



Policy Considerations: Systematic Review of Nonpharmacologic Treatment for Chronic Pain

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Background

Chronic pain:

- Pain lasting ≥ 3 months or persisting past normal tissue healing time
- Leading cause of disability; impacts physical and mental functioning, productivity, quality of life, and relationships
- Often refractory to treatment; costs \$560 billion to \$635 billion annually
- Complex, multifaceted; biopsychosocial factors

2011 IOM report, National Pain Strategy: Opioid use concerns and need for evidence on treatment options

CDC Guideline: preferred use of non-opioid treatments recommendation

Purpose

Comparative effectiveness review purpose: To assess which noninvasive, nonpharmacologic treatments for common chronic pain conditions improve function and pain for at least one month after treatment

Presentation objective: To highlight results that might impact clinical and/or policy decision making

Key Questions

Key Questions: 5 common chronic pain conditions:

KQ 1: Chronic low back pain (non-radicular)

KQ 2: Chronic neck pain (non-radicular)

KQ 3: Osteoarthritis (hip, knee, hand)

KQ 4: Fibromyalgia

KQ 5: Primary chronic tension headache (≥ 15 d/12 wks or > 180 d/year)

KQ 6: Differential efficacy, safety (effects of age, sex, or comorbidities)

Subquestions/Comparators: for each condition, what are the **benefits and harms** of noninvasive nonpharmacologic therapies compared with

- a. Sham, no treatment, waitlist, attention control, or usual care?
- b. Pharmacological therapy?
- c. Exercise or (for headache) biofeedback?

Population, Interventions

Population: Adults (≥ 18 years); chronic pain (≥ 12 weeks or persisting past normal tissue healing time): LPB, NP, OA, fibromyalgia, primary CTTH

Interventions:

- Exercise
- Psychological therapies
- Physical modalities
- Manual therapies
- Mindfulness practices
- Mind-body practices
- Acupuncture
- Multidisciplinary/interdisciplinary rehabilitation

Analytic Framework

Interventions: Exercise, psychological therapies, physical modalities, manual therapies, mindfulness and mind-body practices, acupuncture, and multidisciplinary rehabilitation (includes functional restoration)

Population: Adults with one of the following chronic pain conditions: low back pain, neck pain, osteoarthritis, fibromyalgia, or headache

(KQ 6)

Age, sex,
comorbidities



(KQ 1-5)



(KQ 1-5)



Intervention-
related harms

Primary Outcomes

- Function/disability/pain interference
- Pain

Secondary Outcomes

- Psychological distress (depression, anxiety)
- Quality of life
- Opioid use
- Sleep quality, disturbance
- Health care utilization

Other inclusion criteria

Timing: ≥ 1 month follow-up after treatment or ≥ 6 months intervention

- Short term: 1 to < 6 months
- Intermediate term: ≥ 6 to < 12 months
- Long term: ≥ 12 months

Study Design: RCTs (including cross-over design)

Publication: Full-length studies in English; peer-reviewed journals

Setting: Non-hospital; self-directed care

Literature Searches

- **Databases/sources:**

Ovid MEDLINE®, Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews, through November 2017, reference lists, prior reports ClinicalTrials.gov; Federal Register Notice; peer review/public comment

- **Citations reviewed:** 4996

- **Citations retained:** 218 publications (202 trials; CLBP, 68; OA, 53; FM, 47, CNP, 25; CTTH, 9)

- **Common exclusions:** inadequate f/u, ineligible population, ineligible intervention, systematic review

Study limitations/risk of bias – individual studies

Primary Criteria:

- Random sequence generation
- Statement of allocation concealment
- Intent-to-treat analysis
- Baseline group similarity
- Blinding: patient, care provider, outcomes assessor/analyst
- Compliance acceptable in all groups (80%)
- Attrition: $\leq 20\%$ overall and between groups $<10\%$
- Timing of outcome assessment in all groups similar
- Avoidance of selective outcomes reporting

Overall rating: **Good, fair, poor**

Strength of Evidence

Included studies: RCTs

Risk of Bias Appraisal: Good, fair, poor
Synthesis/meta-analysis

Overall Strength of Evidence Determination (AHRQ/GRADE)



Outcome #1

Outcome #2

Outcome #3



Strength: High

Strength: Moderate

Strength: Low

Strength of Evidence Ratings

High	Very confident that effect is true.
Moderate	Moderately confident.
Low	Limited confidence.
Insufficient	No evidence or no confidence in effect.

Strength of Evidence Criteria

Overall body of evidence for primary outcomes:

- **Study limitations:** the extent to which the included studies protect against bias in majority of studies
- **Consistency:** degree to which estimates are similar in terms of range and variability.
- **Directness:** evidence directly related to patient health outcomes.
- **Precision:** level of certainty surrounding the effect estimates.
- **Publication/reporting bias:** selective reporting or publishing.

