Dealing with phantom limb pain after amputation

Nurses must conduct holistic assessments to manage this condition appropriately

In this article...

- The mechanism of phantom limb pain
- The barriers to accurate pain assessment
- Why patients may not report pain
- What pain assessment tools are available

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Abstract Fiedlsen D, Wood S (2011) Dealing with phantom limb pain after amputation. Nursing Times; 107, 1: 21-23. Patients usually experience phantom limb pain after amputation but it may also occur following resection of other parts of the body, such as the breast and internal organs like the rectum. The causes are complex and patients require careful assessment to ensure they receive appropriate care. This article describes the causes of phantom limb pain and discusses assessment strategies.

Phantom limb pain (PLP) is reported in 60–80% of patients after a limb amputation, with up to 10% reporting severe pain (Nikolajsen et al, 2006). It is defined as a painful phenomenon at the site of limb amputation, which gives the sensation that the limb may still be there (Australian and New Zealand College of Anaesthetists, 2010; Nikolajsen et al, 2006). Table 1 lists descriptions of phantom pain after amputation.

Phantom pain has also been reported after amputation and removal of other body parts, including the breast, rectum, tongue and/or teeth and genitalia. Reasons for amputation include vascular disease (including neuropathy caused by diabetes), trauma, infection and abnormal tissue growth (Limb Loss Information Centre, 2010).

What is pain?

Pain is an individual experience, which is not caused solely by a painful stimulus (Mann et al, 2009). The perception of pain can be affected by numerous factors, including memory of previous pain, the cause of the pain, the type and intensity of preoperative pain and cultural perspectives of pain (Mann et al, 2009).

The International Association for the Study of Pain (2010) defines pain as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage”. This suggests pain is not only a physiological process, but an experience that people interpret individually, regardless of whether there is actual injury to the body. This may help to explain why patients experience PLP.

The pain response

A response to noxious stimuli occurs after amputation surgery, resulting in patients experiencing nociceptive pain. The nociceptive pain pathway includes transduction, transmission, perception and modulation (McCaffrey et al, 1999). These are outlined in Box 1.

Normal nociceptive pain will be experienced after surgery, but the exact physiology of PLP is unknown (Houser, 2002). It may be experienced in missing limbs and stumps, and a range of symptoms that are different to those associated with nociceptive pain will be present (see Table 1).

There may be no physical reason for PLP (McCaffrey et al, 1999) but it can be associated with the physiological mechanisms of neuropathic’ pain (Flor, 2002). Neuropathic pain is associated with a primary lesion or dysfunctions in the nervous system (IASP, 2010). Box 2 outlines possible causes of PLP.

Assessment of phantom limb pain

Nurses have an important role in managing pain control because they have more contact with patients who are experiencing pain than any other healthcare professional (Mann et al, 2009). Using pain assessment tools improves communication and makes it easier to select the appropriate treatment (Mann et al, 2009).

The Department of Health (2010) suggests assessment should include an evidence based tool that is appropriate to the individual’s needs and health problem. Assessment should consider the physical, psychological, social and spiritual aspects of the pain experience (DH, 2010). The Clinical Resource Efficiency Support Team (2008) and the National Institute for Health and Clinical Excellence (2010) offer guidance on the pharmacological management and treatment of neuropathic pain. This type of pain is often an element of PLP but guidance does not specifically mention it.

Pain assessment tools

Common pain assessment tools include:

- The four-point verbal rating scale (VRS), which is used to describe increasing pain intensity: 0 (no pain); 1 (mild pain); 3 (moderate pain); 4 (severe pain).
- The 10-point numerical rating scale (NRS), which is represented as a line with numbers: 0 (no pain) to 10 (most pain possible) on which patients indicate their level of pain.

Measuring pain intensity is an important part of assessment (Turk et al, 2001) and benefits of these tools include ease of use (Jensen et al, 2001).

Research has demonstrated that the VRS

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Nociceptive pain may be experienced in missing limbs and stumps

**Table 1. Types of phantom limb pain**

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<thead>
<tr>
<th>Type of pain</th>
<th>Symptoms</th>
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<tr>
<td>Phantom pain</td>
<td>Burning, tingling, stinging, cramping, shooting, twisting. Often stronger versions of phantom sensations</td>
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<tr>
<td>Phantom sensations</td>
<td>Sense of position, temperature, itching, discomfort</td>
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<tr>
<td>Stump pain</td>
<td>Localised pain in the area of amputation, often acute postoperative pain</td>
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Adapted from Australian and New Zealand College of Anaesthetists (2005)

**Box 1. NOCICEPTIVE PAIN PATHWAYS**

- **Transduction:** Initial stimulation of the primary afferent neurons occurs as a result of thermal, mechanical or chemical stimuli from amputation surgery and the inflammatory response (Caterina et al, 2005). This causes the release of excitatory neurotransmitters including prostaglandins, substance P and histamine.
- **Transmission:** Impulses are generated along the afferent neurons to the dorsal horn of the spinal cord. Through excitatory neurotransmitters, the impulse can continue across the synaptic cleft, up the spinal cord, through the ascending pathways to the brain stem and thalamus (Wood, 2008; McCaffrey et al, 1999).
- **Perception:** This does not originate from one distinct area of the brain, which has led to the neuromatrix theory (Brooks et al, 2005). Melzack and Wall (1965) proposed this theory to describe the mechanism of phantom limb pain, suggesting a network of neurons continuously communicated information about pain sensation through various circuits in the brain.
- **Modulation:** This describes regulating the response to the perceived pain (Jagger, 2005). Melzack and Wall (1965) suggested inhibitory neurons in the dorsal horn can control incoming sensory information before transmission to the brain. Stimulation by massage and touch can release inhibitory neurotransmitters, including endogenous opioids and serotonin aiding pain relief (Mann et al, 2009; Mitchinson et al, 2007; McCaffrey et al, 1999).

