# check

Independent learning program for GPs

Unit 476 November 2011

# Pain management

The Royal Australian College of General Practitioners

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**For chronic moderate to severe osteoarthritis pain and back pain**[1]

NORSPAN®
buprenorphine transdermal system

**7-DAY CONTINUOUS PAIN RELIEF**[1]

**PBS INFORMATION:** Restricted benefit. Chronic severe disabling pain not responding to non-narcotic analgesics. Authority required for increased maximum quantities and/or repeats. Refer to PBS Schedule for full Authority Required Information.

Please review Product Information and refer to State and Federal regulations before prescribing. **NORSPAN® (buprenorphine) TRANSDERMAL PATCH MINIMUM PRODUCT INFORMATION. INDICATIONS** Management of moderate to severe pain. **CONTRAINDICATIONS** Hypersensitivity to buprenorphine or patch components, myasthenia gravis, *delirium tremens*, pregnancy, severely impaired respiratory function, concurrent non-selective MAO inhibitors (or within 14 days of their administration), treatment of opioid dependence or narcotic withdrawal. **PRECAUTIONS** Use with caution in convulsive disorders, head injury, shock, reduced consciousness of uncertain origin, intracranial lesions or increased intracranial pressure, severe hepatic impairment, hypotension, hypovolaemia, biliary tract disease, pancreatitis, inflammatory bowel disorders, prostatic hypertrophy, adrenocortical insufficiency, chronic renal and hepatic disease, following abdominal surgery, in debilitated patients, drug or alcohol abuse problems, serious mental illness, intravenous abuse of buprenorphine, congenital or medication-induced QT prolongation, driving or operating machinery, pregnancy (Category C), lactation. Do not use in immediate post-operative period, within 24 hours of cordotomy or other pain-relieving surgery. Reduce dosage in hypothyroidism and monitor severely febrile patients for enhanced drug absorption. Physical dependence and withdrawal syndrome may develop. Do not substitute for agonist opioids, as antagonist activity can induce withdrawal. **INTERACTIONS** Non-selective MAO inhibitors are contraindicated and caution is advised with newer selective MAO inhibitors. CNS depressants may cause respiratory depression, hypotension and profound sedation or coma. Some general anaesthetics and other drugs can decrease hepatic elimination. CYP3A4 inhibitors can increase buprenorphine levels. Enzyme-inducers can increase clearance and reduce efficacy. INR levels may increase with concurrent warfarin. Increased aminotransferase levels and weight decrease have been noted. **ADVERSE EFFECTS** The most frequently observed side effects are application site reaction, constipation, dizziness, dry mouth, headache, nausea, pruritus (especially but not just limited to application site), somnolence, vomiting. Other effects commonly observed are abdominal pain, anorexia, anxiety, asthenia (including muscle weakness), chest pain, confusion, depression, diarrhoea, dyspepsia, dyspnoea, erythema at site, exanthema, insomnia, nervousness, oedema, pain, paraesthesia, peripheral oedema, rash (not just limited to application site), sweating, taste perversion, tiredness, vasodilation. **DOSAGE AND ADMINISTRATION** Transdermal use over 7 days. Adults: 5 microgram/hour starting dose, especially opioid-naïve patients and those converting from other opioids. Titrate dose to pain relief, use supplemental analgesics as required and only increase dose after an interval of at least 3-days. Apply the patch to intact, non-irritated, hairless skin of upper arm, upper back, upper or side chest, avoiding scarred areas. Use only water to clean skin, and dry before applying patch immediately after taking it from the pouch. Press patch in place for 30 seconds. When changing the patch, remove the old one and apply 1 or 2 new patches to a different site or sites (the current site should not be used again for 3-4 weeks). Do not use more than 2 patches at the same time. On removal of a used patch, fold adhesive sides together and dispose of safely. If edges start peeling off, tape down with skin tape. If patch falls off, apply a new one. Avoid exposing the application site to external heat sources. Monitor patients and if adequate pain relief cannot be achieved at maximum patch dosage regimen, convert to 24-hourly strong opioids. After discontinuing with the patch, serum buprenorphine concentrations will decrease gradually, and subsequent opioids should not be needed for 24 hours. No dosage adjustment is required in renal impairment, mild to moderate hepatic impairment or the elderly, but use with extreme caution in severe hepatic impairment. Not for children under 18 years. **TGA APPROVAL DATE** 4 April 2005. **DATE OF MOST RECENT AMENDMENT** 14 September 2009. PBS Dispensed Price: NORSPAN® patch 5[2]: $26.70. NORSPAN® patch 10[2]: $40.77. NORSPAN® patch 20[2]: $56.08. Product Information is available from Mundipharma Pty Limited. ABN 87 081 322 509. 50 Bridge Street, Sydney, NSW 2000. Phone 1800 188 009. ®: NORSPAN is a Registered Trademark.

**References: 1.** NORSPAN® patch Product Information, August 2009. **2.** Schutter U *et al.* Chronic osteoarthritis pain: efficacy and tolerability of a 7-day patch with low-dose buprenorphine. Results of a multicentre observational study. MMW Progress in Medicine Originals II 2008;96–103 (translated from German).

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The five domains of general practice
Communication skills and the patient-doctor relationship
Applied professional knowledge and skills
Population health and the context of general practice
Professional and ethical role
Organisational and legal dimensions

The Royal Australian College of General Practitioners



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This unit of *check* focuses on pain management. It is unlikely that a day goes by in general practice without the general practitioner needing to manage pain in their patients. Pain can be classified in a variety of ways. It can be classified as acute or chronic, nociceptive (due to stimulation of normal pain sensors in response to a noxious stimulus) or neuropathic (due to disease, injury or dysfunction of the peripheral or central nervous system) and as malignant or non-malignant. Nociceptive pain can be subclassified as somatic (involving superficial tissue) or visceral (involving deeper organs).

The authors of this unit bring a wealth of clinical and teaching experience to the topic.

**The authors of this unit are:**

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**The learning objectives of this unit are to:**

- identify and distinguish between nociceptive and neuropathic pain and list the groups of medications used to treat each of them
- consider the possibility of chronic regional pain syndrome in patients with an injured limb exhibiting symptoms and signs that suggest chronic regional pain syndrome
- display increased knowledge of the tools to assess the severity of pain and an increased knowledge of the significance of common findings on examination in those who present with low back pain
- understand the principles of opioid use in the effective management of malignant pain
- recognise the importance of early identification and management of yellow flags (psychosocial risk factors for long term pain and disability) in patients presenting with low back pain
- identify the presence of red flags (factors that suggest the presence of a serious underlying disorder) in those with low back pain and recognise the importance of urgent investigation and/or referral in patients with these features
- educate patients about the psychological factors that contribute to the perpetuation of chronic pain and utilise cognitive behavioural therapy and antidepressants where appropriate.

We hope that this unit of *check* will help you to confidently assess and manage patients who present with pain, with a focus on addressing both their physical and psychological needs.

Kind regards

Catherine Dodgshun
Medical Editor

## CASE 1

### ANGELA'S RIGHT FOOT IS BLUE AND PAINFUL 6 WEEKS AFTER SURGERY

Angela, aged 50 years, presents with a blue and painful right foot 6 weeks after surgery (*Figure 1*).

Angela gave a history of significant forced inversion of the right ankle 12 months previously. She was referred for an orthopaedic opinion and underwent an MRI examination. The MRI revealed peroneus brevis tendinopathy and a tear within the tendon. She subsequently underwent arthroscopic debridement and peroneal tendon repair. Her leg was immobilised in a below the knee plaster of Paris cast, but it developed severe swelling necessitating removal 2 days later. Her leg was then placed in a fibreglass cast, which was removed 3 weeks later.

Due to significant swelling, Angela was investigated for a deep venous thrombosis, which was not present. She also developed a number of other symptoms including skin discolouration, burning pain, exquisite sensitivity to light touch and inability to move the ankle or toes. She described a numb sensation developing over both the dorsal and plantar surfaces of the foot, paraesthesia over the plantar surface and increased sweating.

Angela presents to you 6 weeks after surgery. On examination, she uses bilateral elbow crutches for walking. Her right foot is dry and swollen, has blue discolouration and is 2°C warmer than the left foot. There are a number of well healed surgical scars. Peripheral pulses are palpable. She is capable of little voluntary movement of the ankle or toes. There is no tremor or dystonia. There is hypoalgesia, particularly dense over the plantar surface of the right foot in the distribution of the plantar nerves but also over the dorsum of the right foot, in a stocking distribution. There is allodynia, which is a painful response to a non-noxious mechanical stimulus, of the right foot and ankle.

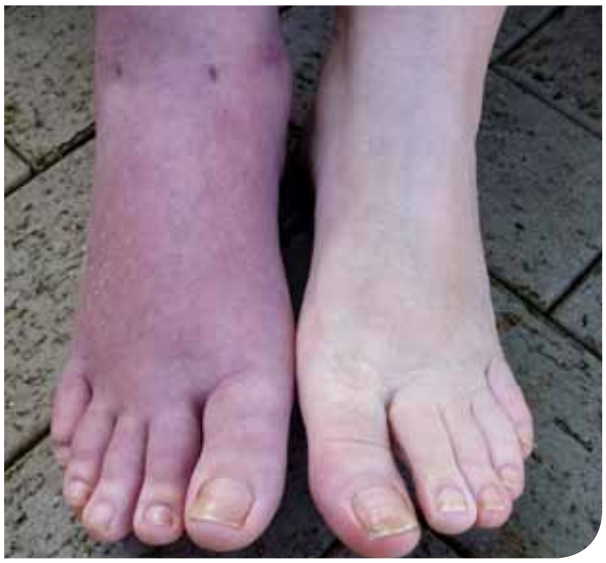

Figure 1. Angela's foot 6 weeks after surgery

### QUESTION 1

What is the descriptive term for Angela's presentation? Does this condition have other descriptive terms?

