scoring Totals:**

- **Scoring (risk)**
  - 0-3: low
  - 4-7: moderate
  - ≥8: high

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Webster et al, Pain Medicine 2005;6:432-42

denmar.impulsar.co/opioid-risk-tool-patient-form/
The Stanford Five--Ask about each of these:

1. Patient’s belief about the cause of pain
2. Meaning of pain - from patient’s perspective
3. Impact of pain on life - from patient’s perspective
4. Patient’s goals
5. Patients perception of appropriate treatment

Mackey, Sean C —quoted in Thernstrom: The Pain Chronicles; 2010
Counseling the Patient: Adopting a Helpful Lexicon

• Avoid medical jargon
• Use easily understood language
• Verbalize you have ruled out serious pathology
• Be calm, confident, positive and empathetic
  – Physician attitudes and beliefs correlate with patient attitudes, beliefs, and clinical outcomes.
• Emphasize pain does not mean they are doing more damage
• Encourage staying active
Final Comments

• Understand the impact of LBP on the patient
• A patho-anatomic model is helpful only in a small minority of cases
• Use risk stratification to guide treatment
• Imaging, opioids, specialty referrals should be the exception, not the rule
• Self-management, nonpharmacologic therapies, and nonopioid medications should be the mainstay of treatment
Thank you

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