Effectiveness and safety of nonpharmacological and nonsurgical treatments for chronic pain conditions

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Conflict of Interest Disclosure

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Session Objectives

• Understand the evidence on the effectiveness and safety of nonpharmacological and nonsurgical treatments for chronic pain conditions
• Understand current treatment guidelines for common pain conditions, focusing on nonpharmacological and nonsurgical therapies
• Understand current knowledge on the effectiveness of treatments in specific populations (indigent, older adults, racial/ethnic groups)
Background

• Chronic noncancer pain is highly prevalent, with substantial burdens
• Many pharmacological and nonpharmacological treatments are available to treat chronic pain
  • Opioids commonly prescribed, but short-term benefits are limited, data lacking on long-term benefits, and serious harms
  • Other pharmacological treatments associated with relatively modest benefits and potential harms
  • Increased interest in and shift towards use of nonpharmacological treatments
Recommendation #1

• Nonpharmacological therapy and nonopioid pharmacologic therapy are preferred for chronic pain.
• Consider opioid therapy only if expected benefits are anticipated to outweigh risks to the patient.
• If opioids are used, combine with appropriate nonpharmacologic therapy and nonopioid pharmacologic therapy.
Biopsychosocial Approach and Chronic Pain

• Psychosocial factors are stronger predictors of transition to chronic pain and severity
• Biological factors (e.g., imaging findings, lab tests) poorly correlate with transition to chronic pain or severity
• Treatment approaches for chronic pain must address psychosocial contributors to pain and improvement in function to be most effective
  • A number of nonpharmacological therapies explicitly focus on function, movement, maladaptive coping behaviors
• Targeting of therapies based on presence and severity of psychosocial factors: STarT Back approach

Gatchel RJ et al. Psychol Bull 2007;133:581-624
Chou R and Shekelle P. JAMA 2010;303:1295-1302
Nonpharmacological Interventions

• Cognitive-behavioral therapy (CBT)
  • Restructures maladaptive thinking patterns and replaces undesirable with healthier behaviors

• Biofeedback
  • Helps achieve greater control over usually involuntary processes

• Mind-body interventions
  • Meditation/relaxation techniques and movement-based therapies

• Exercise: Many different types; ideally CBT-informed

• Interdisciplinary rehabilitations
  • Combines physical and biopsychosocial components at a minimum

• Manipulation, acupuncture, massage

• Physical modalities
  • Ultrasound, TENS, low-level laser therapy, traction, lumbar supports
Low Back Pain

- 5th most common reason for U.S. office visits, 2nd most common symptomatic reason
  - 5% of PCP visits are for LBP
- Up to 84% of adults have LBP at some point, >1/4 report LBP in prior 3 months
- Affects all ages, peaks at 55 to 64 years
- Most common cause of activity limitations in persons under 45 years
- >$100 billion dollars in total health care expenditures
  - Increased use of advanced imaging, surgery, interventional procedures, opioids

Boudreau et al Pharmacoepidemiol Drug Saf 2009
Trends in prevalence of chronic LBP

Percentage of North Carolina adults with chronic low back pain

![Bar chart showing the prevalence of chronic low back pain (LBP) in North Carolina adults across different age groups and years (1992 and 2006). The data is presented for overall population and specific age groups: 21-34 yo, 35-44 yo, 45-54 yo, 55-64 yo, and >=65 yo. The chart highlights a comparison between the years 1992 and 2006, indicating changes in prevalence over time.]
Issues in evaluating effectiveness of non-pharmacological therapies

- Can be difficult to mask treatments
  - Cannot fully control for attentional and placebo effects
- Variability in techniques and intensity of treatments
  - Limited evidence on optimal frequency and duration
  - Effects may also be provider-dependent
- Interindividual variability in responses
  - Patient expectations/beliefs
  - Other factors: psychological comorbidities, maladaptive coping behaviors, central sensitization, opioids
- Magnitude of effects generally small and short-term
  - ≤1 point on 1 to 10 point pain scale
  - Data on functional effects often more limited
- Methodological limitations in trials
- Potential conflicts related to profession, proprietary interests
## 2007 APS/ACP LBP review