### QUESTION 2

What are the main features of this condition? What are the main precipitants of this condition?

### QUESTION 3

What pathophysiological mechanisms are involved in the condition?

### QUESTION 4

What treatments are effective for this condition?

### QUESTION 5

What is your management plan for Angela?

### QUESTION 6

What is the natural history of this condition if untreated?

### FURTHER INFORMATION

You refer Angela to a chronic pain specialist who makes a diagnosis of Complex Regional Pain Syndrome (CRPS). A combination of oral pregabalin and topical prazosin is instituted while simultaneous referral to a physiotherapist is arranged. Three days later a lumbar sympathetic block is performed. At review 10 days later the swelling had largely resolved, the range of movement had improved and the allodynia had disappeared.

At 16 weeks after surgery Angela is walking well with a single walking stick and reporting very little pain. The recovery is maintained when a second sympathetic block was performed at 16 weeks. *Figure 2* shows Angela's foot 16 weeks after surgery. See *Answer 4* for comment on the evidence relating to sympathetic blocks.

Figure 2. Angela's foot 16 weeks after surgery

### QUESTION 7

What is the prognosis in Angela's case?

## CASE 1 ANSWERS

### ANSWER 1

It is likely that Angela has CRPS. This term replaces terms[1] such as Reflex Sympathetic Dystrophy (RSD), causalgia and algodystrophy. The term RSD was coined by Evans in 1946.[2] Treatment with sympatholytics improves only a minority of patients with this condition; the name was consequently changed to the more generalised term, CRPS.

CRPS-I is a term that replaced RSD for patients without known nerve injuries. CRPS-II is a term that replaced 'causalgia' for patients with neural injury. Many consider the variants to have similar pathophysiology and to form part of the same condition.

### ANSWER 2

CRPS is a neuropathic pain disorder usually triggered by tissue trauma in an extremity. Fractures and sprains are common precipitants as are some elective surgical procedures, such as median nerve decompression. Injuries to limbs in the setting of wars have also produced this condition in many people.[3,4]

Patients with CRPS describe intense burning pain, allodynia and altered sensation including hypoalgesia (a decreased response to a painful stimulus) and hyperalgesia (an increased response to a painful stimulus). Findings on physical examination include localised limb oedema and autonomic features such as altered sweating, skin colour and temperature. Changes in motor function are common with loss of strength, reduced range of movement, tremor and even dystonia. Trophic changes involving the skin, hair and nails appear as the condition becomes chronic.

### ANSWER 3

Multiple pathophysiological mechanisms are involved in CRPS. Attempts to reduce CRPS to a single mechanism, such as sympatho-afferent coupling, have not been successful. There are three main pathophysiological concepts for the development of CRPS: neurogenic inflammation, autonomic dysfunction and neuropathic changes in the central nervous system.[5] *Table 1* lists the contributing factors in the development of CRPS.

**Table 1. Contributing factors in the development of CRPS[6]**

| |
|---|
| Altered cutaneous innervation |
| Central sensitisation |
| Altered sympathetic nervous system function |
| Changes in circulating catecholamines |
| Inflammatory neuropeptides |
| Brain plasticity |
| Genetic factors |
| Psychological issues |

### ANSWER 4

The lack of clear understanding of the pathophysiology of CRPS inhibits the development of effective treatments. There are few controlled studies on the therapy of CRPS. Generally, there is a need for a multidisciplinary approach to treatment in the environs of a pain clinic, but the GP can also do much to commence early and aggressive treatment.

There are three main pathways in treatment: nonpharmacological, rational polypharmacy and invasive therapies.

#### Nonpharmacological treatment

The occupational therapist, or alternatively physiotherapist, experienced in treating CRPS, is essential in improving and restoring function of the involved limb. Early physiotherapy can avoid the development of atrophy and contractures. Its efficacy has been demonstrated in a randomised controlled trial comparing physiotherapy techniques to occupational therapy.[7]

Recent work with the 'mirror box' shows promise. A mirror is placed perpendicular to the midline so that the unaffected limb and its mirror image are viewed by the patients. This provides an illusion of movement in the affected limb.[8]

#### Rational polypharmacy

Limited data exist for the treatment of CRPS pain with medication. Medication such as anticonvulsants, antidepressants and opioids are used in an analogy to other neuropathic pain states.[9] Specifically for CRPS, gabapentin and opiates have been shown to be effective.[10,11] In a recent review of the evidence base, bisphosphonates also appear to offer clear benefits.[12]

#### Invasive therapies

The presenting features of CRPS would suggest altered sympathetic nervous system function, but sympathetic blocks and sympathectomy have questionable efficacy[13] while introducing the possibility for significant unwanted complications. Sympathetic blockade with local anaesthetic agents may have a place in the early treatment of CRPS.

Spinal cord stimulation is reported to significantly reduce pain intensity for up to 2 years.[14] Stimulation techniques are costly (about $35 000) and often patients require revisions and reoperations.

### ANSWER 5

Early referral to a competent hand therapist or physiotherapist, along with the introduction of anticonvulsant therapy, should be considered. Additional pharmacological agents can be added, including the possibility of topical agents such as ketamine[15] and prazosin. Topical treatment is attractive as there are few central side effects, but its use is experimental at this stage.

Due to the prolonged waiting times often encountered for entry to a pain clinic, early referral to a multidisciplinary group should be arranged as soon as the condition is recognised.

### ANSWER 6

Patients diagnosed with CRPS often improve or stabilise early after disease onset while later improvement is less common. There are few data on longstanding CRPS and in patients who have failed all treatment modalities. Only one-third of patients reach full recovery. CRPS should be considered a serious condition with a high probability of remaining impairments.[16]

### ANSWER 7

Angela's prognosis is excellent with virtual total recovery expected from her CRPS.

## CASE 2

### TOM'S ONGOING PAIN

Tom, aged 68 years, is a retired teacher who was diagnosed with prostate cancer 3 years ago. He had multiple bony metastases at diagnosis. His prostate specific antigen (PSA) normalised with hormonal therapy, but started to increase again recently with his most recent PSA being 131. His last full blood examination revealed a normochromic normocytic anaemia consistent with chronic disease, and his liver function tests reveal an isolated increase in his ALP (alkaline phosphatase) level. His urea, electrolytes and creatinine are normal. A recent bone scan has shown progressive bony metastases in multiple vertebrae and ribs.

Tom has no other significant past medical history and has no allergies to any medications.

Tom comes to see you because of increasing chest pain. He describes right sided chest pain, which has been worsening over the past 2 weeks. It starts in the anterior right chest and radiates to the axilla. He initially obtained good relief with tablets belonging to his wife. These contained codeine phosphate 30 mg/paracetamol 500 mg, but his pain has increased. He currently rates his pain as 6 out of 10 despite taking two tablets of codeine phosphate 30 mg/paracetamol 500 mg three times per day. He has no cough or fever.

Physical examination reveals tenderness over the sixth rib anteriorly in the midline and a clear chest.

### QUESTION 1

What is the likely cause of Tom's pain and what type of pain is it?

### FURTHER INFORMATION

You decide to change Tom from codeine phosphate 30 mg/paracetamol 500 mg to a strong opioid.

### QUESTION 2

Which of the strong opioid medications would you use and why?

### QUESTION 3

What dose would you prescribe?

### FURTHER INFORMATION

You decide to prescribe a breakthrough dose (a dose of short acting opioid to be taken as required for pain in between regular does of opioid).

### QUESTION 4

What breakthrough medication and dose would you prescribe?

### QUESTION 5

What are the potential side effects of strong opioid medication and how would you manage these?

### QUESTION 6

What adjuvant analgesics may be useful if the pain is ongoing despite initiation and titration of the strong opioid?

### QUESTION 7

What other treatment strategies may be useful for control of pain due to bony metastases?

## CASE 2 ANSWERS

### ANSWER 1

This pain is probably due to his bony metastases as Tom has known disease in the ribs. Bone pain is thought to have both nociceptive and neuropathic components.

### ANSWER 2

There are four strong opioids commonly used in Australia for cancer pain: morphine, hydromorphone, oxycodone and fentanyl. Methadone is also used for complex pain, but should be managed by a palliative care physician or pain specialist.[17]

Morphine is the opioid of choice unless there are contraindications, such as renal impairment or significant side effects including confusion, severe sedation or intractable nausea with previous morphine use.[17,18] If a patient has experienced these side effects with morphine, a different opioid is generally well tolerated.

As Tom has normal renal function, morphine is the opioid of choice.

### ANSWER 3

To work out an appropriate initial dose of morphine it is necessary to convert Tom's current codeine dose to the equivalent dose of morphine. Recommended conversion ratios vary between institutions.[17] *Table 2* and *Table 3* show examples of opioid conversions.

**Table 2. Approximate equianalgesic doses of opioids (NB conversions vary between institutions)[17–19]**

| Opioid | Oral dose | Subcutaneous dose |
|---|---|---|
| Morphine | Morphine 30 mg | Morphine 15 mg |
| Hydromorphone | Hydromorphone 6 mg | Hydromorphone 3 mg |
| Oxycodone | Oxycodone 20 mg | Oxycodone 10 mg |
| Codeine | Codeine 240 mg | N/A |
| Tramadol | Tramadol 240 mg | N/A |

**Table 3. Converting oral morphine to a fentanyl patch (NB conversions vary between institutions)**

| Oral morphine 4/24 dose (mg) | Fentanyl patch (mcg/hour) |
|---|---|
| 5 | 12 |
| 10–20 | 25 |
| 35 | 50 |
| 50 | 75 |
| 65 | 100 |
| 80 | 125 |
| 95 | 150 |
| 110 | 175 |
| 125 | 200 |

Tom is taking 6 tablets of codeine phosphate 30 mg/paracetamol 500 mg/day, which is equivalent to 180 mg of codeine. Codeine is about one-eighth as strong as morphine, so 180 mg codeine is equivalent to 22.5 mg morphine. Therefore, the starting dose of morphine should be at least 22.5 mg/day, and it would be reasonable to consider increasing this by 25–30% given that Tom's pain is poorly controlled at the moment. A good starting dose would be morphine 30 mg/day.

