Nonpharmacologic Therapies for Acute and Chronic Low Back Pain: A Review of the Evidence for an American Pain Society And American College of Physicians Clinical Practice Guideline

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This article has 188 references

Intervention Definitions

Spinal manipulation
Manual therapy in which loads are applied to the spine using short- or long-lever methods. High-velocity thrusts are applied to a spinal joint beyond its restricted range of movement.

Spinal mobilization
Low-velocity, passive movements within or at the limit of joint range.

Massage
Soft tissue manipulation using the hands or a mechanical device through a variety of specific methods.

Acupuncture
An intervention consisting of the insertion of needles at specific acupuncture points.

Exercise therapy
A supervised exercise program or formal home exercise regimen, ranging from programs aimed at general physical fitness or aerobic exercise to programs aimed at muscle strengthening, flexibility, or stretching.

Yoga
An intervention distinguished from traditional exercise therapy by the use of specific body positions, breathing techniques, and emphasis on mental focus.

Back schools
An intervention consisting of an education and a skills program, including exercise therapy, in which all lessons are given to groups of patients and supervised by a paramedical therapist or medical specialist.

Psychological therapies
Includes biofeedback (the use of auditory and visual signals reflecting muscle tension or activity to inhibit or reduce the muscle activity), progressive relaxation (a technique that involves the deliberate tensing and relaxation of muscles to facilitate
the recognition and release of muscle tension), and standard cognitive-behavioral and operant therapy.

Interdisciplinary therapy (also called *multidisciplinary therapy*)
An intervention that combines and coordinates physical, vocational, and behavioral components and is provided by multiple health care professionals with different clinical backgrounds.

Functional restoration (also called *physical conditioning, work hardening, or work conditioning*)
An intervention that involves simulated or actual work tests in a supervised environment in order to enhance job performance skills and improve strength, endurance, flexibility, and cardiovascular fitness in injured workers.

Interferential therapy
The superficial application of a medium-frequency alternating current modulated to produce low frequencies up to 150 Hz.

Low-level laser therapy
The superficial application of lasers at wavelengths of 632–904 nm.

Lumbar supports
A back brace or orthotic device worn to passively support the back.

Shortwave diathermy
Therapeutic elevation of the temperature of deep tissues by application of shortwave electromagnetic radiation with a frequency range of 10–100 MHz.

Superficial heat
The superficial application of heat to the lumbar area.

Traction
An intervention involving drawing or pulling to stretch the lumbar spine.

Transcutaneous electrical nerve stimulation (TENS)
Use of a small battery-operated device to provide continuous electrical impulses via surface electrodes, with the goal of relieving symptoms by modifying pain perception.

Ultrasonography
The therapeutic application of high-frequency sound waves up to 3 MHz.
FROM ABSTRACT:

Background:
Many nonpharmacologic therapies are available for treatment of low back pain.

Purpose:
To assess benefits and harms of acupuncture, back schools, psychological therapies, exercise therapy, functional restoration, interdisciplinary therapy, massage, physical therapies (interferential therapy, low-level laser therapy, lumbar supports, shortwave diathermy, superficial heat, traction, transcutaneous electrical nerve stimulation, and ultrasonography), spinal manipulation, and yoga for acute or chronic low back pain (with or without leg pain).

Data Sources:
English-language studies were identified through searches of MEDLINE (through November 2006) and the Cochrane Database of Systematic Reviews (2006, #4). These electronic searches were supplemented by hand searching of reference lists and additional citations suggested by experts.

Study Selection:
Systematic reviews and randomized trials of 1 or more of the preceding therapies for acute or chronic low back pain (with or without leg pain) that reported pain outcomes, backspecific function, general health status, work disability, or patient satisfaction.

Data Synthesis:
We found good evidence that cognitive-behavioral therapy, exercise, spinal manipulation, and interdisciplinary rehabilitation are all moderately effective for chronic or subacute (4 weeks’ duration) low back pain.