Some multidimensional pain assessment tools are specifically designed to diagnose neuropathic pain. As PLP appears to be considered within the umbrella term of neuropathic pain, CREST (2008) suggests using The Leeds Assessment of Neuropathic Symptoms and Signs – Self-report tool (S-LANSS).

This tool has encouraged accurate diagnoses of neuropathic-related pain – including PLP – in 75% of people studied and demonstrates high levels of sensitivity (Bennett et al, 2005). This suggests the S-LANSS provides a more accurate and sensitive assessment of PLP when compared with the unidimensional VRS and NRS.

Dworkin et al (2001) argued the assessment of neuropathic-related pain, such as PLP should include more than one tool in order to consider wider aspects of the pain experience. The S-LANSS tool diagnoses the presence and type of pain and, combined with an intensity score – for example, from the VRS or NRS – may help nurses provide the most appropriate treatment or early referral to specialist services. It may also be necessary to use additional tools that assess the different aspects of the effect of PLP on the patient, for example, mood, behaviour and functions. Further research is required to identify a tool that will facilitate a holistic assessment of PLP.

The DH (2010) describes pain as the fifth vital sign and confirms that assessment of it and management strategies should be ongoing and regularly observed along with other vital physiological measurements. This can be done with a unidimensional VRS or NRS but may be more problematic.
with a tool like the S-LANSS as the data obtained is more difficult to represent on vital sign documents. Adapting documentation to include a multidimensional and pain intensity assessment tool for people with PLP would make it more likely that pain would be treated as the fifth vital.

Assessment barriers

Difficulties are often encountered in clinical practice when assessing PLP. The commonly reported symptoms outlined in Table 1 are difficult to understand as the source of the pain has been amputated, the assessment must rely purely on the patient’s description of it. McCaffrey et al. (1999) acknowledged that healthcare professionals are more likely to treat pain when the cause is clear.

It is vital that nurses remain non-judgmental and administer analgesia according to the pain being expressed. Pain management can be affected by healthcare professionals’ beliefs that people who report PLP construct it in their minds (Flor, 2002). This can lead to inaccurate assessment by nurses and non-reporting of pain by patients.

Other barriers to the overall assessment of pain that are commonly experienced in clinical practice can include heavy workload, constant interruptions and problems with prescriptions. Barriers to effective pain management may also include staff shortages, nurses not asking patients what levels of pain they are experiencing and relying on non-verbal behaviour to assess pain (Mann et al., 2009; Schafheutle et al., 2000). Patients may also be reluctant to express their pain experience to nurses due to psychological barriers, such as fear of the meaning of the pain, of injections, of becoming addicted to pain killers, of becoming an unpopular patient or being disbelieved, or resignation to the pain. This demonstrates why pain assessment undertaken by nurses may be seen as inadequate (Sloman et al., 2005).

Treatment of neuropathic and phantom limb pain

Recommendations for the treatment of neuropathic pain and PLP suggest that opioids, such as morphine, and the tricyclic antidepressant, amitriptyline, should be used (NICE, 2010; CREST, 2008). Gabapentin and other anticonvulsant drugs are often used to treat PLP but the evidence base on their efficacy is small (Smith et al., 2005). These are commonly used in clinical practice, but they are not effective for all people experiencing symptoms of PLP.

Dworkin et al. (2007) suggested that pharmacological treatment should be tailored to the individual patient by identifying the medication that delivers the greatest pain relief with the least number of side effects. This is why individualised pain assessment is important. CREST (2008) and NICE (2010) have recommended prompt referral to specialist pain services.

Conclusion

Nurses should be aware of PLP and how it can differ from other types of pain to ensure patients receive holistic care. Nurses should obtain information about pain from the patient as part of their care plan and use the tools available in their clinical area. It may also be possible for nurses to access the specialist knowledge of pain nurses, who are there to support both nurses and patients through the management of pain. NT

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<th>BOX 2</th>
<th>CAUSES OF PHANTOM LIMB PAIN</th>
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<tr>
<td>Alldynia: Pain evoked by stimuli that would not usually be considered painful (Jensen et al., 2001). Nerve fibres may lose their ability to desensitize the pain sensation and instead evoke pain impulses (Mann et al., 2009). Touching or massaging an amputated area may cause more pain.</td>
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<td>Hyperalgesia: Increased response to painful stimuli and lowered pain threshold (Jensen et al., 2001).</td>
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<td>Central sensitisation: Can occur in the dorsal horn of the spinal cord due to the increased number or intensity of the impulses generated. This results in permanent changes to the dorsal horn neurons (Flor, 2002).</td>
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<td>Neuromas: Commonly form after nerves are cut and can lead to spontaneous activity and increased sensitivity to stimulation (Wood, 2008; Nikolajsen et al., 2006).</td>
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<td>Regenerative sprouting: Occurs at the site of nerve injury, which can lead to an increase in pain impulses (Wood, 2008).</td>
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References

International Association for the Study of Pain (2010) IASP Pain Terminology. tinyurl.com/iasp-terminology
Limb Loss Information Centre (2010) FAQs: Limb Loss? tinyurl.com/limbloss-FAQ