This can be given either as regular short acting morphine (eg. 5 mg Ordine® orally 4 hourly) or as a long acting preparation (eg. MS Contin® 15 mg twice per day). A long acting preparation is often more convenient in an outpatient setting.

### ANSWER 4

The breakthrough dose is calculated as a fraction of the total daily dose of opioid and is usually one-twelfth to one-sixth of the total daily dose given 2–4 hourly as required.[18] The same opioid is used for the breakthrough dose as for the regular dose if possible. The patient should be instructed to use breakthrough medication as required to help guide further dose titration of the regular opioid used.

Tom's total daily dose of morphine is 30 mg, so he should be prescribed morphine liquid 2.5–5.0 mg orally 2–4 hourly as required for breakthrough pain.

### ANSWER 5

While there is a long list of potential side effects to strong opioids, there are only a few that occur commonly in practice – namely constipation, nausea and mild sedation.[17]

Constipation is almost universal so almost every patient prescribed a regular opioid requires regular laxatives. Docusate and senna may be prescribed – 2 tablets daily is a reasonable starting dose.[18]

Nausea occurs in about 30% of patients, but tends to resolve in a few days. However, it is reasonable to provide an antiemetic to be taken if needed, such as metoclopramide 10 mg four times per day as required.[17,18]

Mild sedation is common, but again tends to resolve in a few days. However, patients are often very concerned about this side effect and it is worth warning them in advance of its likelihood.[17,18]

### ANSWER 6

Firstly, Tom should continue taking paracetamol as it has an additional benefit for pain in many patients who are on a strong opioid.[20] Other classes of adjuvant medication to consider in this setting are anti-inflammatory drugs and medication for neuropathic pain, as bone pain is thought to have a neuropathic component.

Nonsteroidal anti-inflammatory drugs (NSAIDs) are effective for bone pain, but side effects – particularly gastrointestinal and renal toxicity – limit their use in many patients. If an NSAID is used, a short acting medication with a low risk of gastrointestinal complications should be used and the patient monitored closely.[18]

There are several medications that are used for neuropathic pain in palliative care, the commonest being the anticonvulsants (sodium valproate, gabapentin and pregabalin) and the tricyclic antidepressants (amitriptyline and nortriptyline).[18] There is also some evidence to suggest that the serotonin-noradrenaline reuptake inhibitors (SNRIs) duloxetine and venlafaxine are effective.[21] The choice of medication depends on the side effect profile, availability and cost.

Gabapentin and pregabalin are not funded by the Pharmaceutical Benefits Scheme (PBS) for neuropathic pain, although they are available on the Repatriation Pharmaceutical Benefits Scheme (RPBS) for this indication. However, they are used commonly in areas where the local hospital or palliative care service will subsidise these medications. In areas where these medications are not subsidised sodium valproate, or an antidepressant, may be more appropriate. Sodium valproate, the antidepressants and gabapentin/pregabalin have different mechanisms of action[22] so if one medication is ineffective, another medication with a different mode of action could be trialled. Suggested titration schedules can be found in *Therapeutic Guidelines: Palliative Care*. More specialised treatment as an inpatient may be required if pain is ongoing.

### QUESTION 7

Other treatment strategies to consider would include radiotherapy, which is very effective for palliating pain due to bony metastases and often given as a single fraction. Response can take 2–3 weeks.[21] Bisphosphonates also contribute to pain control, although the effects take many weeks and they are not considered a first line strategy.[18,21]

## CASE 3

### DOES GEORGE HAVE A 'PINCHED NERVE'?

George, aged 45 years, is a sedentary worker who presents to you as a new patient. He has a 12 month history of chronic low back pain (CLBP). He has been otherwise well in the past with no other past medical problems.

George's pain came on without apparent precipitant. He describes the pain as a deep ache, concentrated in the low back with diffuse spread into the right buttock and upper aspect of the right posterior thigh. The pain is worst when sitting for long periods at work and eased by standing and moving about. It tends to be worse toward the end of the day.

George reports mild morning stiffness and soreness lasting about 5 minutes, a sitting tolerance of 45 minutes, a standing tolerance of 30 minutes and no problems walking. He can jog 5 km, but experiences the pain toward the end of the run. He rates his average pain at a level of 3–4 on a scale from 0 to 10. At worst it could reach a level of 6–7 out of 10.

George consulted a physiotherapist and subsequently participated in a pilates program for 6 months, which did not change his pain to any significant degree. He uses 2 tablets of 12.8 mg codeine/200 mg ibuprofen up to three times per day on his worst days and obtains variable relief of up to 50%.

George says that he was told that he must have 'a pinched nerve' because of the thigh pain. He consults you about the diagnosis and treatment and asks about a having a CT scan.

### QUESTION 1

List some important factors that you need to determine in relation to George's pain.

### QUESTION 2

In low back pain, in general, what findings on physical examination might suggest:

- the anatomical site of origin of the pain?
- a nonmusculoskeletal cause for the pain?
- psychosocial distress?

### FURTHER INFORMATION

You determine that George has no red flags or yellow flags. He is tender to the right of the spine over the L4/5 and L5/S1 facet joints and the quadrant test reproduces George's pain.

### QUESTION 3

What further investigations would you request?

### QUESTION 4

How would you manage George?

### QUESTION 5

How would you monitor George's progress and response to treatment?

### QUESTION 6

If George was not coping with the pain, what specific interventions might help? Is a surgical opinion indicated?

## CASE 3 ANSWERS

### ANSWER 1

Once it is established that the major reason for the consultation is low back pain (LBP), the clinician needs to determine whether:

- the pain is a focal problem, or is part of a more generalised pain problem
- it is coming from the back (highly likely), or whether it is referred to the back (very rare) if the pain is a focal problem
- the buttock and thigh pain is somatic referred pain or neuropathic/radicular pain
- there any red flags for underlying serious pathology (thankfully, these are rare)
- there are any yellow flags indicative of psychosocial distress
- medications are appropriate or not.

One of the key issues is the differentiation of somatic referred pain and radicular pain.

Somatic referred pain can theoretically derive from any locally innervated spinal structure including the facet joints, sacro-iliac joints, intervertebral discs, ligaments and muscles. The mechanism for referred pain is convergence of afferents within the central nervous system. Radicular pain occurs due to irritation of the sensory root or dorsal root ganglion of a spinal nerve.

*Table 4* summarises the differences between radicular pain and somatic referred pain.

In George's case, the diffuse aching-type pain spreading into the buttock and thigh is typical of somatic referred pain and not radicular pain, and so he can be reassured that he does not have a 'pinched nerve' causing his problems.

Red flags include fever and certain neurological deficits and indicate the presence of serious underlying conditions. The presence of red flags determines the need for urgent investigation and referral. (*Answer 1, Case 5* and *Table 5* describe red flag conditions and *Table 5* lists questions to elicit their presence).

Yellow flags are psychosocial features unrelated to the cause of pain – such as the belief that the pain is harmful or severely disabling and conflict at home or work – which constitute the most significant predictors of disability from back pain.[23] They require early attention as they can impede, retard and prevent recovery.

### ANSWER 2

A basic examination of the lumbar spine can be summarised by applying the orthopaedic paradigm inspection (look), movement (move) and palpation (feel).[24]

The absence of pain on movement, provocation tests or palpation should alert the clinician to the possibilities of a nonmusculoskeletal cause of the pain.

Examination of the hip joint is an integral part of examination of the back because the hip joint may refer pain not only to the groin and anterior thigh, but also to the buttock as high as the iliac crest and posterior and/or lateral thigh.[25]

Some specific provocation tests increase the likelihood of certain underlying structures being the source of symptoms, for example:

- pain deriving from the lumbar zygapophyseal (facet) joints is suggested if lumbar extension combined with rotation and side bending to the same side (the quadrant test) reproduces the patient's LBP[26]
- sacro-iliac joint (SIJ) mediated pain is more likely if the pain is centred over the SIJ and three or more of the following tests are positive: the thigh thrust or posterior shear test, Patrick test, pelvic compression test, sacral thrust test and the distraction test[26]
- hip joint pain is more likely when end of range hip movements are restricted and reproduce pain.

Clinicians should also be alert to the presence of amplified pain behaviours. These are yellow flags and suggest psychosocial distress. They are generally not regarded as a sign of malingering. They suggest that the problem should be managed by a biopsychosocial model of pain management, such as offered in a comprehensive pain management program.

| Table 4. Comparison of the features of somatic referred pain and radicular pain | | |
|---|---|---|
| **Feature** | **Somatic referred pain** | **Radicular pain** |
| Distribution of pain | Back and proximal limb | Mainly distal limb |
| Localisation | Vague, poorly localised | Narrow band |
| Pain descriptors | Dull, deep, aching | Electric, sharp, shooting |
| Neurological symptoms | None | Possibly tingling, numbness, weakness* |
| Neurological signs | None | Possibly dermatomal loss of sensation, myotomal weakness, loss of reflexes* |
| * Radicular pain can occur without objective neurological deficit. The presence of neurological signs indicates radiculopathy | | |

## ANSWER 3

The absence of red flags and neurological features in this case means that further investigations are not clinically indicated.

It is essential to understand that radiological imaging often shows morphological changes, which are most likely to be associated with genetic and aging factors and generally correlate poorly with spinal pain.[27]

CT scans should rarely be requested to investigate chronic back pain due to high radiation dose risks. Nuclear bone scanning is the investigation of choice to exclude secondary malignancy. MRI scanning is the investigation of choice where there is neurological loss, or when invasive interventions including surgery are being contemplated.

