# *Easing the Ouch:* Relieving Short-Term Pain

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Pain is one of the most frequent clinical problems facing primary care physicians and specialists. One area of consternation for many physicians is how to manage subacute or short-term pain that may persist for up to several months.

Distinguishing pain that is caused by tissue damage from pain caused by abnormalities in the peripheral nervous system (PNS) or central nervous system (CNS) helps determine the most effective pharmacologic approach.

## What are the mechanisms of short-term pain?

Short-term pain can be classified as nociceptive, neuropathic, or a combination of the two (Table 1).

### *Nociceptive pain*

Nociceptive pain is defined as caused by tissue damage or inflammation. The majority of short-term pains begin as nociceptive pain.

### *Neuropathic pain*

Neuropathic pain is less common and arises from an abnormality in the PNS or

## The case of Craig

Craig, 36, developed acute, right-sided sciatica when he bent over to pick up his safety goggles at work. He has had two prior episodes of sciatica, both caused by herniation of the L4-L5 disc. The second episode required an open discectomy. The patient complains of severe pain along the posterior aspect of the right leg that radiates to the dorsum of the right foot. The pain is aching and burning. It is also constant (night and day) and exacerbated by movement, as well as by sitting.

On physical examination, the patient has a positive straight leg raising test at 40 degrees on the right side. There is residual weakness of extensor hallucis longus dating back to a previous episode of sciatica. Bowel and bladder function are normal.

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CNS. Neuropathic mechanisms often play an important role in the transition from acute to chronic pain.

Evidence suggests that prolonged, or even brief exposure to acute pain can lead to chronic pain.[1] The process by which this occurs is known as sensitization or "windup." Sensitization may occur within the PNS, the CNS, or both.

## Can chronic pain be prevented by managing acute pain?

Several lines of evidence suggest that aggressive management of acute pain may help prevent chronic pain. For instance, patients who undergo laparoscopic surgical procedures experience less post-operative pain and recover more quickly than patients who undergo open surgical procedures. This is because smaller incisions mean less nociceptive pain.[2]

As well, studies have demonstrated that a preemptive approach may help prevent chronic neuropathic pain. It has been shown that the epidural administration of local anesthetics and opioid analgesics prior to elective amputation can prevent phantom limb pain.[3] As well, it has been shown that the timely administration of antiviral drugs during acute herpes zoster can prevent the development of postherpetic neuralgia.[4]

## How should you approach treatment?

It is extremely useful to distinguish between nociceptive and neuropathic pain. First, the distinction helps direct efforts at finding the

**Table 1**
**Examples of nociceptive and neuropathic pain**

**Nociceptive**

- Fractures
- Muscle injuries
- Strains and sprains of the ligaments
- Pancreatitis
- Renal colic

**Neuropathic**

- Trigeminal neuralgia
- Postherpetic neuralgia
- Complex regional pain syndrome
- Sciatica

## A followup on Craig

Craig is predominantly suffering from neuropathic pain. Although the likely cause is recurrent disc herniation, other considerations include osteoarthritis of the spine, spinal stenosis, scar tissue at the site of the previous discectomy, or piriformis syndrome. The absence of new motor abnormalities or bowel or bladder complaints suggest that surgery is unlikely to be required.

At this point, the goals of therapy include optimal pain control and a brief period of rest, followed by gradual mobilization. Since the pain is not nociceptive, drugs, such as acetaminophen, non-steroidal anti-inflammatories, and cyclooxygenase-2 inhibitors are unlikely to provide much relief.

Opioid analgesics are likely to be a mainstay of therapy in this patient. Although codeine tends to be the agent of choice, other opioid analgesics, such as oxycodone, hydromorphone, and morphine should also be considered.

Because the pain is likely to persist for several weeks, controlled-release oxycodone may also be considered from the outset. Although drugs, such as tricyclic antidepressants, have not been studied extensively in the management of sciatica, there is some evidence to suggest they may be effective in this form of neuropathic pain. The use of anticonvulsants has not been studied extensively in the management of sciatica.

cause of the pain. Second, identifying the correct mechanism of pain helps guide pharmacotherapy.

### *Nociceptive pain*

Nociceptive pain is described as burning, aching, sharp, or stinging. If involving the skin, nociceptive pain is well localized. If deeper structures are involved, the pain is more diffuse. When identifying nociceptive pain, it is important to look for and treat any sources of tissue damage or nociception. For example, a patient who presents with nociceptive pain due to polymyalgia rheumatica requires specific therapy with systemic corticosteroids. However, while looking for the source of nociceptive pain, there is no logical argument for withholding analgesics. Nociceptive pain responds to acetaminophen, non-steroidal anti-inflammatory drugs (NSAIDs) and cyclooxygenase-2 inhibitors (coxibs), as well as opioid analgesics.

### *Neuropathic pain*

Neuropathic pain is described as constant burning or paroxysms of lancinating pain. The location or distribution of the pain helps identify the part of the nervous system affected. For instance, neuropathic pain confined to a dermatome (as occurs with sciatica or postherpetic neuralgia) suggests involvement of a peripheral nerve. On physical examination, patients with neuropathic pain exhibit hyperalgesia (exaggerated pain with pin prick testing), and allodynia (pain provoked by non-noxious stimuli, such as light touch).

