

# Phantom limb pain: A brief discussion of treatment considerations including management of symptomatic neuromas

**F**rom 2010 to 2019, WorkSafeBC saw 120 injured workers requiring an upper or lower limb amputation. Thirty-nine percent of those workers subsequently developed phantom limb pain (PLP).

Having an amputation changes many aspects of life: mobility, balance, endurance, dexterity, self-confidence, mood, vocation, recreation, and more. In addition, most individuals with amputations experience post-amputation pain that may include PLP, phantom limb sensation, or residual limb pain.

PLP is a well-recognized condition that affects most amputees at some point after limb loss. Pain is perceived as arising from the limb that is no longer there. It is often described as electrical, shooting, stabbing, burning, cramping, or intense pins and needles. Phantom limb sensation is the non-noxious perception that the amputated limb/digit is still present. Residual limb pain may result from (1) extrinsic sources such as undue pressure, friction, or shear from the use of a prosthesis or (2) intrinsic etiologies such as vascular insufficiency, local infection, muscle cramping, tendinopathies, or bursitis.

PLP is not solely a result of “centralized pain”: there are peripheral, spinal, and supraspinal modulators. One possible peripheral pain source may be a transected nerve that forms a symptomatic neuroma, which then refers pain to the phantom limb. Although every cut nerve will form a terminal neuroma, not all terminal

neuromas become symptomatic. The incidence of symptomatic neuroma presentation is variably reported in the literature and depends on the site of amputation; therefore, the clinical presentation is what drives the diagnostic consideration. Accurate identification of a symptomatic neuroma may lead to more definitive management of presenting PLP.

Taking a history of phantom pain should include the location pattern of the phantom symptoms. If the distribution of PLP is suggestive of a peripheral nerve territory, evaluate the patient for hypersensitivity along the expected course of the identified nerve. If mechanical stimulation (tapping, applying pressure) elicits the typical experience of the bothersome PLP symptoms, there may be a role for further diagnostic and therapeutic actions. Image-guided local anesthetic (+/- corticosteroid) diagnostic blocks of the specific peripheral nerves in question help determine if further focal nerve intervention may reduce the severity of PLP symptoms.

Since the early 2000s, newer peripheral nerve surgical techniques have emerged to manage symptomatic neuromas. More recently, these procedures are starting to be done at the time of the initial amputation surgery with the goal of preventing neuroma formation from happening at all. Targeted muscle reinnervation surgery is a technique where the transected nerve is transferred (coapted) into a recipient motor nerve within the amputated residual limb. The nerve then “has a place to go” as it reinnervates the recipient muscle. Regenerative peripheral nerve interface surgery uses nonvascularized

pieces of muscle wrapped around the transected nerve ending with the goal of having the nerve fibres grow into, or innervate, the muscle graft. Clinical observation and reports from the literature suggest that targeted muscle reinnervation may be the preferred choice for larger mixed (sensory-motor) nerves where an appropriate recipient muscle can be identified in the local area of the neurectomy.

The intensity, duration, and provoking/relieving factors of PLP vary among individuals. Taking the history and examining the patient through the lens of “looking for root cause” helps guide treatment. Effective pain management plans can be challenging to discover but may consist of nonpharmacologic strategies, prosthetic adjustments, topical/oral medications, injections, or surgery.

In BC, there are several centres where treatments and procedures are being evaluated and implemented. The goal of care is optimization of pain management, function, and quality of life. The therapeutic approach often requires multidisciplinary input from various specialties that may include physiatry, plastic surgery, diagnostic/interventional radiology, anesthesiology, prosthetists, physiotherapy, occupational therapy, and psychology. Consider referring to an amputee clinic or a physiatrist in your community if assistance is needed. ■

—Rhonda Willms, MD

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*This article is the opinion of WorkSafeBC and has not been peer reviewed by the BCMJ Editorial Board.*