Benefits over placebo, sham therapy, or no treatment averaged 10 to 20 points on a 100-point visual analogue pain scale, 2 to 4 points on the Roland–Morris Disability Questionnaire, or a standardized mean difference of 0.5 to 0.8.

We found fair evidence that acupuncture, massage, yoga, and functional restoration are also effective for chronic low back pain.

For acute low back pain (4 weeks’ duration), the only nonpharmacologic therapies with evidence of efficacy are superficial heat (good evidence for moderate benefits) and spinal manipulation (fair evidence for small to moderate benefits).

Conclusions:
Therapies with good evidence of moderate efficacy for chronic or subacute low back pain are cognitive-behavioral therapy, exercise, spinal manipulation, and interdisciplinary rehabilitation.
For acute low back pain, the only therapy with good evidence of efficacy is superficial heat.

THESE AUTHORS ALSO NOTE:

This article summarizes current evidence on noninvasive therapies for low back pain in adults.

These authors excluded trials of low back pain associated with acute major trauma, cancer, infection, the cauda equina syndrome, fibromyalgia, and osteoporosis or vertebral compression fracture.

RESULTS

**Spinal Manipulation**

Sixty-nine unique trials on efficacy of spinal manipulation were included in 12 systematic reviews.

“For acute low back pain, a higher-quality Cochrane review found spinal manipulation to be slightly to moderately superior to sham manipulation for short-term pain relief.”

“For chronic low back pain, the Cochrane review found spinal manipulation moderately superior to sham manipulation (3 trials) and therapies thought to be ineffective or harmful (5 trials).”

“Five systematic reviews consistently found that serious adverse events after spinal manipulation (such as worsening lumbar disc herniation or the cauda equina syndrome) were very rare. One systematic review found no serious complications reported in more than 70 controlled clinical trials. Including data from observational studies, the risk for a serious adverse event was estimated as less than 1 per one million patient visits.”

**Massage**

Eight unique trials of massage were included in 2 systematic reviews.

“For acute low back pain, evidence is insufficient to determine efficacy of massage.”

There is some evidence that massage is beneficial when combined with exercise and education. “One higher-quality trial found that beneficial effects of massage compared with acupuncture and self-care education persisted for 1 year.”

“Massage seemed more effective in trials that used a trained massage therapist with many years of experience or a licensed massage therapist.”
Negative trials of massage often evaluated superficial massage techniques with brief treatment sessions (10 to 15 minutes), or few sessions.

**Acupuncture**

Fifty-one trials on efficacy of acupuncture were included in 3 systematic reviews.

For chronic low back pain, the systematic reviews found acupuncture moderately more effective than no treatment or sham treatments for short-term (6 weeks to 3 months duration) pain relief.

Acupuncture was associated with moderate (38%) short-term improvements in functional status compared with no treatment.

“The addition of acupuncture to a variety of noninvasive interventions significantly improved pain and function through 3 to 12 months in 4 higher-quality trials.”

**Exercise Therapy**

Seventy-nine unique trials of exercise therapy were included in 6 systematic reviews.

For acute low back pain, exercise therapy is superior to usual care or no treatment in only 2 of 9 trials.

Exercise therapy was not superior to other noninvasive treatments for acute or subacute low back pain.

“For chronic low back pain (43 trials), the Cochrane review found exercise slightly to moderately superior to no treatment for pain relief.”

“The authors of the Cochrane review also conducted a meta-regression analysis and found that exercise therapy using individualized regimens, supervision, stretching, and strengthening was associated with the best outcomes.”

**Yoga**

One higher-quality trial (101 patients) found 6 weeks of a therapeutically oriented yoga style to be slightly superior to conventional exercise and moderately superior to a self-care education book.

Yoga was also associated with decreased medication use at week 26 compared with exercise and the self-care book.

**Back Schools**
Thirty-one unique trials of back schools were included in 3 systematic reviews.

For acute or subacute low back pain, back school was not effective for pain or long-term recurrences.