## ANSWER 4

Management of George's condition could include:

- explaining the pain in biological terms – this may require showing him a diagram or a model of the local anatomy
- reassuring him about the benign nature of CLBP
- dispelling myths and addressing fears, including the myth that more pain is indicative of more injury and the fear that degeneration is the cause of the pain
- encouraging him to continue with normal activities and exercise, and reassuring him that he can continue with any activities (including jogging) that do not aggravate his pain. Walking regularly every day is usually beneficial for back pain
- referring him for physical therapies (eg. massage/manipulation). Such therapies may be used as an adjunct to help maintain mobility, but rarely alter the long term prognosis
- encouraging him to self manage his condition with exercises he finds beneficial
- considering prescribing a trial of regular long acting paracetamol if his current medications fail to achieve sufficient pain relief on their own
- considering prescribing low dose tricyclic antidepressants if pain is interfering with his sleep.

Multimodal therapy (ie. combinations of the above) is often required for optimal management.

## ANSWER 5

It is essential to have some objective measure of pain levels and degree of disability in order to monitor the progress of any painful condition. This can be achieved by utilising a validated health questionnaire such as the Brief Pain Inventory (BPI).[28] This questionnaire includes documenting the patient's responses to being asked to rate their pain on a numerical scale.

Simple questions to monitor progress of CLBP include daily average, worst and least pain scores on a 0 to 10 scale, sitting and standing tolerances in minutes, and activity restrictions. Most patients are limited by specific activities and these should be noted. Medication, including dosages, should also be monitored over time as should the use of allied health services.

## ANSWER 6

There is no indication that George needs further interventions, as he is coping despite his pain.

In general, for patients who are more disabled by their back pain and who display an absence of red and yellow flags, consideration of referral for interventional procedures may be appropriate. These include diagnostic injections under fluoroscopy in accordance with stringent guidelines. Proven facet joint or SIJ pain is amenable to radiofrequency neurotomy (RFN).

The prevalence of facet joint pain increases with age. It is less common in the patient under 30 years of age (5–10%) and very common over the age of 60 (50%) years. When performed in accordance with current guidelines, facet joint RFN provides near complete relief of pain for 11 months on average and can be repeated in the future.[29]

Recent literature has highlighted controversies in the use of discography as a means of diagnosing discogenic pain.[30,31] There is no current effective percutaneous therapy for primary discogenic pain.

Spinal fusion surgery for nonspecific LBP has been shown to be no more effective than intensive rehabilitation.[32] In general, surgery for somatic low back pain is not recommended.

## CASE 4

### NICK'S BACK PAIN IS MAKING HIM DEPRESSED

Nick, aged 51 years, works in the finance sector. This mostly involves sitting at a desk with a computer, but he travels frequently interstate (by airplane) for meetings. Five years ago Nick developed aching low back pain. No specific event was involved, but investigations revealed multilevel degenerative disc disease. His pain has gradually become more constant and is affecting his ability to sit and walk. Consequently, Nick is missing some workdays and his home and social life, including playing social cricket, is increasingly restricted. He also reports significantly less enjoyment of those activities that used to give him pleasure. He reports often feeling distressed and hopeless about his predicament over the past 6 months. He has always prided himself on being a hard worker, but he is worried about his ability to continue and being unable to support his family.

Surgical options have been ruled out and he is reluctant to take strong analgesics as they affect his ability to concentrate at work. Although he attempts to push on despite his pain, he is also resting more to minimise his pain. He is putting on weight and drinking more alcohol. His sleep is often disturbed by pain and his wife is expressing concern about him.

### QUESTION 1

What information about Nick's psychological state and social life would you like to know?

### QUESTION 2

What is/are the likely diagnosis/diagnoses?

### QUESTION 3

What specific psychological factors and environmental factors could be contributing to Nick's presentation?

### QUESTION 4

How would you explain Nick's problems to him?

### QUESTION 5

Given that Nick is depressed and increasingly disabled by his pain, what psychological therapy would you suggest for him?

### QUESTION 6

Which antidepressant has the most evidence for its use in cases of chronic pain?

### QUESTION 7

What is your management plan for Nick?

## CASE 4 ANSWERS

### ANSWER 1

Information on the pathophysiology of his back pain is available, but a full assessment of Nick's situation requires knowing information about his psychological state and social life.

It would be useful to enquire more about Nick's mental state including the presence of suicidal ideation, appetite loss and weight loss. It is also useful to ask about his usual responses to his pain, his understanding of his pain, his expectations, his interactions at home (in relation to the pain), any other major stressors, and his work options including the possible consequences if he reduces his workload.[33]

### ANSWER 2

Nick's back pain could be called 'musculoskeletal LBP', 'non-specific LBP', 'mechanical LBP' or 'vertebral dysfunction'.

The combination of symptoms suggests major depression, or an adjustment disorder with depressed mood as a comorbid condition.

### ANSWER 3

The amount of disability, pain and distress associated with pain is not strongly related to pathophysiology.[33,34] Instead, psychological and environmental factors are likely to be playing stronger roles. In Nick's case, the psychological contributors include:

- catastrophic beliefs about his pain and his future
- fear of pain/re-injury
- poor pain coping strategies (a combination of avoidance of activities and periods of excessive activity that aggravate the pain)
- sleep disturbance
- possible guilt over the impact of his inability to cope with his pain on the family
- lack of exercise and increasing reliance on alcohol to cope.

Environmental contributors could include work demands (time pressure and physical demands) and financial considerations.

His depression may be aggravated by his unhelpful thinking style (eg. catastrophic beliefs, frequent comparisons with his idealised past, and exhortations to 'push on' regardless) as opposed to more flexible problem solving.

Avoiding valued activities (eg. cricket and family occasions) could reduce his usual sources of pleasure and sense of purpose.

### ANSWER 4

You could explain the nature of Nick's back pain to him and point out that the degenerative disc disease seen on imaging usually has a poor correlation with disability. Reassurance and advice to stay active are paramount.

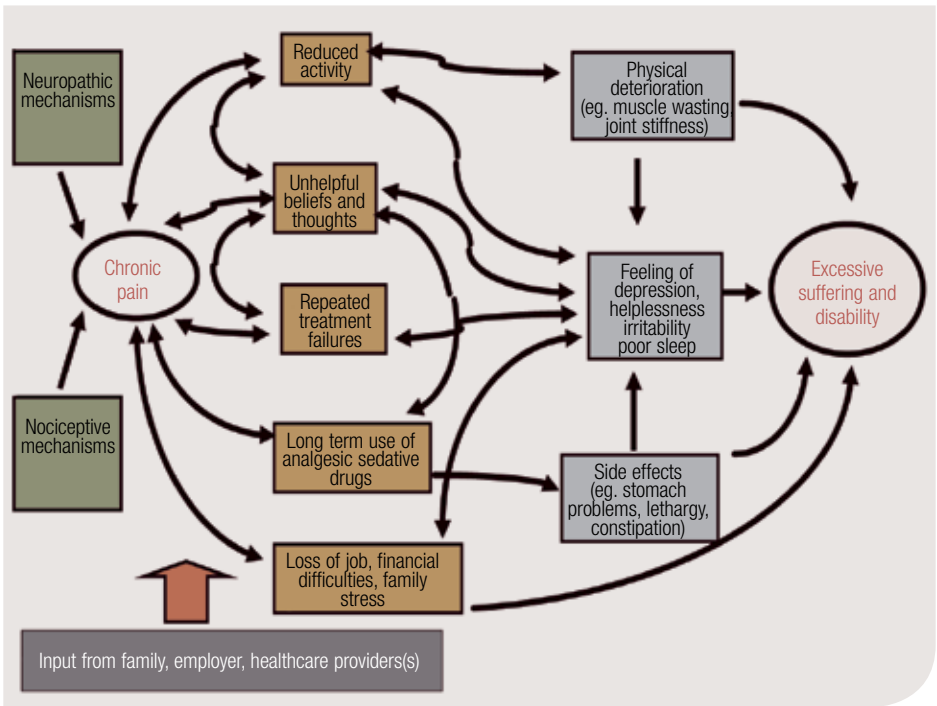


Figure 3. Putting it all together: chronic pain – contributors and effects[35]



Reformulate Nick's problems in terms of the likely impact of all the contributors, rather than just explaining the diagnoses.[34] Providing he agrees with this formulation, you would then be in a position to plan management. This should be done in a collaborative way where he is encouraged to take responsibility and and gain insight into his problem.

*Figure 3* is a diagrammatic representation of the contributors to, and effects of, chronic pain.

## ANSWER 5

The psychological treatment with the most evidence for both depression and persisting pain is cognitive behavioural therapy (CBT).[33,35] This would target his beliefs about his pain and possible impact on:

- his life – unhelpful fears and worries, by using self monitoring and challenging unhelpful thinking styles
- his responses – identifying and challenging catastrophising, gradually reducing avoidance of activities and self reinforcement for achievements in the presence of pain, rather than comparisons with past glories – which guarantee a sense of failure
- his behaviours – setting specific, realistic goals to achieve over time, improving sleep habits, graduated activity increments using pacing, planning his days to include time for pleasurable activities.

## ANSWER 6

The available evidence[36–38] supports the use of tricyclic antidepressants in neuropathic pain, headaches, low back pain, fibromyalgia and irritable bowel syndrome. The efficacy of the newer SNRIs has less support, but the evidence is growing. Selective serotonin reuptake inhibitors do not appear to have an analgesic effect, but beneficial effects on wellbeing have been reported in several chronic pain conditions.

## ANSWER 7

Based on the formulation of Nick's problems in *Answer 4*, treatments should be developed to address his pain, depression, disturbed sleep, work performance and family/social life.[33] Trying to target pain and/or depression pharmacologically alone is unlikely to be sufficient, as many of his problems are likely to be related to his beliefs, responses and behaviours. Nick needs to work on changing these.

