





PAIN MATTERS

Community Information Series
Hunter Integrated Pain Service
January 2010

Neuropathic Pain

		Information content Intermediate
	Contacts for further discussion Your local doctor will be able to discuss neuropathic pain further. Staff from Hunter Integrated Pain Service can also help if you are referred to us.	
	Links and further reading Understanding Pain (www.hnehealth.nsw.gov.au/pain /Pain information for the community/Understanding Pain)	

What is neuropathic pain?

Neuropathic pain is pain caused by damage, injury or dysfunction of nerves. It is different to nociceptive pain that is caused by damage to tissues.

Nerve injury or dysfunction can occur at the level of the brain, spinal cord or peripheral nerves. Injury can be caused by trauma, surgery or disease processes including infection and cancer. Common examples include phantom pain (felt in the absent body part after an amputation), painful diabetic neuropathy (where nerves are damaged by diabetes) and the pain that can persist after shingles infection (post-herpetic neuralgia). In many pain states there is a mixture of neuropathic and nociceptive components.

Why does nerve injury cause pain?

Nerves are part of the body's communication system. Messages are transmitted from one part of the body to another. The nerves carry messages via electrical impulses and also chemical transmitters.

Nerves are different to the electrical wiring that connects a switch to a light bulb. If the electrical wiring is cut, the system goes down and the light does not work. Generally when human nerves are damaged the system does not go down. Injured nerves often become hyper-excitability with increased transmission of electrical and chemical messages. The amplified and distorted messages are then read by the brain as pain. Using the light bulb picture, this is like the light flickering on and off after damage to the system.

Humans are complex beings. Some have no pain after a nerve injury while others have severe pain. Many have early neuropathic pain that settles with time. There are a number of factors that influence whether persistent pain develops after nerve injury. It is likely that there is a genetic aspect. In other words some people have nerves that are prone to develop persisting hyper-excitability after injury. Behavioural change can be a

critical factor. Ongoing problems are more likely if a person with acute neuropathic pain avoids using the affected part. Mindbody factors can also play a role. The mind can influence the pain pathways through various mechanisms including sympathetic nerves and hormonal and immune system effects. Mindbody issues are discussed in more detail in My Story and Inner Wholeness (www.hnehealth.nsw.gov.au/pain) Pain information for the community/Meaning and Personal Story).

What is the role of the sympathetic nervous system?

The sympathetic nervous system is part of the body's "fight or flight" response. The system responds to stress by increasing release of noradrenalin from sympathetic nerves. This in turn stimulates the adrenal gland to release more noradrenalin and adrenalin into the blood stream. The combined effect is an increase in heart rate and sweating. Blood vessels in muscles dilate to deliver more oxygen in anticipation of fighting or running. Blood vessels in many other tissues constrict to shunt blood to the muscles.

Under normal circumstances, the nerves that transmit pain related messages are quite separate from sympathetic nerves. However when nerve injury occurs the sympathetic system can behave in unusual fashion. Small sympathetic fibres sprout towards the injured "pain" fibres and release noradrenalin onto them. The noradrenalin increases the electrical excitability of the injured nerve and contributes to pain (sympathetically maintained pain). A second form of sympathetic linkage is the "reflex" increase in sympathetic activity that occurs in response to "pain" messages arriving at the spinal cord. This can bring about changes in skin colour and temperature and also sweating and swelling in the region of the injury.

The sympathetic nervous system is also of interest in terms of the mindbody connection. Mind factors such as anxiety or suppression of emotions can activate the sympathetic nervous system. It is proposed that sympathetically mediated constriction of blood vessels reduces blood flow and oxygen supply to localised parts of the body. This can include nerves, muscles and tendons. In nerves the lack of oxygen causes dysfunction which contributes to pain as well as numbness and weakness. Likewise lack of oxygen can also contribute to pain of muscles and tendons.

Features suggestive of neuropathic pain

It can be difficult to differentiate neuropathic pain from nociceptive (tissue) pain. There are various features that suggest a neuropathic picture:

1. History of nerve injury or dysfunction
2. A possible delay in onset of pain after nerve injury
3. Pain in the absence of ongoing tissue damage
4. Pain within an area of numbness
5. Description of pain as burning, shooting, stabbing or pulsing
6. Possible spontaneous flares of pain
7. Light touch can produce pain in the affected area and the pain of pin-prick can be amplified.
8. Pain produced by touch or pin-prick often persists after the stimulus stops. Also repeating the touch or pin-prick can escalate the pain.
9. Unpleasant feelings can occur like pins and needles, numbness, insects crawling, water running over the skin and the sensation of walking on glass.
10. Changes related to altered activity in the sympathetic nervous system are common (swelling, change in colour, temperature or sweating)

What is complex regional pain syndrome?

Complex regional pain syndrome (CRPS) refers to “neuropathic” type pain that is associated with obvious change in sympathetic nervous system activity. This means change in colour, temperature, sweating and swelling in the region of the pain. **CRPS Type 1** refers to neuropathic type pain (often burning) that is associated with change in sympathetic nervous system activity but without obvious nerve injury. This typically follows relatively minor trauma. The old name for this condition was reflex sympathetic dystrophy (RSD). **CRPS Type 2** refers to neuropathic type pain again associated with change in sympathetic nervous system activity but this time with clear evidence of nerve injury. The old name for this was causalgia.

What management strategies are available?

With neuropathic pain of relatively short duration (< 3 to 6 months) there is an emphasis on early intervention to prevent development of an established persistent pain state. Once persistent neuropathic pain has become established the likelihood of “curative” medical intervention is much less and the focus broadens to a full whole person approach.

Available procedural interventions include blocks of the nerve fibres involved in transmitting pain messages and also blocks of sympathetic nerve supply to the effected area. Local anaesthetic agents are usually used for these procedures, sometimes combined with steroid. These agents can reduce electrical activity in hyper-excitable nerves. Procedural interventions are more likely to be effective if used early. The concept is that, by interrupting a stream of “pain” messages bombarding the spinal cord and brain, one can break a cycle and allow the hyper-excitable nervous system to reset itself.

Various medications can be helpful for either acute or persistent neuropathic pain. These include drugs in the anti-depressant, anti-convulsant (epilepsy treatment) and opioid (morphine-like) groups. Unfortunately the benefits of these agents are not guaranteed and side effects are common. Therefore each agent needs to be given on a trial basis before maintenance therapy. The concept of time-limited maintenance therapy can be used to encourage a more active self management approach. The idea is that once broader strategies are in place addressing thoughts, actions, nutrition and personal story, the medication can be tapered, ceased and reviewed.