Definitions: Magnitude of Effect Size

	Slight/Small	Moderate	Large/Substantial
Pain	5–10 points on 0-100-point VAS or equivalent 0.5–1.0 points on 0-10-point NRS or equivalent	>10–20 points on 0-100-point VAS or equivalent >1–2 points on 0-10-point NRS or equivalent	>20 points on 0-100-point VAS or equivalent >2 points on 0-10-point NRS or equivalent
Function	5–10 points on ODI, WOMAC, KOOS, NPQ, FIQ Total 1–2 points on RDQ, Lequesne Index 7.5-10 points on the NDI 1.3 – 2.2 on the PSFS	>10–20 points >2–5 points >10-20 on the NDI 2.3 -2.6 on the PSFS	>20 points >5 points >20 points on the NDI >2.6 on the PSFS
Pain or function	0.2–0.5 SMD	>0.5–0.8 SMD	>0.8 SMD

Results: “Active” CLBP interventions vs. UC, waitlist , attention, placebo

	Function			Pain		
Intervention	Short-Term ES, SOE	Intermediate ES, SOE	Long-Term ES, SOE	Short-Term ES, SOE	Intermediate ES, SOE	Long-Term ES, SOE
Exercise	slight +	none +	none +	slight ++	moderate +	moderate +
Psychological: CBT primarily	slight ++	slight ++	slight ++	slight ++	slight ++	slight ++
Mind-Body Practices: Yoga	slight ++	slight +	no evidence	moderate +	moderate ++	no evidence
Mindfulness Practices: MBSR	none +	none +	none +	slight ++	slight +	none +
Multidisciplinary Rehabilitation	slight +	slight +	none +	slight ++	slight ++	none +

Results: “Passive” CLBP interventions vs. UC, waitlist , attention, sham

Intervention	Function			Pain		
	Short-Term ES, SOE	Intermediate ES, SOE	Long-Term ES, SOE	Short-Term ES, SOE	Intermediate ES, SOE	Long-Term ES, SOE
Physical Modalities: Ultrasound	insufficient evidence	no evidence	no evidence	none +	no evidence	no evidence
Modalities: Low Level Laser	slight +	none +	no evidence	moderate +	none +	no evidence
Manual Therapies: Spinal Manipulation	slight +	slight +	no evidence	none +	slight ++	no evidence
Manual Therapies: Massage	slight ++	none +	no evidence	slight ++	none +	no evidence
Manual Therapies: Traction	none +	no evidence	no evidence	none +	no evidence	no evidence
Acupuncture	slight +	none +	none +	slight ++	none +	slight +

Results: Active and passive CLBP interventions vs. exercise

	Function			Pain		
Intervention	Short-Term ES, SOE	Intermediate ES, SOE	Long-Term ES, SOE	Short-Term ES, SOE	Intermediate ES, SOE	Long-Term ES, SOE
“Active”						
Mind-Body Practices: Yoga	none +	none +	no evidence	slight +	none +	no evidence
Mind-Body Practices: Qigong	none +	slight favoring exercise +	no evidence	slight favoring exercise +	none +	no evidence
Multidisciplinary Rehabilitation	slight ++	slight ++	none +	slight ++	slight ++	none +
“Passive”						
Physical Modalities: Low-Level Laser Therapy	no evidence	none +	no evidence	no evidence	slight +	no evidence
Manual Therapies: Spinal Manipulation	none +	none +	no evidence	none +	slight +	no evidence
Manual Therapies: Massage	no evidence	none +	no evidence	no evidence	none +	no evidence

CLBP: High, non-high intensity multidisciplinary rehab

MDR vs. usual care, waitlist, attention control; impact of high (≥ 20 hours/week or >80 hours total) vs. non-high intensity MDR

- **Short term:** Effects on function and pain somewhat larger with high vs. non-high; interaction test was not statistically significant
- **Intermediate term:** No clear differences in function and NS differences in pain for high vs. non-high intensity; interaction NS

MDR vs. exercise: impact of high vs. non-high intensity

- **Short term:** Effect estimates for function and pain were similar when stratified by intensity
- **Intermediate term:** Pain estimates similar when stratified

Fibromyalgia “active” interventions vs. UC, waitlist , attention, placebo

Intervention	Function			Pain		
	Short-Term ES, SOE	Intermediate ES, SOE	Long-Term ES, SOE	Short-Term ES, SOE	Intermediate ES, SOE	Long-Term ES, SOE
Exercise	slight +	slight ++	none +	slight ++	none ++	none ++
Psychological Therapies: CBT	slight +	slight +	insufficient evidence	slight +	none +	insufficient evidence
Mind-Body: Qigong, Tai Chi	slight +	no evidence	no evidence	moderate +	no evidence	no evidence
Mindfulness Practices: MBSR	none ++	no evidence	no evidence	none ++	no evidence	no evidence
Multidisciplinary Rehabilitation	slight +	slight +	slight +	none +	slight +	none +