The ideal management plan would include a combination of either a tricyclic antidepressant, or an SNRI, and CBT targeting pain management skills and the contributors to depression and poor sleep.[33,37–40]

The management plan should include an explanation of the pain that is as clear as possible, perhaps using a diagram like *Figure 3*, and attempting to effectively answer any concerns Nick may have about the basis of his pain.

The CBT approach should underlie all interactions between Nick and the GP, but time and specific skill requirements might also call for referral to a clinical psychologist with expertise in treating pain and depression. The plan may also include a physiotherapy designed home exercise program that incorporates the CBT principles.[34]

The management plan would need to be agreed on by Nick and reinforced with regular discussions between the GP, the clinical psychologist and physiotherapist. If this is not feasible, or not working, then consider referral to multidisciplinary pain clinic that provides an intensive CBT pain management program.[33]

## CASE 5

### JUSTIN BENT OVER AND HURT HIS BACK

Justin, aged 41 years, is an accountant. He has presented as a new patient with a 1 day history of LBP. He points to the area around the lumbosacral junction and just to right of this. The pain came on with bending to pick up his keys that he had dropped on the garage floor after returning home from a game of golf. The pain was intense initially, so he took two tablets of his wife's codeine phosphate 30 mg/paracetamol 500 mg and went to bed.

Although the pain eased overnight, it has been difficult for Justin to get to your practice today as moving around is so painful. He looks quite distressed as he lowers himself carefully into the chair. He is otherwise well. He says he was surprised at how such a simple movement could cause so much pain and admits that he is worried that something serious might be going on.

### QUESTION 1

What questions would you like to ask Justin in order to address his concern that something serious might be going on?

### QUESTION 2

What other key questions should you ask to assess the severity and cause of his pain and its effect on his day-to-day activities?

### FURTHER INFORMATION

Justin's response to your questions reveals that is it unlikely there is a serious cause for his back pain.

Justin rates his pain at 6 out of 10 and describes it as a constant ache with sharp stabs when he moves quickly. He can sit for only a few minutes and standing is limited to 30 minutes. Lying is most comfortable for him. He has no leg pain, weakness or paraesthesiae. His work as an accountant involves prolonged sitting at a computer. He usually enjoys golf and sailing.

### QUESTION 3

What other questions would you routinely ask in a new patient presenting with acute back pain?

### FURTHER INFORMATION

He remembers one previous episode of acute LBP 10 years ago that resolved in 3–4 days after some physiotherapy. He is not on regular medications, but has tried some ibuprofen for his current pain with little effect. He is a nonsmoker and drinks several beers most nights of the week. He is worried about how long this episode may last, and what can be done about it. You offer to examine him.

### QUESTION 4

Outline the relevant steps in examination of the lumbosacral spine and explain the significance of some of the common findings in each of these steps in low back pain.

### FURTHER INFORMATION

The key positive findings in his physical examination include a 50% reduction in his expected range of flexion and right side bending, pain with these movements, and moderate tenderness over his lumbosacral junction centrally and to the right of this over the right L5/S1 facet joint. His examination is otherwise normal.

### QUESTION 5

How should management proceed initially with Justin?

### FURTHER INFORMATION

One week later Justin is reviewed in the rooms. He says his pain and flexibility have improved, but his pain has not gone.

### QUESTION 6

What would you do at this consultation?

## CASE 5 ANSWERS

### ANSWER 1

One of the first tasks in the assessment of acute LBP is the exclusion of the red flag, or potentially life threatening or severely disabling causes that comprise around 1% of acute LBP presentations. *Table 5* lists these causes and the key questions to detect each of them.[41–43]

**Table 5. Red flag conditions causing acute low back pain and the key questions to detect them[41–43]**

| Red flag condition | Key questions |
|---|---|
| Cancer | Past history of any malignancies?<br>Unexplained weight loss of more than 4–5 kg in the past 6 months?<br>Has sought medical care during the past month, but is not improving?<br>Aged over 50 years? |
| Dissecting abdominal aortic aneurysm | Ripping or tearing pain? |
| Spinal infection | Fever?<br>IV drug use?<br>Note: nonspinal causes of infection are much more likely to cause back pain than spinal infection and will have a range of other accompanying symptoms |
| Spinal fracture | Significant trauma?<br>Note: if osteoporosis is present milder trauma may be sufficient |
| Cauda equina compression | Bilateral leg pain and paraesthesia?<br>Saddle anaesthesia? |
| Inflammation | Pain >3 months and morning stiffness >30 minutes and <35 years of age? |

### ANSWER 2

The severity of Justin's pain can be quickly assessed by getting him to rate his pain on a numerical scale of zero to 10.

Regarding the nature of his back pain, differentiating sharp pain from dull or aching pain is of limited use alone in differentiating spinal from nerve or nonspinal causes, as both sharp and dull pain are often present. It is more relevant in the diagnosis of spinal referred pain, where sharp pain in the leg suggests pain from an irritated nerve root, and where dull pain in the leg suggests pain referred from a muscoloskeletal source in the spine such as facet joint. It would be more useful to enquire about aggravating and relieving factors that should include movement and sustained postures for spinal causes, but not for nonspinal causes.

The effect of Justin's pain on his activities can also be quantified on a zero to 10 scale, and by questions about basic activities such as sitting, standing, walking and bending.

A brief history of his occupation and hobbies may help clarify both the cause and effects of Justin's pain.

## ANSWER 3

Other routine history should include enquiring about:

- past episodes of back pain, their severity, duration and the treatments used
- medications, especially analgesics and anti-inflammatories
- medication allergies
- smoking and alcohol
- concerns about the back pain and its prognosis.

## ANSWER 4

Examination of Justin involves the classical Apley paradigm of 'Look, Move, Feel' and will become more focused as it progresses.

### Look

Inspection starting with gait might reveal a gait that is altered by weakness or pain. At this time, it is a good opportunity to briefly screen for weakness of the L5 and S1 myotomes (walk on heels, walk on toes respectively). Given that Justin does not have pain in the leg or any neurological symptoms, a formal neurological examination is not necessary. A muscular scoliosis, where the patient is bent to one side and is associated with limited flexion of the lumbosacral spine, can suggest an acute disc prolapse.

### Move

Gross range of movement of the lumbosacral spine is a useful scanning procedure, although not associated with any high likelihood ratios for any single source of pain.

Gross flexion, extension, side bending and rotation are observed and range can be recorded as a percentage of normal range. Ask the patient if any of these movements exacerbate the pain. If flexion is worse than extension, the pain might be disc-related, but if extension is worse a dysfunction in the zygapophyseal (facet) joints might be implicated. Combining extension with rotation and side bending to the same side (the 'quadrant test') to reproduce the incident pain on the same side has been reported by Laslett et al[44] as showing high sensitivity (100%), but low specificity for relief of pain after a zygapophyseal joint block. Therefore, if this test is negative it probably rules out the zygapophyseal joints as the source of the pain.

In Justin's case, since there is no radiation of the pain below the lumbosacral junction, the pain is unlikely to be caused by nerve root or dorsal root ganglion pressure – even though it still might be discogenic (internal disc disruption). If symptoms did progress into the lower limb (and therefore include a disc protrusion in the differential diagnosis), the centralisation phenomenon (receding of radiating symptoms from the periphery to the central body in response to certain manoeuvres) might be used to help determine the anatomical source of the pain. Manoeuvres include moving into extension or side bending while standing, or rising up from prone (lazy push-up) into extension with or without rotation. If the pain centralises toward the spine, the likelihood ratio of a disc being the source of the pain has been shown to be 6.0 making this a very useful test.[45]

### Feel

The assessment of gross range of movement should be supplemented by a detailed segmental examination using manual palpation in an effort to reproduce the patient's pain, as well as assess the mobility of joints. Although the interexaminer reliability for palpation is only fair, the intraexaminer reliability of palpatory tests is better. The more practised the examiner, the more useful information is gained.

All of the somatic tissues should be examined to look for tenderness. This includes skin, muscle and joints.

*Skin* – the skin in the region of the perceived pain can be assessed for increased sensitivity, including hyperalgesia and allodynia. Hyperalgesia is commonly found with somatic pain referred to the skin. On the other hand, allodynia is more specific for neuropathic pain.

*Muscles* – next, the muscles in the region of the perceived pain should be assessed for signs of irritability – tightness and tenderness. Such localised areas of muscle might indicate a primary source of this patient's pain such as a muscle strain. However, they are more commonly associated with dysfunction in a deeper structure, such as a joint or intervertebral tissue innervated by the same segmental nerves.

The usefulness of finding such areas of tenderness in muscle is that they can be injected with, for example, local anaesthetic in a 'focal local' manner to reduce or eliminate the pain.

Trigger points (or tender points) in muscles such as the quadratus lumborum, gluteus minimus and piriformis are commonly said to refer pain to the paravertebral region in the lower lumbar spine. These are examined via direct palpation for tenderness and may be present in Justin. Also, Justin might have pain from the so-called iliolumbar ligament syndrome. In this case there might be localised tenderness on the top of the iliac crest or anterior and deep to the crest.

*Intervertebral joints* – the segmental palpation of the intervertebral joints of the lumbar spine – including the thoraco-lumbar junction – is performed by a range of methods including downward pressure over individual spinous processes, transverse pressure over spinous processes (induces rotation of the vertebra) and direct downward pressure over the region of individual zygapophyseal joints, always comparing both sides. The thoraco-lumbar junction should be included in this assessment since there is good experimental evidence that this region is a source of referred pain to the lower lumbar/hip/buttock region.[46]

*Sacro-iliac joint* – another possible source of pain in this region is the sacro-iliac joint. This can be examined by stressing the joint with the patient prone, palpating over the joint lines. Reproduction of the patient's pain increases the likelihood of this joint being

the source of the pain, although it is more likely if there is pain reproduction with a combination of tests. These tests are the thigh thrust or posterior shear test, Patrick test, pelvic compression test, sacral thrust test and the distraction test. The reported positive likelihood ratio for this combination of tests is 4.02, making this a useful test.[45]

*Other structures* – with this patient, it would be appropriate to perform a quick screening test of the hip joint to exclude any hip pathology (pain with resisted hip flexion, painful limitation of internal rotation of the hip).