Neuropathic pain is not effectively relieved by acetaminophen, NSAIDs, or coxibs. Opioid analgesics are effective at relieving neuropathic pain, although higher doses may be required than those often needed to relieve nociceptive pain.[5] As well, neuropathic pain often responds to neuromodulating drugs, including tricyclic antidepressants and anticonvulsants.

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## What analgesics are commonly used?

### *Acetaminophen*

Acetaminophen is effective as monotherapy in the management of mild nociceptive pain. It is also useful in combination with opioid analgesics in the management of nociceptive pain that is moderate to severe. The maximum recommended dosage of acetaminophen for short-term use (*i.e.*, up to 10 days) is 4,000 mg per day (12x325 mg tablets of acetaminophen or combination products). Exceeding the maximum recommended dose of acetaminophen increases the risk that hepatotoxic metabolites will be produced.

### *NSAIDs*

NSAIDs are effective in managing nociceptive pain. They are useful as monotherapy in mild cases of pain and can be used in combination with opioid analgesics in the management of moderate to severe pain. NSAIDs are known to cause gastrointestinal (GI) ulceration, bleeding, and perforations. Such complications can add considerably to the cost of managing pain.[6] The use of cytoprotective agents can help prevent, but not eliminate, the risk of GI complications. Other significant adverse effects due to NSAIDs include hypertension, renal compromise, and congestive heart failure.

### *Coxibs*

Coxibs are as effective as NSAIDs in managing nociceptive pain. As is the case with NSAIDs, coxibs are useful as monotherapy in the management of mild nociceptive pain, and can be used in combination with opioid analgesics in the management of moderate and severe nociceptive pain. The use of rofecoxib has been associated with a 50% reduction in ulcer-related complications.[7] Celecoxib had outcomes similar to those found with traditional NSAIDs.[8] As well, it's important to be aware, as is the case with NSAIDs, that coxibs are associated with an increased risk of hypertension, renal impairment, and congestive heart failure.

### *Opioid analgesics*

Opioid analgesics are effective at relieving nociceptive and neuropathic pain. Opioid analgesics may be titrated until they show a positive effect or until unmanageable side-effects appear. Common side-effects include nausea, constipation, sedation, euphoria, and sweating. Respiratory depression is highly unlikely to occur if titration occurs slowly, beginning at a low dosage. Nausea is a transient complaint; it can usually be relieved by lying supine during its peak effect and by the use of antinauseants, such as prochlorperazine.

## Take-home message

***What's the diagnosis?***

- Nociceptive pain is caused by tissue damage or inflammation. Neuropathic pain is caused by abnormalities in the PNS and CNS. It is essential to distinguish between the two before initiating treatment.

***What's the treatment?***

- Acetaminophen, NSAIDs, and coxibs are most useful for mild nociceptive pain. These treatments can also be used in combination with opioid analgesics in the management of moderate to severe pain.
- Opioid analgesics can relieve nociceptive and neuropathic pain, but some side-effects include nausea, constipation, and sedation.
- Antidepressants and anticonvulsants have been shown to be effective for neuropathic pain.

In Canada, there is a tendency to rely on codeine-based products as the analgesics of choice. Other opioid analgesics, such as oxycodone, hydromorphone, and morphine play a useful role in the management of severe, short-term pain. Because of individual variation in efficacy, as well as side-effect profile, it is useful to become familiar with the properties of several opioid analgesics. Short-acting opioid analgesics have traditionally been preferred over controlled-release products in the management of short-term pain. However, recent studies suggest that controlled-release oxycodone may be effective and safe in the management of short-term pain that is likely to persist for more than five to seven days.[9]

### *Antidepressants*

Tricyclic antidepressants have been shown to be effective in the management of neuropathic pain. Drugs, such as amitriptyline, have been found to have a number needed to treat (NNT) of 3.5 for 50% pain relief in diabetic neuropathy and 2.1 for 50% pain relief in postherpetic neuralgia.[10] Although amitriptyline (and its metabolite, nortriptyline) have been studied the most, other tricyclic drugs, such as imipramine and desipramine are also effective at relieving neuropathic pain. Such agents have significant potential adverse effects, particularly in elderly patients. These adverse effects include cardiotoxicity, exacerbation of glaucoma, urinary retention, and other anticholinergic effects.

There is little evidence to suggest that selective serotonin reuptake inhibitors are effective in the management of neuropathic pain. On the other hand, there is growing evidence attesting to the effectiveness of venlafaxine, a serotonin and noradrenergic reuptake inhibitor.[11]

### *Anticonvulsants*

Older anticonvulsants, such as carbamazepine and valproic acid, have been shown to be effective in the management of neuropathic pain. However, adverse effects (*i.e.*, hepatotoxicity and marrow dysplasia) have limited their usefulness. Gabapentin has been shown to be

effective at relieving burning pain, lancinating pain, allodynia and hyperesthesia associated with diabetic neuropathy, postherpetic neuralgia, and other neuropathic pain syndromes.[12] The effective dose should be individualized according to patient response and tolerability. Slower titration may be necessary in elderly patients because of an increased risk of adverse effects, particularly sedation.

## A growing arsenal of options

There is growing evidence that early and effective management of short-term pain can help prevent chronic pain. There is also a growing arsenal of analgesics and neuromodulating drugs available to combat pain. A mechanistic approach helps physicians make the right choice of analgesic. Dx

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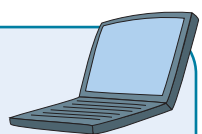

1. UCLA Healthcare Acute Pain Service: *www.healthcare.ucla.edu*