

What is the best way to manage phantom limb pain?

Evidence-based answer

No single best therapy for phantom limb pain (PLP) exists. Treatment requires a coordinated application of conservative, pharmacologic, and adjuvant therapies.

Evaluative management (including prosthesis adjustment, treatment of referred pain, and residual limb care) should be tried initially (strength of recommendation [SOR]: **C**, expert opinion). Other first-line treatments such as transcutaneous electrical nerve stimulation (TENS) (SOR: **A**, multiple high-quality randomized, control trials

[RCTs]), and biofeedback (SOR: **B**, numerous case studies) can reduce PLP. Pharmacotherapy, including opioids, anticonvulsants (gabapentin), and nonsteroidal anti-inflammatory drugs (NSAIDs), can also relieve pain (SOR: **B**, initial RCTs and inconsistent findings).

Adjuvant therapies (mirror box therapy, acupuncture, calcitonin, and N-methyl d-aspartate receptor antagonists) haven't been rigorously investigated for alleviating PLP, but can be considered for patients who have failed other treatments.

Evidence summary

An estimated 1.7 million people in the United States are living with limb loss. The number is expected to increase because of ongoing military conflicts.¹ The incidence of PLP is 60% to 80% among amputees.¹

A multidisciplinary approach

A lack of comparative clinical trials of therapies for PLP has led health-care providers to adopt a multidisciplinary approach that combines evaluative management, desensitization, psychotherapy, and pharmacotherapy (**FIGURE**).

Evaluative management, based largely on expert opinion, includes assessing the fit of the prosthesis, treating referred pain, and assessing aggravating factors. Because residual limb pain can exacerbate PLP, adjusting a poorly fit-

ting prosthesis or providing the patient with NSAIDs when there is evidence of stump inflammation may adequately control pain.^{2,3} Anatomically distant pain syndromes, such as hip or lower back pain, can also aggravate PLP and should be managed to provide optimal pain relief.²

Desensitization, using TENS, has reduced PLP in multiple placebo-controlled trials and epidemiologic surveys.²⁻⁵ TENS is an easy-to-use, low-cost, noninvasive, first-line therapy.⁵ Its long-term effectiveness in alleviating PLP remains unknown.² Some experts suggest that pain reductions after 1 year of treatment are comparable to placebo.² Other forms of desensitization (percussion and massage) are supported only by anecdotal reports.

Psychotherapy, including biofeedback, has been found in several case

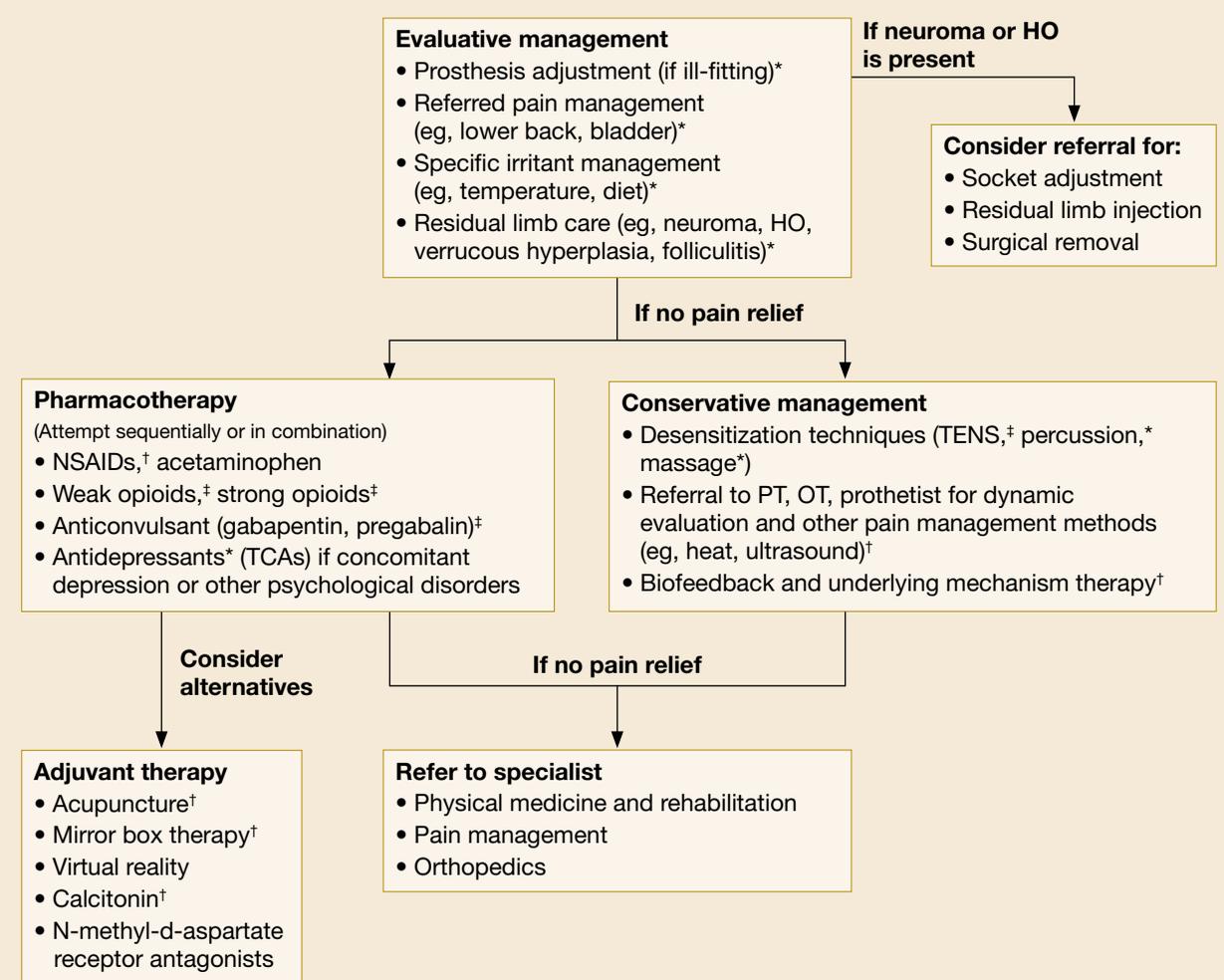
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FAST TRACK