For chronic low back pain, most studies found no benefits to back schools.

**Psychological Therapies**

Thirty-five trials of psychological therapies for chronic low back pain were included in 2 systematic reviews.

“No differences were seen between psychological therapies and other active therapies (such as exercise or usual care) for most outcomes.”

Psychological therapies did not improve outcomes when added to a variety of other noninvasive therapies.

**Interdisciplinary Rehabilitation and Functional Restoration**

Twenty-eight trials were included in 4 systematic reviews of interdisciplinary rehabilitation or functional restoration.

For chronic low back pain, intensive (100 hours) daily interdisciplinary rehabilitation was moderately superior to noninterdisciplinary rehabilitation or usual care for short- and long-term functional status at 3 to 4 months.

Interdisciplinary rehabilitation was also moderately superior for pain outcomes at 3 to 4 months.

“In contrast to more intensive interventions, less intensive interdisciplinary rehabilitation was no better than noninterdisciplinary rehabilitation or usual care.”

**Interferential Therapy**

There were no clear differences between interferential therapy and either spinal manipulation or traction for subacute or chronic back pain.

**Low-Level Laser Therapy**

These authors found no systematic reviews of low-level laser therapy for low back pain.
“For chronic low back pain or back pain of unspecified duration, 4 trials found laser therapy superior to sham for pain or functional status up to 1 year after treatment.”

**Lumbar Supports**

Six trials of lumbar supports for treatment of low back pain were included in a higher-quality Cochrane review.

For low back pain, there was insufficient available evidence to determine efficacy of lumbar supports compared with other interventions.

**Shortwave Diathermy**

For acute low back pain shortwave diathermy is inferior to spinal manipulation for pain relief after 2 weeks.

For chronic low back pain or low back pain lasting more than 1 week there was no differences between shortwave diathermy versus sham diathermy.

**Superficial Heat**

Nine trials of superficial heat or cold were included in a higher-quality Cochrane review.

“For acute low back pain, the Cochrane review found consistent evidence from 3 higher-quality trials that heat wrap therapy or a heated blanket is moderately superior to placebo or a nonheated blanket for short-term pain relief and back-specific functional status.”

**Traction**

Twenty-four trials of traction were included in 3 systematic reviews.

In treating low back pain, traction is no more effective than placebo, sham, or no treatment for any reported outcome.

For sciatica, self, static traction was more effective than placebo, sham, or no treatment, but “intermittent traction was not effective.”

**TENS**

Eleven unique trials of TENS were included in a higher quality Cochrane review of TENS and 5 systematic reviews of other interventions.

Largely, TENS was not effective in the treatment of chronic low back pain.
For subacute low back pain TENS is moderately inferior to spinal manipulation for subacute low back pain.

**Ultrasound**

For chronic low back pain or low back pain of unspecified duration, ultrasound was not effective.

For acute sciatica, ultrasound is superior to sham ultrasound or analgesics for pain relief.

**DISCUSSION**

“We found good evidence that psychological interventions (cognitive-behavioral therapy and progressive relaxation), exercise, interdisciplinary rehabilitation, functional restoration, and spinal manipulation are effective for chronic or subacute (4 weeks’ duration) low back pain.”

“Compared with placebo or sham therapies, these interventions were associated with moderate effects, with differences for pain relief in the range of 10 to 20 points on a 100-point visual analogue pain scale.”

There is fair evidence that acupuncture is more effective than sham acupuncture.

There is fair evidence that massage is similar in efficacy to other noninvasive interventions for chronic low back pain.

Intensive interdisciplinary rehabilitation is moderately more effective than non-interdisciplinary rehabilitation for improving pain and function.

There is fair evidence that yoga is slightly superior to traditional exercises for functional status and use of analgesic medications.

“For acute low back pain (4 weeks’ duration), the only nonpharmacologic therapies with evidence of efficacy are superficial heat (good evidence for moderate benefits) and spinal manipulation (fair evidence for small to moderate benefits).”