## ANSWER 5

In the absence of red flags on history taking and with the presence of the musculoskeletal signs mentioned, a somatic/musculoskeletal cause of Justin's LBP is most likely, making investigations unnecessary at this consultation. However, investigation may be indicated in a month or so if the pain does not decrease.

To address his pain and disability, an overall approach of useful framework comes from addressing concerns in the so-called 'musculoskeletal quartet':[47]

'I hurt'

'I can't move'

'I can't work'

'I'm scared'.

The Australian National Musculoskeletal Medicine Initiative[48] and Blomberg's pragmatic trials[49–52] are significant trials that have compared algorithms involving multiple treatments versus standard care. Further significant trials on workers have used similar approaches, but without formal manual therapy or injections with similarly good results.[53,54] They inform the approach to the four concerns above:

### 'I hurt'

Prompt control of pain is paramount. Pain is the fifth vital sign and is an independent risk factor for chronicity. At this first consultation, Justin needs a credible, convincing explanation of the cause of his pain. Justin's problem can be described in terms of a muscle cramp, which is a condition understood by most people. The bending activity that Justin performed appeared to trigger his pain. An irritable lumbar segment was likely to have been provoked setting off muscle spasm around this segment leaving the segment dysfunctional. The cramp analogy is also useful in explaining treatment such as heat, stretching and manual therapy. This needs to be done well to facilitate the other necessary steps in pain management – analgesics, manual therapy and exercises (*Table 6*).

**Table 6. Pain management options**

- Give a full explanation of the nature of the pain and assurance regarding the good chance of full recovery
- Encourage the patient to stay active, to minimise pain and disability
- Advise time-contingent use of analgesics to control pain to allow activity and avoid sleep disruption
- Use the safest medication at the lowest effective dose. Paracetamol is first line. If it doesn't help, consider a stronger analgesic for night. Anti-inflammatories are best for short term use, ie. 3–5 days, but carry gastrointestinal, cardiovascular and renal risks. Opioids may be considered short term to enable a faster return to activities and sleep normalisation
- Consider a trial of manual therapies to relieve somatic dysfunction
- Consider medication to treat neuropathic pain if the pain is predominantly neuropathic in origin
- Consider use of needling interventions, both dry and wet

**Table 7. Recommendations for activity and exercise in the presence of low back pain in the absence of red flags[55,56]**

- Give general advice to stay active, keep flexible and walk without limping. The worst thing the patient can do for their back is to be too careful.
- Stipulate that the patient must mobilise their lumbar spine by light activity
- Build on the patient's personal preferences for exercise, encourage them to set their own goals
- Encourage directional preference, ie. moving in a direction that either reduces pain or doesn't cause pain
- Enquire about and redress any misunderstandings about back pain
- Make every effort to address patient fears about low back pain and avoid sickness behaviour
- Discourage activities involving static work for the back muscles.
- Treat acute attacks of back pain as an acute muscle spasm, with stretching and light activity
- With respect to lifting, instruct patients to:
  - avoid twisting with bending
  - use the thighs with a vertical back for heavy objects
  - use the back and flex it at other times
  - not be afraid to lift
- Explain:
  - that increased tension in muscles, for whatever reason, would increase the pain and thereby add to the problem
  - that longstanding pain could create a vicious circle and chronic pain as a result
- Core stability exercises and Alexander technique programs have evidence for effectiveness, but selecting appropriate patients can be problematic[55,56]
- Encourage and help the patient to try to walk as flexibly as possible
- Prescribe exercise while a significant other is in attendance at the consultation
- Reinforce instructions at 3 months and at 1 year
- Remain available to see the patient at their request

### ‘I can’t move’

The disability associated with acute LBP can quickly impair a person’s ability to work, socialise and participate in leisure activities. Justin has become too frightened to move, in case he further ‘damages’ his spine. Assurance of the benefits of early mobilisation and the dangers of prolonged rest[57] need to be clearly explained to Justin. Before leaving the first consultation, Justin should have a sound knowledge of what to expect when engaging in physical activity and have a program for pacing activities, maintaining movement and controlling any resultant flare of pain or stiffness. This may involve manual therapy, be it manipulation or an exercise regimen or both (*Table 7*).

### ‘I can’t work’

The work domain and LBP have long been the subject of debate. The experience could be summarised as: ‘If the workplace has a toxic environment, the injured patient is unlikely to return no matter what physical rehabilitation occurs’. Therefore, the yellow flag concept as first comprehensively set out in the New Zealand Government guidelines is vitally important.[23] Returning Justin to work in some role as soon as practical should be a priority.

### ‘I’m scared’

The fear associated with LBP is a leading cause of disability even though the fears are often grounded in myth and mistaken beliefs. Initiating discussion with Justin about his understanding of the cause of the pain, his expectations regarding recovery and his motivation to actively become involved in the recovery process will help overcome Justin’s initial apprehensions. Rectifying any fears, educating Justin in coping skills and reassuring him of his good prognosis are all helpful steps. Formal psychological intervention should be sought if this does not occur within the first few visits.

## ANSWER 6

Justin needs to be reassessed to check his pain and disability scores. If he has not improved or worsened, it may be appropriate to review the red flag questions, his analgesia and his concerns about the pain and its prognosis.

A brief review of posture, spinal movement range and palpation for tenderness should be performed.

As his second examination reveals improvement in function and pain, Justin can be assured that his prognosis is excellent. The performance and understanding of the home exercise program should be reviewed. A graded return to normal activity and methods of preventing recurrences should be discussed. Justin should be reminded that he can return at any time if he has concern.

## CASE 6

### ANTHONY HAS A SORE KNEE

Anthony, aged 45 years, presents for the first time to your practice with a 2 month history of pain in the right knee. He describes right knee pain, which is unremitting. He lifted some heavy boxes while moving house 2 months ago. This resulted in sudden low back pain and pain in the front of the right knee, and to a lesser extent in the outer thigh as well as the front and inner aspect of the right lower leg. The back pain settled after a few weeks, but the right knee pain persisted.

On examination of the right knee, there is no redness, no swelling and no tenderness. You passively move Anthony's knee without precipitating any discomfort.

### QUESTION 1

What further history would you like to know about Anthony?

### QUESTION 2

Where could Anthony's pain be originating from? What is neuropathic pain?

### QUESTION 3

Describe the neuro-anatomical pathways involved in pain.

### QUESTION 4

What are some of the questionnaires that would help determine if Anthony's knee pain is neuropathic?

### QUESTION 5

What findings on physical examination might be present if Anthony's pain is neuropathic?

### FURTHER INFORMATION

Anthony describes no relevant past history. He explains that the pain in his right knee feels burning in nature. You perform a DN4 (Doleur Neuropathique 4) questionnaire, which reveals Anthony has a positive score (score of 6, where greater than or equal to 4 is positive) for neuropathic pain. You perform a neurological examination of his lower limbs and find that he has sensory deficits in the L4 dermatome of his right lower limb. Examination of his hips and lumbosacral spine are normal.

### QUESTION 6

If you require confirmation that Anthony's knee pain was neuropathic, is history and examination sufficient, or do you need to request investigations?

### QUESTION 7

What medications could be used to treat Anthony's pain?

### QUESTION 8

If Anthony has a poor response to medication, what other factors should you consider? What other therapeutic options would you consider?

### QUESTION 9

Under what circumstances would you consider prescribing opioid treatment for Anthony? What strategies should you put in place if prescribing opioids?

## CASE 6 ANSWERS

### ANSWER 1

Further history taking could include enquiring about:

- the character of the pain. Is it sharp, aching, throbbing or burning? Pain that is burning, shooting, stabbing, electric shock-like or like a toothache suggests neuropathic pain
- other features in a pain history, such as exacerbating or relieving factors
- associated symptoms such as parasthesiae (pins and needles), tingling and numbness in the distribution of the pain
- previous injuries, operations and past medical history such as diabetes, which may also give a clue to the cause of the pain.

### ANSWER 2

Anthony's knee pain could be originating from the knee itself (this is unlikely as there are no signs of inflammation), referred from another site such as the hip or back, or it could be neuropathic, ie. originating from a nerve. Examination should include examination of the hips, lumbosacral spine and a neurological examination of the lower limbs.

Neuropathic pain is defined by the International Association for the Study of Pain as 'pain caused by a lesion or disease of the somatosensory system'.[58]

Neuropathic pain is due to a disorder of the signalling system, as opposed to nociceptive pain, which involves the stimulation of pain sensors (nociceptors) that signal potential or actual tissue damage.

Neuropathic pain can be central or peripheral in origin. Peripheral neuropathic pain can involve one nerve (mononeuropathy) or many nerves (polyneuropathy). Neuropathic pain may be caused by infection such as occurs in post herpetic neuralgia, or disease such as occurs in diabetic painful peripheral neuropathy or injury. Whatever the cause, neuropathic pain is very distressing to most patients. In addition, they can experience pain in a region where they have lost feeling, which is paradoxical.

## ANSWER 3

Peripheral pain is transmitted via C fibres and A delta fibres (first order neurones) to the spinal cord where they interface with the nerves of the spinothalamic tract (second order neurones). As implied by its name, the spinothalamic tract carries the signal to the thalamus where the pain is processed via interfaces to other regions of the brain. These relate to sleep, moods and previous experience. The thalamus then modulates the pain signal via the periaqueductal grey matter and it descends via the dorsolateral fasciculus of the spinal cord to interface with the first order neurone. From the thalamus, the pain signal is also transmitted to the cortex, where it undergoes further processing before it enters conscious thought.[59]

There is also processing within the spinal cord, which is responsible for sensitisation. The microglia and astrocytes play a role in central sensitisation. This is important as neuropathic pain often becomes chronic or persistent, which adds further complexity to treatment.

