Essential Pain Management

EPM Lite Workshop Manual

2017

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Workshop Manual

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Acknowledgements

Disclaimer

We have done our best to provide accurate information regarding medication doses and other treatments, however this book may contain mistakes. In addition, treatment options vary from country to country. It is important that health workers double-check medication doses and use their clinical judgement when treating patients.

CONTENTS

INTRODUCTION

Pain affects all of us – young and old, rich and poor. Pain has many causes – cancer, injury, infection, surgery – and people experience pain in many different ways.

Pain is often a 'hidden' problem and is poorly treated. We do not always recognize that a person is in pain. There are also many barriers to the treatment of pain – e.g. people's attitudes, lack of health workers and lack of medicines.

Pain can often be improved with very simple treatments.

In some ways, pain is like a rat – something that causes a lot of suffering but is often hidden from view.

The letters R.A.T. can also be used to help us manage pain:

> R = Recognize
>
> A = Assess
>
> T = Treat

Essential Pain Management (EPM) is a *system* for managing pain and teaching others about pain management.

> **The aim of this course is to improve recognition,**
>
> **assessment and treatment of pain.**

WHAT IS PAIN?

The International Association for the Study of Pain defines pain in the following way:

> **Pain is "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage".**

This definition is quite complicated but some important points can be made:

- Pain is unpleasant and therefore people do not like having pain.

- Pain can influence a person's feelings, thoughts and emotions.

- Pain is not always associated with visible tissue damage. In other words, a patient may be experiencing pain even if we cannot see an obvious cause for it.

Another simpler definition of pain is:

> **"Pain is what the person says hurts."**

QUESTIONS

1. From a biological point of view, why is it beneficial for pain to be unpleasant?
2. Give an example of pain where there is no obvious tissue damage.
3. Pain can influence emotions, but can emotions influence pain?

WHY SHOULD WE TREAT PAIN?

GROUP DISCUSSION

Think of a patient who has or had pain (or use your pre-prepared case).

How did he or she describe the pain?

What were the benefits of treating his or her pain?

CASE 1

A 55-year-old woman has breast cancer that has spread to her spine. She has severe chest wall and low back pain and is expected to die within a few weeks.

Why should we treat her pain?

Acute pain is a symptom of tissue injury. Untreated pain causes inflammatory changes in the body which may have harmful physical and psychological effects. In addition, poorly treated acute pain may progress to chronic pain by causing changes in the nervous system.

There are **benefits** of effective pain management for both the patient, the patient's family, and society (hospital and wider community).

For the patient:

- Treating pain is the "humane" thing to do
    — Less suffering
    — Greater dignity (especially for patients dying with cancer pain)
- Fewer physical problems
    — Better sleep, improved appetite
    — Earlier mobilization, faster recovery after injury or surgery
    — Fewer medical complications
      (e.g. heart attack, pneumonia, deep vein thrombosis)
- Fewer psychological problems
    — Less depression and anxiety

For the family:

- Able to function as part of the family
- Able to provide for the family

For society:

- Reduced health costs
  — Patients are discharged earlier
  — Patients are less likely to be readmitted
- Patients are able to work and contribute to the community

QUESTIONS

1. Can the experience of pain make a person stronger in the long term?

2. What are the benefits of treating chronic low back pain in a 45-year-old man?

3. Is it necessary to treat pain in newborn babies?

ASSESSMENT OF SEVERITY

Pain assessment is the "fifth vital sign" (along with temperature, pulse rate, blood pressure and respiratory rate).

