PALLIATIVE CARE NETWORK OF WISCONSIN

FAST FACTS AND CONCEPTS #212
PHANTOM LIMB PAIN

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Background Phantom limb pain (PLP) can be a painful and debilitating consequence of limb amputation from any cause including trauma, cancer, and vascular diseases. This *Fast Fact* will review the evaluation and management of PLP.

Definition and Characteristics PLP describes pain which patients perceive as coming from an amputated limb as if it were still contiguous with the body. It is distinct from pain at the actual site of the amputation ('stump pain'). Patients usually experience PLP as occurring in the distal part of the phantom limb and can describe it as feeling 'burning,' 'tingling,' 'sharp,' and 'cramping.' Uncomfortable perceptions of limb distortion (such as retraction into the stump) are also reported. PLP is most commonly seen after limb amputation, but similar syndromes can occur with the removal of other body parts including breasts, testicles, eyes, and tongue.

Epidemiology PLP occurs in 50-80% of patients after amputation, but is severe in 5-10% of cases. Risk factors for developing PLP include: tumor-related amputations, chronic limb pain prior to amputation, and significant pain the day of amputation. Despite this, meticulous peri-operative analgesia with epidural anesthesia has not been clearly shown to prevent PLP.

Pathophysiology Both central and peripheral mechanisms are believed to mediate PLP and are incompletely understood. Amputation can lead to reorganization of the somatosensory cortex with 'remapping' of the location of amputated limb into the mouth and chin areas. For these patients stimulation of the mouth or ipsilateral face can cause sensations, including pain, that seem be originating from the phantom limb. Central sensitization from preexisting chronic limb pain as well as ectopic discharges from the stump neuroma are also implicated.

Therapy While both drug and non-drug therapies have been investigated, treatment of phantom limb pain remains poorly studied and is largely empiric. *Due to the complex nature of PLP and its therapies, a multi-disciplinary approach to treatment is mandatory including pain specialists, physiatrists, physical and occupational therapists, and psychologists.*

- Drug treatment: Most clinicians approach PLP as a neuropathic pain syndrome. A few small controlled trials have shown positive results with gabapentin, ketamine, and opioids, but not with tricyclic antidepressants. Despite this, there is insufficient evidence to judge the superiority or inferiority of any drug therapy for PLP, and most clinicians empirically use the full range of adjuvant analgesics along with opioid therapy if needed in its management.
- Non-drug treatments: Non-pharmacologic therapies have also been investigated. These include massage, biofeedback, regional nerve blocks, myoelectrical prostheses, transelectrical nerve stimulation, botulinum toxin injection, and, lidocaine/depomedrol injections. In small studies, the regular use of a myoelectric prosthesis (a prosthesis with electrodes embedded in the socket which stimulate nerves in the stump), has been demonstrated to alter cortical re-organization and reduce pain. For those patients for whom a myoelectric prosthesis is not possible, transelectrical nerve stimulation (a TENS unit) to the stump can have a similar affect. In a small randomized pilot study, a single injection of either botulinum toxin or lidocaine/depomedrol improved residual limb pain but it did not lead to pain reduction for PLP.
- Mirror therapy: This is a newly investigated approach which involves the placement of mirrors to create the illusion of an intact limb (patients visually perceive that they have an intact limb where their stump is). Patients are taught to move both the real and the illusory limb with the hypothesis that this increases control of the brain over the phantom limb and leads to a decrease in PLP. Two controlled studies showed significant pain reduction in chronic PLP patients who underwent mirror therapy.

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