Lesions can occur anywhere along the pathway. If the lesion occurs at the level of the first order neurone, it is termed 'peripheral'. All other lesions are 'central'.

*Figure 4* shows a diagrammatic representation of the anatomical pathways involved in pain.

## ANSWER 4

You could use one of the following questionnaires (see *Resources* for further details) to help determine whether the pain is neuropathic in nature:

- DN4 (Doleur Neuropathique 4)
- PainDETECT
- LANSS (Leeds Assessment of Neuropathic Symptoms and Signs).

These questionnaires seek to obtain information about the character of the pain, associated sensations in the distribution of the pain and may obtain information about findings on examination to provide a numerical score. A numerical score above a certain value suggests neuropathic pain.

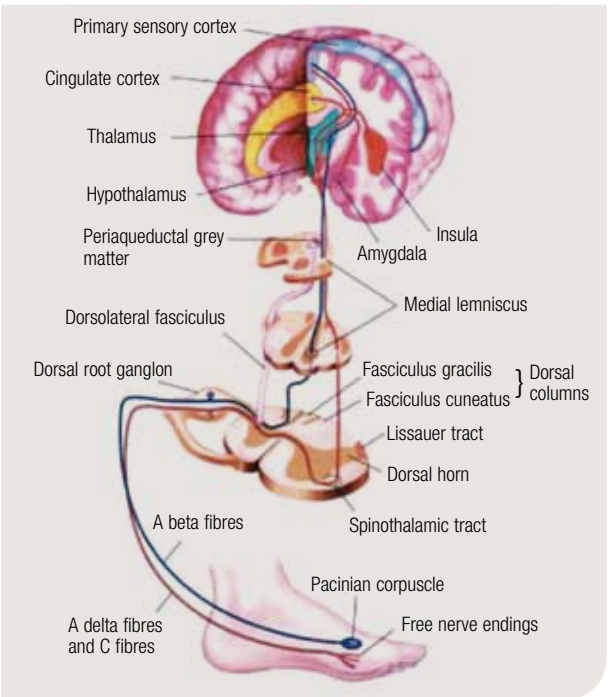


Figure 4. Pain pathways[58]

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## ANSWER 5

The following findings on examination would support a diagnosis of neuropathic pain:

- sensory and/or motor signs – it is important to test all types of sensation such as light touch, pinprick, cold and hot as well as check for motor signs
- other pain related signs such as allodynia (a painful response to a non noxious mechanical stimulus), hyperalgesia (an increased response to a stimulus that is usually painful) or dysaesthesia (an unusual or unpleasant sensation, which is either spontaneous or provoked).

## ANSWER 6

The International Association for the Study of Pain (IASP) has three levels of confidence in the diagnosis of neuropathic pain: possible, probable and definite.[58] A possible diagnosis is from history only, a probable diagnosis is from history and positive examination results and a definite diagnosis is from positive investigation demonstrating the lesion.

In Anthony's case, a definite diagnosis could be made if a CT scan or MRI (preferable, if readily available) was performed and revealed a disc protrusion at the L3/4 level compressing the L4 spinal nerve, which would be consistent with the sensory deficit on physical examination. In practice, a doctor may be satisfied with a lesser level of confidence in diagnosing neuropathic pain. One area where application of the IASP classification may be necessary and a definite diagnosis may be required is in some medicolegal cases.

There are no guidelines as to the level of confidence needed to treat a patient. In some cases, obtaining a definite diagnosis may be difficult. For example, in diabetic neuropathy a nerve biopsy or skin biopsy looking at peripheral nerves is needed to make the definite diagnosis.

Also be aware that the pain may be not purely neuropathic. It may have other components. Having one type of pain does not exclude others.

Urgent investigations of the lumbosacral spine, such as a CT scan, are indicated in the presence of red flags such as fever and certain neurological deficits.[60] (*Answer 1, Case 5* and *Table 5* describe red flag conditions and *Table 5* questions to elicit their presence in more detail).

## ANSWER 7

First line medication options include tricyclic antidepressants (amitryptiline and nortriptyline),[61–63] anticonvulsants such as gabapentinoids (pregabalin and gabapentin)[62,63] and SNRIs (venlafaxine and duoxetine).[61] A decision on which medication to use depends on consideration of efficacy, adverse effects, cost, the need for sedation and contraindications. Some general considerations are that amitryptiline is on general benefit on the PBS, pregabalin is Therapeutic Goods Association (TGA) listed for neuropathic pain, duoxetine is TGA listed for diabetic painful neuropathy and venlafaxine and amitryptiline have no specific pain listing.[63]

Some practice tips are:

- amitryptiline works for neuropathic pain in much lower doses than what is needed to treat depression
- the gabapentinoids need to be uptitrated to be effective
- combination therapy can work well in practice though studies are limited. For example, gabapentinoids and SNRIs are complementary
- tramadol has both mu opioid agonist and noradrenaline uptake inhibition properties and works for both neuropathic and nocioceptive pain. Be alert to the possibility of serotonin syndrome when using tramadol
- if the pain appears out of proportion to the pathology, the nerve may be caught up in an inflammatory process and an NSAID may be of benefit. However, NSAIDs are not usually effective if pain is purely neuropathic.

Opioids are considered third line options. Oxycodone has clinical trial evidence of efficacy and methadone has N-methyl D-aspartate activity, so both of these may be of some benefit in neuropathic pain.

There are topical agents that have shown limited effect on neuropathic pain. These include capsaicin creams, lidocaine patches and botox injections. Lidocaine patches and high strength capsaicin patches are available overseas.

## ANSWER 8

You should reassess for the presence of yellow flags for which appropriate cognitive and behavioural management should be instituted.[23]

Psychological techniques, such as CBT, are often helpful in the presence of a poor response to medication. In addition, distraction, activity and a positive mood lessen the pain.

It is important to reinforce to Anthony that there is nothing intrinsically wrong with his right knee and it is a problem with the 'wiring system' of the body and that his pain is a false signal.

Back strengthening exercises may help stabilise the spine and, if a disc protrusion is present, help prevent further disc protrusion.

The use of a multidisciplinary team in treating pain should be considered. These specialised teams are available through pain management units. The members of the pain multidisciplinary team include pain specialists, psychiatrists, psychologists, occupational physicians, nurses, physiotherapists, occupational therapists and exercise physiologists.

A spinal cord stimulator, where the nervous system is stimulated by electrodes, may be useful in reducing intractable neuropathic pain. This treatment involves surgery and is usually expensive.

## ANSWER 9

Opioids could be considered if other therapies such as those outlined in *Answer 7* have failed after an adequate trial.

In prescribing opioids, the following need to be considered:

- Is the opioid to be used short term or long term?
- What are the goals of the opioid treatment? Is there a functional goal? Agree on both the goals and length of treatment.
- What are the patient's expectations? Are they realistic?

The following measures may also be helpful in preventing disagreements in the future:

- use an opioid risk management tool before commencing treatment – this may change the agent that you use and the safeguards you put into place. An opioid risk management tool includes questions about family and personal history of substance abuse, as well as psychiatric past history
- have some rules in place, which you write down and sign off on
- have an agreed titration and withdrawal schedule.

There is evidence that managing pain well initially can prevent its progression to chronic or persistent pain.

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## RESOURCES FOR DOCTORS

- Information on assessment and management of pain including body maps to note the location of pain, neuropathic pain questionnaires such as the DN4 Neuropathic pain diagnostic questionnaire and the Leeds Assessment of Neuropathic Symptoms and Signs (LANSS) pain scale, is available at www.painxchange.com.au
- PainDETECT Questionnaire for use in neuropathic pain is available at www.informahealthcare.com/doi/pdfplus/10.1185/03007990 6X132488
- IASP is a professional forum for science, practice and education in the field of pain and includes information on terminology relating to pain and links to a range of professional resources. Available at www.iasp-pain.org/AM
- The Australian Pain Society is a body that aims to reduce pain through education, research and public advocacy. Available at www.apsoc.org.au
- Australian Acute Musculoskeletal Pain Guidelines Group. Evidence-based management of acute musculoskeletal pain: a guide for clinicians. Bowen Hills: Australian Academic Press Pty. Ltd., 2004. Available at www.nhmrc.gov.au/_files_nhmrc/publications/attachments/cp95.pdf
- Accident Compensation Corporation. New Zealand acute low back pain guide incorporating the guide to assessing psychosocial yellow flags in acute low back pain. Available at www.acc.co.nz/PRD_EXT_CSMP/groups/external_ip/documents/internet/wcm002131.pdf.

## RESOURCES FOR PATIENTS

- Information on pain is available at www.betterhealth.vic.gov.au. This site has a search facility into which various words can be inserted
- Information on pain is available at www.healthinsite.gov.au. This site has a search facility into which various words can be inserted
- CareSearch is a palliative care organisation. Available at www.caresearch.com.au it contains useful links to patient education materials, as well as evidence based guidelines on a range of topics and links to useful resources
- Lovell M, Boyle F. Overcoming cancer pain. A booklet for patients and families. The Cancer Council NSW, 2011. Copies can be ordered for free or downloaded from www.nswcc.org.au/editorial.asp?pageid=1159
- Arthritis Australia provides information on arthritis. Available at www.arthritisaustralia.com.au
- Information on chronic regional pain syndrome can be found on the Reflex Sympathetic Dystrophy Syndrome Association's website at www.rsds.org
- Information for carers can be found on the Carers Australia website at www.carersaustralia.com.au.

## Pain management

In order to qualify for 6 Category 2 points for the QI&CPD activity associated with this unit:

- read and complete the unit of *check* in hardcopy or online at the *gplearning* website at www.gplearning.com.au
- log onto the *gplearning* website at www.gplearning.com.au and answer the following 10 multiple choice questions (MCQs) online
- complete the online evaluation.