Assessment of severity is important because it:

- Guides choice of treatment
- Measures response to treatment

The severity of pain can be quickly and easily measured using a simple scoring system:

- Verbal Rating Scale (e.g. mild / moderate / severe or 0 to 10)
- Visual Analogue Scale (VAS)
- Faces Pain Scale (FPS)

Visual Analogue Scale (VAS)
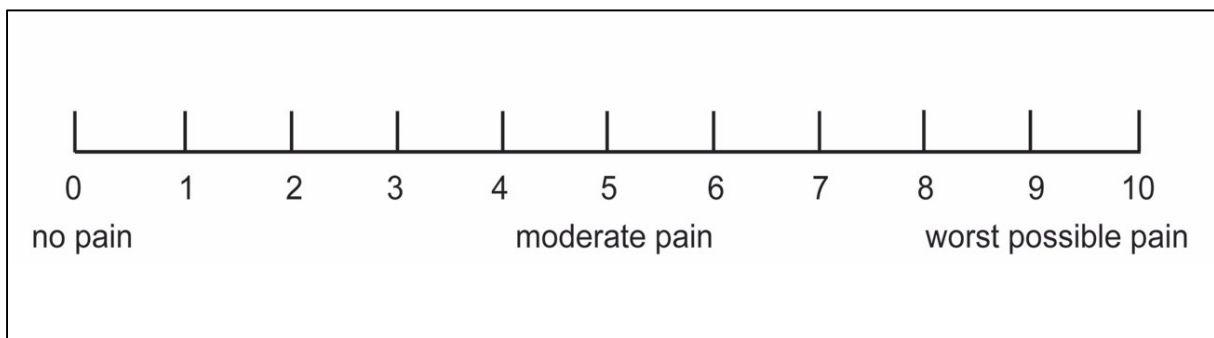
Faces Pain Scale
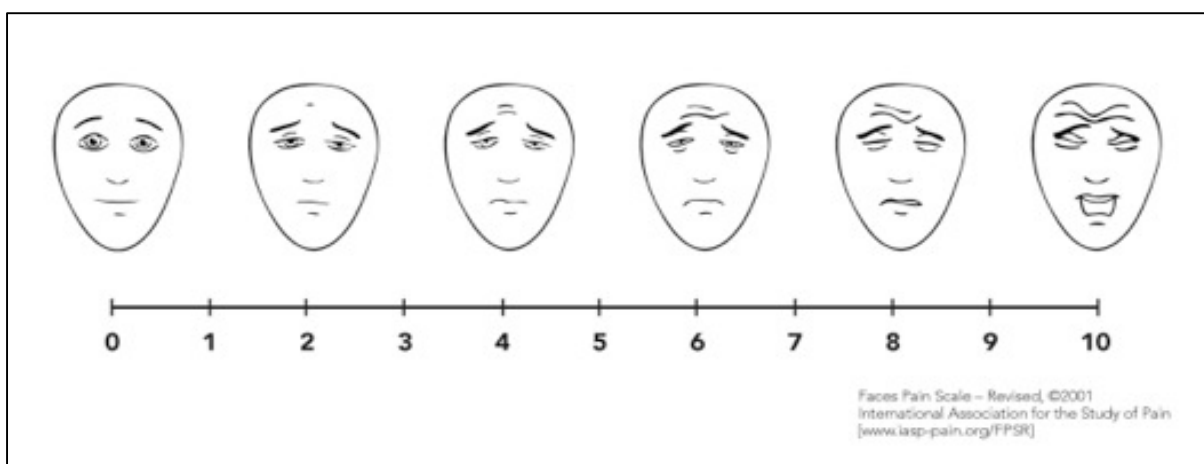
It is important to assess the pain score at rest and with movement (some patients will appear to have mild pain at rest but be unable to move because of severe pain).

How is the pain affecting the patient? Examples:

- Post-laparotomy patient
    — Can the patient cough, get out of bed, walk?
- Chronic cancer patient
    — Can the patient look after himself / herself at home? Work?

CLASSIFICATION OF PAIN

Not all pain is the same.

It is important to classify the pain (make a pain diagnosis) because this helps us to choose the best treatment.

Pain can be classified in many ways, but it is helpful to classify pain using three main questions:

1. How long has the patient had pain?
2. What is the cause?
3. What is the pain mechanism?

1.   Acute versus chronic pain (duration)

Pain can be acute (pain for less than 3 months) or chronic (pain for more than 3 months or pain persisting after an injury heals). Sometimes, a patient with chronic pain may experience additional acute pain (acute on chronic pain).