“Other noninvasive therapies (back schools, interferential therapy, low-level laser therapy, lumbar supports, TENS, traction, and ultrasonography) have not been shown to be effective for either chronic or subacute or acute low back pain.”
KEY POINTS FROM DAN MURPHY

1) This article, published in the *Annals of Internal Medicine*, October 2007, is probably the most comprehensive review of the literature concerning non-drug therapies used in the treatment of low back pain. It was prepared for the American Pain Society and the American College of Physicians Clinical Practice Guideline.

2) Many nonpharmacologic therapies are available for treatment of low back pain.

3) These authors assessed the benefits and harms of acupuncture, back schools, psychological therapies, exercise therapy, functional restoration, interdisciplinary therapy, massage, physical therapies (interferential therapy, low-level laser therapy, lumbar supports, shortwave diathermy, superficial heat, traction, transcutaneous electrical nerve stimulation, and ultrasonography), spinal manipulation, and yoga for acute or chronic low back pain (with or without leg pain).

4) There is “good evidence that cognitive-behavioral therapy, exercise, spinal manipulation, and interdisciplinary rehabilitation are all moderately effective for chronic or subacute (4 weeks’ duration) low back pain.”

5) There is “fair evidence that acupuncture, massage, yoga, and functional restoration are also effective for chronic low back pain.”

6) “For acute low back pain (4 weeks’ duration), the only nonpharmacologic therapies with evidence of efficacy are superficial heat (good evidence for moderate benefits) and spinal manipulation (fair evidence for small to moderate benefits).”

7) Therefore, the only non-drug treatment that has proven evidence to benefit acute, subacute, and chronic back pain is spinal manipulation.

8) In this study, manipulation was defined as “Manual therapy in which loads are applied to the spine using short- or long-lever methods. High-velocity thrusts are applied to a spinal joint beyond its restricted range of movement.”

9) These authors concluded “Therapies with good evidence of moderate efficacy for chronic or subacute low back pain are cognitive-behavioral therapy, exercise, spinal manipulation, and interdisciplinary rehabilitation.”

10) Importantly, these authors did not review the evidence of benefit / harm in trials of low back pain associated with acute major trauma, cancer, infection, the cauda equina syndrome, fibromyalgia, and osteoporosis or vertebral compression fracture.
The Following Chart Summarizes The Treatment Benefit For Low Back Pain

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<th>Acute</th>
<th>Subacute</th>
<th>Chronic</th>
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<tr>
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11) “Massage seemed more effective in trials that used a trained massage therapist with many years of experience or a licensed massage therapist.”

12) “For chronic low back pain, the Cochrane review found exercise slightly to moderately superior to no treatment for pain relief.”

13) “The authors of the Cochrane review also conducted a meta-regression analysis and found that exercise therapy using individualized regimens, supervision, stretching, and strengthening was associated with the best outcomes.”

14) “We found good evidence that psychological interventions (cognitive-behavioral therapy and progressive relaxation), exercise, interdisciplinary rehabilitation, functional restoration, and spinal manipulation are effective for chronic or subacute (4 weeks’ duration) low back pain.”

15) There is fair evidence that acupuncture is more effective than sham acupuncture.

16) There is fair evidence that massage is similar in efficacy to other noninvasive interventions for chronic low back pain.

17) Intensive interdisciplinary rehabilitation is moderately more effective than non-interdisciplinary rehabilitation for improving pain and function.

18) There is fair evidence that yoga is slightly superior to traditional exercises for functional status and use of analgesic medications.

19) “For acute low back pain (4 weeks’ duration), the only nonpharmacologic therapies with evidence of efficacy are superficial heat (good evidence for moderate benefits) and spinal manipulation (fair evidence for small to moderate benefits).”

20) “Other noninvasive therapies (back schools, interferential therapy, low-level laser therapy, lumbar supports, TENS, traction, and ultrasonography) have not been shown to be effective for either chronic or subacute or acute low back pain.”