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Magnitude of benefit</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acupuncture</td>
<td>Moderate</td>
<td>Fair</td>
</tr>
<tr>
<td>Exercise</td>
<td>Small-moderate</td>
<td>Good</td>
</tr>
<tr>
<td>Interdisciplinary rehabilitation</td>
<td>Moderate</td>
<td>Good</td>
</tr>
<tr>
<td>Massage</td>
<td>Moderate</td>
<td>Fair</td>
</tr>
<tr>
<td>Psychological interventions</td>
<td>Moderate-substantial</td>
<td>Good</td>
</tr>
<tr>
<td>Spinal manipulation</td>
<td>Moderate</td>
<td>Good</td>
</tr>
<tr>
<td>Yoga</td>
<td>Moderate</td>
<td>Fair</td>
</tr>
<tr>
<td>Physical modalities</td>
<td>Unable to estimate</td>
<td>Poor</td>
</tr>
</tbody>
</table>
2007 ACP/APS guideline

- First national guideline to recommend spinal manipulation, massage, yoga, acupuncture, progressive relaxation as treatment options for LBP
- Little guidance on selection of therapies
  - Individualization of therapy?
  - Active vs. passive approaches?
- Little guidance on optimal techniques, intensity, duration, timing of therapy
2017 AHRQ review on non-invasive treatments for LBP

- More evidence to support:
  - Yoga: More effective than usual care, education; similar to exercise
  - Tai Chi: More effective than waitlist, no Tai Chi (limited evidence)
  - Mindfulness-based Stress Reduction: Similar to CBT and more effective than usual care
- Physical modalities: Evidence generally remains insufficient

2017 American College of Physicians guideline

- Emphasis on nonpharmacologic therapies, particularly for chronic LBP
- Stronger evidence/recommendations for mind-body interventions (yoga, Tai Chi, mindfulness-based stress reduction)
- Stronger cautions regarding opioids
2018 Comparative Effectiveness Review

Noninvasive Nonpharmacological Treatment for Chronic Pain: A Systematic Review

- Focus on durability of treatment effects (>1 month after completing treatment)
- Five common chronic pain conditions
  - LBP, neck pain, OA, fibromyalgia, tension HA
- Identified a standard comparator for head-to-head comparisons
  - Exercise for all conditions except for HA (biofeedback)
- Challenges in conveying large volume of information
Chronic LBP, vs. usual care, sham, attention control, or waitlist

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Function Short-Term</th>
<th>Function Intermediate-Term</th>
<th>Function Long-Term</th>
<th>Pain Short-Term</th>
<th>Pain Intermediate-Term</th>
<th>Pain Long-Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise</td>
<td>slight +</td>
<td>none +</td>
<td>none +</td>
<td>slight ++</td>
<td>moderate +</td>
<td>moderate +</td>
</tr>
<tr>
<td>Psychological Therapies: CBT primarily</td>
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<td>slight ++</td>
<td>slight ++</td>
<td>slight ++</td>
<td>slight ++</td>
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<td>Physical Modalities: Ultrasound</td>
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<td>no evidence</td>
<td>moderate +</td>
<td>none +</td>
<td>no evidence</td>
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<tr>
<td>Manual Therapies: Spinal Manipulation</td>
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<td>none +</td>
<td>slight ++</td>
<td>no evidence</td>
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<tr>
<td>Manual Therapies: Massage</td>
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<td>no evidence</td>
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<td>none +</td>
<td>no evidence</td>
</tr>
<tr>
<td>Manual Therapies: Traction</td>
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<td>no evidence</td>
<td>none +</td>
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<td>no evidence</td>
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<tr>
<td>Mindfulness Practices: MBSR</td>
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<td>slight +</td>
<td>none +</td>
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<tr>
<td>Mind-Body Practices: Yoga</td>
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<td>slight +</td>
<td>no evidence</td>
<td>moderate +</td>
<td>moderate +</td>
<td>no evidence</td>
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<tr>
<td>Acupuncture</td>
<td>slight +</td>
<td>none +</td>
<td>none +</td>
<td>slight ++</td>
<td>none +</td>
<td>slight +</td>
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<tr>
<td>Multidisciplinary Rehabilitation</td>
<td>slight +</td>
<td>slight +</td>
<td>none +</td>
<td>slight ++</td>
<td>slight ++</td>
<td>none +</td>
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</tbody>
</table>
• Some evidence of persistent beneficial effects of multidisciplinary rehabilitation over exercise for chronic LBP
• Evidence on other chronic pain conditions limited
  • Neck pain: Exercise, psychological therapies, acupuncture
  • Osteoarthritis: Exercise, psychological therapies, acupuncture
  • Fibromyalgia: Exercise, psychological therapies, massage, mindfulness, mind-body, acupuncture, multidisciplinary rehabilitation
  • Tension HA: Spinal manipulation (limited)
• Little evidence to assess specific techniques, duration/intensity of treatment, sequencing of therapies
• Little evidence on impacts of nonpharmacological therapies on opioid use and associated harms
Harms of Nonpharmacological Treatments