Treatment of phantom limb pain requires a coordinated application of conservative, pharmacologic, and adjuvant therapies.

FIGURE

Management of phantom limb pain¹⁻¹⁰

HO, heterotopic ossification; NSAIDs, nonsteroidal anti-inflammatory drugs; OT, occupational therapy; PT, physical therapy; TCAs, tricyclic antidepressants; TENS, transcutaneous electrical nerve stimulation.

*Expert opinion.

†Case studies.

‡Randomized controlled trials or cohort studies.

studies to effectively treat chronic PLP.^{2,5} Psychotherapy can reportedly reveal the underlying mechanisms (muscle spasm, vascular insufficiency) and therefore direct therapeutic interventions by biofeedback or other focus techniques.²

Pharmacotherapy is best used as an adjunct to other treatments.² Although PLP is typically treated as neuropathic pain, only a few medications have been critically evaluated for treating it.⁶ Morphine

(number needed to treat [NNT]=2.5; 95% confidence interval [CI], 1.9-3.4) and other opioids, including tramadol (NNT=3.9; 95% CI, 2.7-6.7 in neuropathic pain) help some patients.^{6,7} Despite the proven benefit of tricyclic antidepressants (TCAs) in other neuropathic pain conditions, a recent RCT demonstrated no benefit of TCAs over placebo in PLP.⁸ Anticonvulsants, including gabapentin, have documented benefit in neuropathic pain modalities and are often used for

PLP.⁶ However, their value in reducing PLP is still under investigation.⁶ One 2002 RCT showed benefit regarding an improvement of the visual analog scale by an average of 3 points (on a 10-point scale) after 6 weeks of gabapentin therapy.⁹ A similarly designed 2006 RCT of gabapentin, however did not identify significant pain reductions.¹⁰

Promising adjuvant therapies use mirroring techniques

Of the adjuvant treatments mentioned previously, only mirror box therapy has shown promise. This technique allows the amputee to perceive the missing limb by focusing on the reflection of the remaining limb during specific movements and activities. Theoretically, this perception allows reconfiguration of the amputee's sensory cortex.

Virtual reality therapy employs similar techniques based on the idea that the brain can be deceived. Initial case studies

are promising and have prompted further research.¹¹

Recommendations

The US Department of Veterans Affairs and Department of Defense recently issued clinical guidelines for rehabilitating lower-limb amputees that include a segment on pain management.¹² The guidelines stress the importance of an interdisciplinary team approach that addresses each pathology plaguing the amputee.

They recommend narcotics during the immediate postoperative period, followed by transition to a non-narcotic medical regimen during the rehabilitation process. The guidelines don't support a single, specific pain control method over others; they recommend the following approaches to PLP:

- pharmacologic treatment, which may include antiseizure medications, tricyclic antidepressants, selective serotonin reuptake inhibitors, NSAIDs, dextro-

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FAST TRACK

Of the available adjuvant treatments for managing phantom limb pain, only mirror box therapy has shown promise.