Fibromyalgia “passive” interventions vs. UC, waitlist , attention, placebo

	Function			Pain		
Intervention	<i>Short-Term</i> ES, SOE	<i>Intermediate</i> ES, SOE	<i>Long-Term</i> ES, SOE	<i>Short-Term</i> ES, SOE	<i>Intermediate</i> ES, SOE	<i>Long-Term</i> ES, SOE
Physical Modalities: Magnetic Pads	insufficient evidence	none +	no evidence	insufficient evidence	none +	no evidence
Manual Therapies: Massage (Myofascial Release)	no evidence	slight +	none +	insufficient evidence	insufficient evidence	slight +
Acupuncture	slight ++	slight ++	no evidence	none +	none +	no evidence

Knee OA interventions vs. UC, waitlist , attention, placebo/sham

Intervention	Function			Pain		
	Short-Term ES, SOE	Intermediate ES, SOE	Long-Term ES, SOE	Short-Term ES, SOE	Intermediate ES, SOE	Long-Term ES, SOE
“Active” Interventions						
Exercise	slight ++	slight +	slight +	slight ++	moderate +	none +
Psychological: Pain coping, CBT	none +	none +	none +	none +	none +	none +
“Passive” Interventions						
Modalities: Ultrasound	slight +	none +	no evidence	slight +	none +	no evidence
Modalities: TENS	no evidence	none +	no evidence	no evidence	none +	no evidence
Modalities: EM Field	none +	no evidence	no evidence	none +	no evidence	no evidence
Acupuncture	none +	none ++	no evidence	none +	none ++	no evidence

Results: Chronic Neck Pain (vs. UC, waitlist, attention, sham)

	Function			Pain		
Intervention	Short-Term ES, SOE	Intermediate ES, SOE	Long-Term ES, SOE	Short-Term ES, SOE	Intermediate ES, SOE	Long-Term ES, SOE
“Active” Interventions						
Exercise	none +	no evidence	no evidence	none +	no evidence	no evidence
Psychological Therapies: PT-lead relaxation training	none +	none +	no evidence	none +	none +	no evidence
Mind-Body: Alexander Technique	slight +	slight +	no evidence	no evidence	no evidence	no evidence
“Passive” Interventions						
Physical Modalities: Low Level Laser	moderate ++	no evidence	no evidence	moderate ++	no evidence	no evidence
Manual Therapies: Massage	none +	none +	no evidence	no evidence	no evidence	no evidence
Acupuncture	slight +	slight +	none +	none +	none +	none +

Limitations

- Evidence was sparse for most interventions with little or no includable evidence for some; evidence varied across conditions
- Data on long term effects and harms were sparse
- Not possible to effectively blind participants for many interventions
- Restricted to RCTs with at least 1 month follow-up after treatment in patients with one of five chronic pain conditions
- Heterogeneity in clinical presentation/diagnosis as well as within and across interventions and comparators
- Limited evidence comparing interventions with active comparators
- Patients likely continued medications/other treatments

Summary and Implications

- Exercise, CBT, MDR, mind-body interventions, some complementary and alternative therapies showed sustained effect on function with no evidence of serious harms; effect sizes were generally small
 - Findings support guidelines recommending such treatments
 - Given heterogeneity in CP, variability in patient preferences and possible differential treatment response within a given condition, broader access to a wider array of effective nonpharm treatments may have a greater impact (vs. focus on single/few therapies)
 - Policy could prioritize access to such interventions across pain conditions, however supporting evidence varies across conditions and reasonableness of extrapolation of findings across conditions needs to be considered (e.g. CBT for LBP vs. OA)

Summary and Implications

- MDR for CLBP:
 - Findings suggest that less-intensive may be similarly effective to more intensive MDR and may have implications for MDR delivery
 - Evidence supports MDR use over exercise or UC but cost and availability may be barriers, particularly in rural areas
- Evidence for “active” vs. “passive” interventions may inform clinical strategies/treatment priorities for CLBP, FM, OA
- Variability in access and reimbursement, particularly for complimentary and alternative therapies needs consideration
- Aside: Value vs. meds – ICER report suggests CBT, mind-body therapies for CLBP, NP may be cost effective, meet benchmarks and have a small PMPM increase

Report and related information

Report available at:

<https://effectivehealthcare.ahrq.gov/sites/default/files/pdf/nonpharmachronic-pain-cer-209.pdf>

Protocols for related work:

Systematic Review Update: Noninvasive Nonpharmacologic Treatments for Chronic Pain

<https://effectivehealthcare.ahrq.gov/topics/noninvasive-nonpharm-pain-update/protocol>

Nonopioid Pharmacologic Treatments for Chronic Pain

<https://effectivehealthcare.ahrq.gov/topics/nonopioid-chronic-pain/protocol>

Opioid Treatments for Chronic Pain

<https://effectivehealthcare.ahrq.gov/topics/opioids-chronic-pain/protocol>

Thank you! Questions?