• Generally, few harms reported in trials of nonpharmacological treatments and serious harms rare
  • Spinal manipulation: Serious harms rare with lumbar manipulation; more common with cervical manipulation
  • Serious harms rarely reported with traction, acupuncture
  • Prolotherapy: Inflammation/pain an expected short-term effect
  • Short-term soreness/discomfort reported with a number of therapies
Effects in subpopulations

• Indigent populations
  • Some trials focused on low-income populations, but insufficient evidence to determine whether treatment effectiveness varies in this population
  • Access and comorbidities may be issues

• Age
  • Evidence to determine how effectiveness varies by age limited
  • Some data indicate that mindfulness, CBT, exercise, effective in older populations

• Race/ethnicity
  • No clear evidence of race/ethnicity effects; data limited
  • Patient expectations/beliefs may impact effectiveness and may be impacted by culture/locale (e.g., acupuncture)
### Mindfulness Practices

#### 5.5.1 Mindfulness-based stress reduction

<table>
<thead>
<tr>
<th>POPULATION</th>
<th>INTERVENTION</th>
<th>COMPARATOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individuals with low back pain</td>
<td>Mindfulness-based stress reduction</td>
<td>Usual care or attention control</td>
</tr>
</tbody>
</table>

#### Outcomes

- **Function (Short-term)**
  - Based on data from 64 patients in 4 studies
  - Difference: 0.25 lower (SMD) (CI 95% -0.33 lower to 0.44 higher)

- **Pain (Short-term)**
  - Scale: 0-10
  - Based on data from 64 patients in 4 studies
  - Difference: 0.76 lower (MD) (CI 95% -1.13 lower to 0.38 lower)

- **Function (Intermediate-term)**
  - Based on data from 225 patients in 1 study
    - Follow-up
  - SMD: -0.20 (55% CI: -0.47 to 0.06)

- **Function (Long-term)**
  - Based on data from 228 patients in 1 study
    - Follow-up
  - SMD: -0.20 (55% CI: -0.47 to 0.06)

#### Literature search

- **Evidence profile**
- **Summary**
- **References**
- **PICO codes**
- **Evidence Matrix**
Non-Pharmacological Interventions for Pain

To Use This Report (Optimal Viewing: Full Screen on 1080p Monitor):
Use the checkboxes below to subset the results. The top section includes data on the Summary level, meaning that studies are aggregated based on common outcomes. The second level, Studies, shows each study and their individual outcomes. If you would like to see the studies that are included in a Summary Outcome, then select the Summary(set) that you are interested in. This will filter the individual studies below.

Summary

<table>
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<tr>
<th>Condition</th>
<th>Intervention</th>
<th>Comparison</th>
<th>Effect On</th>
<th>Term</th>
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<tbody>
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<td>Chronic Low Back Pain</td>
<td>Exercise</td>
<td>Usual Care</td>
<td>Function</td>
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<tr>
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<td>Intermediate</td>
<td>Long</td>
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Studies

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<tr>
<th>Condition</th>
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<th>First Author and Year</th>
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The data from this report was extracted from a systematic review of Non-Pharmacological Interventions for Pain, funded by AHRQ. This report was generated during a T1 Methods Pilot funded by AHRQ.
Amid Opioid Crisis, States Start Embracing Alternative Medicine

Some aren’t just covering yoga and acupuncture but recommending it before prescription drugs.

BY MATTIE QUINN | NOVEMBER 2017

(Shutterstock)
Emerging areas

- Living systematic reviews
  - Machine learning, crowdsourcing
- Network meta-analysis
- Individual patient data meta-analysis
- Open access to data
- Evaluation of complex interventions
  - TIDieR checklist
Conclusions

• Many nonpharmacological interventions are available for chronic pain

• A number of nonpharmacological treatments are associated with effects on pain and function that are similar to pharmacological therapies

• Harms of nonpharmacological treatments are generally minimal

• Some evidence of persistent/sustained effects

• Use of “active” nonpharmacological treatments is consistent with a biopsychosocial approach to chronic pain
  • Exercise, mind-body interventions, psychological therapies, interdisciplinary rehabilitation