If you are not an RACGP member, please contact the *gplearning* helpdesk on 1800 284 789 to register in the first instance. You will be provided with a username and password that will allow you access to the test.

The expected time to complete this activity is 3 hours.

Do not send answers to the MCQs into the *check* office. This activity can only be completed online at www.gplearning.com.au.

If you have any queries or technical issues accessing the test online, please contact the *gplearning* helpdesk on 1800 284 789.

### QUESTION 1

Susan, aged 33 years, sustained a comminuted fracture of her ankle for which she underwent surgery. She subsequently developed symptoms of chronic regional pain syndrome. Which of the following has been demonstrated to be effective in the treatment of chronic regional pain syndrome in general?

A. Use of the mirror box
B. Gabapentin
C. Topical prazosin
D. Sympathetic block
E. Sympathectomy.

### QUESTION 2

Macy, aged 66 years, has metastatic breast cancer. She has significant pain due to bony metastases. Which of the following is true of pain management in a palliative care situation?

A. Opioids should be used on an 'as required' basis, rather than a regular basis
B. Breakthrough morphine medication is usually one-twelfth to one-sixth of the total daily dose given 2–4 hourly as required
C. If a patient experiences significant side effects with morphine, they are not likely to be able to tolerate a different opioid
D. Regular paracetamol should be avoided when patients are on a strong opioid
E. Nonsteroidal anti-inflammatory medications are not usually effective for bone pain due to metastases.

### QUESTION 3

Tom, aged 30 years, is an intravenous drug user who presents with acute back pain in the setting of a fever, which you note is a red flag. Which of the following is true, in general, regarding red flags in cases of back pain?

A. Their presence suggests underlying serious physical conditions
B. Their presence suggests the need for urgent investigation and/or referral
C. They can be elicited by asking specific questions
D. Their presence should be reassessed for periodically
E. All of the above.

### QUESTION 4

Indari, aged 35 years, has sustained a back injury at football. You think about whether he has any yellow flags. Which of the following is true regarding yellow flags in cases of back pain?

A. They are indicators of underlying physical causes of back pain
B. They indicate that the individual is malingering
C. They indicate that the pain is likely to be short lived
D. They should be first identified at the stage when medication is not working
E. They indicate that a biopsychosocial approach is warranted.

### QUESTION 5

Ling Li, aged 45 years, presents with chronic low back pain and you are unsure of its source. Which of the following is true of findings on physical examination in cases of low back pain?

A. Screening of the hip joint is performed by assessing abduction of the hip
B. Assessing gross range of movement of the lumbosacral spine is likely to locate the source of the pain
C. The 'lazy push up' tests for the presence of sacroiliac joint pain
D. A negative quadrant test generally excludes facet joint pain
E. Walking on the toes tests the L5 dermatome.

### QUESTION 6

You are discussing radiological imaging in cases of low back pain with a medical student. Which of the following is correct regarding the use and interpretation of radiological imaging in low back pain?

A. The presence of yellow flags helps determine the need for radiological imaging
B. CT scans should be requested in most patients with chronic back pain

C. MRI scans are the investigation of choice to exclude secondary malignancy

D. Bone scans are the investigation of choice in the presence of neurological loss

E. Radiological imaging often shows morphological changes, which correlate poorly with spinal pain.

### QUESTION 7

Samuel, aged 55 years, has chronic nonspecific low back pain without other features, but is disabled by his pain. Your approach to treatment of nonspecific low back pain in general involves which of the following?

A. Encourage rest to avoid pain

B. Encourage activities involving static work for the back muscles

C. Discourage a trial of manual therapies

D. Consider radiofrequency neurotomy for proven facet joint or sacroiliac joint pain

E. Consider surgery for somatic low back pain based on the severity of the pain.

### QUESTION 8

Arlene, aged 55 years, has chronic back pain in association with a work-related injury. She takes paracetamol for pain. She has become depressed, sleep deprived and housebound. She avoids activity and worries about the future. Which of the following is the next most important step in her management?

A. Start stronger analgesics to control her pain

B. Treat her sleep deprivation

C. Start tricyclic antidepressants and cognitive behavioural therapy

D. Start a selective serotonin reuptake inhibitor and cognitive behavioural therapy

E. Explain her problems to her by reformulating them in terms of the likely contributors.

### QUESTION 9

Sylvio, 32 years of age, has pain in his low back, right buttock and right lower limb, which you suspect is due to a discal lesion. You wonder whether he has somatic referred or radicular pain (a form of neuropathic pain). Which of the following is true of classical neuropathic pain in general?

A. It occurs by the same mechanism as somatic referred pain

B. It involves stimulation of nociceptors

C. It is classically dull in nature

D. It is not accompanied by allodynia, hyperalgesia or dysaesthesia

E. It can be experienced where there is no obvious ongoing injury.

### QUESTION 10

Beth, aged 47 years, has back pain with radicular pain in her left leg in association with a suspected disc prolapse. She is depressed and unable to sleep. She worries about her finances. She has no other medical conditions. Which of the following medications would be most appropriate to start in Beth?

A. Selective serotonin reuptake inhibitor

B. Seratonin-noradrenalin reuptake inhibitor

C. Tricyclic antidepressant

D. Gabapentinoid

E. Opioid.

# A patch a week for active living[1,2]

**For chronic moderate to severe osteoarthritis pain and back pain**[1]

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Please review Product Information and refer to State and Federal regulations before prescribing. **NORSPAN® (buprenorphine) TRANSDERMAL PATCH MINIMUM PRODUCT INFORMATION. INDICATIONS** Management of moderate to severe pain. **CONTRAINDICATIONS** Hypersensitivity to buprenorphine or patch components, myasthenia gravis, *delirium tremens*, pregnancy, severely impaired respiratory function, concurrent non-selective MAO inhibitors (or within 14 days of their administration), treatment of opioid dependence or narcotic withdrawal. **PRECAUTIONS** Use with caution in convulsive disorders, head injury, shock, reduced consciousness of uncertain origin, intracranial lesions or increased intracranial pressure, severe hepatic impairment, hypotension, hypovolaemia, biliary tract disease, pancreatitis, inflammatory bowel disorders, prostatic hypertrophy, adrenocortical insufficiency, chronic renal and hepatic disease, following abdominal surgery, in debilitated patients, drug or alcohol abuse problems, serious mental illness, intravenous abuse of buprenorphine, congenital or medication-induced QT prolongation, driving or operating machinery, pregnancy (Category C), lactation. Do not use in immediate post-operative period, within 24 hours of cordotomy or other pain-relieving surgery. Reduce dosage in hypothyroidism and monitor severely febrile patients for enhanced drug absorption. Physical dependence and withdrawal syndrome may develop. Do not substitute for agonist opioids, as antagonist activity can induce withdrawal. **INTERACTIONS** Non-selective MAO inhibitors are contraindicated and caution is advised with newer selective MAO inhibitors. CNS depressants may cause respiratory depression, hypotension and profound sedation or coma. Some general anaesthetics and other drugs can decrease hepatic elimination. CYP3A4 inhibitors can increase buprenorphine levels. Enzyme-inducers can increase clearance and reduce efficacy. INR levels may increase with concurrent warfarin. Increased aminotransferase levels and weight decrease have been noted. **ADVERSE EFFECTS** The most frequently observed side effects are application site reaction, constipation, dizziness, dry mouth, headache, nausea, pruritus (especially but not just limited to application site), somnolence, vomiting. Other effects commonly observed are abdominal pain, anorexia, anxiety, asthenia (including muscle weakness), chest pain, confusion, depression, diarrhoea, dyspepsia, dyspnoea, erythema at site, exanthema, insomnia, nervousness, oedema, pain, paraesthesia, peripheral oedema, rash (not just limited to application site), sweating, taste perversion, tiredness, vasodilation. **DOSAGE AND ADMINISTRATION** Transdermal use over 7 days. Adults: 5 microgram/hour starting dose, especially opioid-naïve patients and those converting from other opioids. Titrate dose to pain relief, use supplemental analgesics as required and only increase dose after an interval of at least 3-days. Apply the patch to intact, non-irritated, hairless skin of upper arm, upper back, upper or side chest, avoiding scarred areas. Use only water to clean skin, and dry before applying patch immediately after taking it from the pouch. Press patch in place for 30 seconds. When changing the patch, remove the old one and apply 1 or 2 new patches to a different site or sites (the current site should not be used again for 3-4 weeks). Do not use more than 2 patches at the same time. On removal of a used patch, fold adhesive sides together and dispose of safely. If edges start peeling off, tape down with skin tape. If patch falls off, apply a new one. Avoid exposing the application site to external heat sources. Monitor patients and if adequate pain relief cannot be achieved at maximum patch dosage regimen, convert to 24-hourly strong opioids. After discontinuing with the patch, serum buprenorphine concentrations will decrease gradually, and subsequent opioids should not be needed for 24 hours. No dosage adjustment is required in renal impairment, mild to moderate hepatic impairment or the elderly, but use with extreme caution in severe hepatic impairment. Not for children under 18 years. **TGA APPROVAL DATE** 4 April 2005. **DATE OF MOST RECENT AMENDMENT** 14 September 2009. PBS Dispensed Price: NORSPAN® patch 5[2]: $26.70. NORSPAN® patch 10[2]: $40.77. NORSPAN® patch 20[2]: $56.08. Product Information is available from Mundipharma Pty Limited. ABN 87 081 322 509. 50 Bridge Street, Sydney, NSW 2000. Phone 1800 188 009. ®: NORSPAN is a Registered Trademark.

**References: 1.** NORSPAN® patch Product Information, August 2009. **2.** Schutter U *et al.* Chronic osteoarthritis pain: efficacy and tolerability of a 7-day patch with low-dose buprenorphine. Results of a multicentre observational study. MMW Progress in Medicine Originals II 2008;96–103 (translated from German).

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