There is evidence that poorly treated acute pain is more likely to become chronic pain.

2.   Cancer versus non-cancer pain (cause)

Cancer pain

- Examples include pelvic pain due to uterine cervical cancer, bone pain due to cancer spread.
- Pain symptoms tend to get worse over time if untreated (i.e. symptoms are progressive)
- Often cancer pain is chronic but the patient may get acute pain as well (e.g. pain due to a new fracture from bone metastases)

Non-cancer pain

- There are many different causes, including:
    — Surgery or injury
    — Degenerative disease (e.g. arthritis)
    — Childbirth
    — Nerve compression or injury (e.g. sciatica, "neuralgia")

Non-cancer pain (continued)

- Pain may be acute and last for a limited time or may become chronic.
- The cause may or may not be obvious.

3.   Nociceptive versus neuropathic pain (mechanism)

Pain can also be classified by mechanism (the physiological or pathological way the pain is produced). There is currently much research in this area – understanding the exact cause of pain at the nerve level will help guide more specific treatments.

The pain can either be nociceptive, neuropathic or mixed (both nociceptive and neuropathic). Nociceptive and neuropathic pain are also discussed in the Physiology and Pathology section.

Nociceptive pain

- Commonest type of pain following tissue injury.
- Sometimes called *physiological* or *inflammatory* pain.
- Caused by stimulation of pain receptors in the tissues that have been injured.
- Has a protective function.
- Patients describe pain as sharp, throbbing or aching, and it is usually well localised (the patient is able to point to exactly where the pain is).
- **Examples:** Pain due to a fracture, appendicitis, burn.

Neuropathic pain

- Caused by a lesion or disease of the sensory nervous system.
- Sometimes called *pathological* pain.
- Tissue injury may not be obvious.
- Does not have a protective function.
- Patients describe neuropathic pain as burning or shooting. They may also complain of numbness or pins and needles. The pain is often not well localised.
- **Examples:** Post-amputation pain, diabetic pain, sciatica.

EXTRA FOR EXPERTS

Classification by Neural Mechanism

There is no universally agreed way to classify pain by neural mechanism. We use a simplified classification (nociceptive versus neuropathic) because this allows us to easily assess the patient and choose the right treatment.

Broadly speaking, pain can be either physiological (protective) or pathological (non-protective). The following gives a more detailed classification by neural mechanism.

Physiological pain

- Nociceptive
- Inflammatory

Pathological pain

- Neuropathic
- Dysfunctional

Nociceptive pain acts as an early-warning protective system in response to damaging or noxious stimuli.

Inflammatory pain is also protective. Inflammation results in increased sensory sensitivity after injury (lower intensity stimuli cause pain). This discourages physical contact and movement and promotes recovery.

Neuropathic pain results from damage to the peripheral or central nervous system. It can be thought of as a "hardware problem". It is not protective.

Dysfunctional pain is also not protective and can be thought of as a "software problem". There is no damage to the nervous system.

Based on Woolf CJ. What is this thing called pain? J Clin Invest 2010;120(11):3742-4

PAIN PHYSIOLOGY AND PATHOLOGY

Understanding pain physiology and pathology helps us to understand how to treat pain.

Normal pain physiology involves a number of steps between the site of injury and the brain – this is called the *nociceptive pathway (Fig 1)*. Pain signals can be changed (modulated) at many points along the nociceptive pathway and this affects the severity and nature of the pain we feel.

Pain pathology involves damage to or abnormality of the pain pathway. This can cause neuropathic pain.

Different treatments (non-pharmacological and pharmacological) work on different parts of the nociceptive pathway. Usually, more than one treatment is needed.

Nociception and pain

Nociception is not the same as pain perception (how we "feel" pain).

Pain perception depends on many other factors, including:

- Beliefs / concerns about pain
- Psychological factors (e.g. anxiety, anger)
- Cultural issues, e.g. expectations
- Other illnesses
- Personality and coping strategies
- Social factors (e.g. family, work)
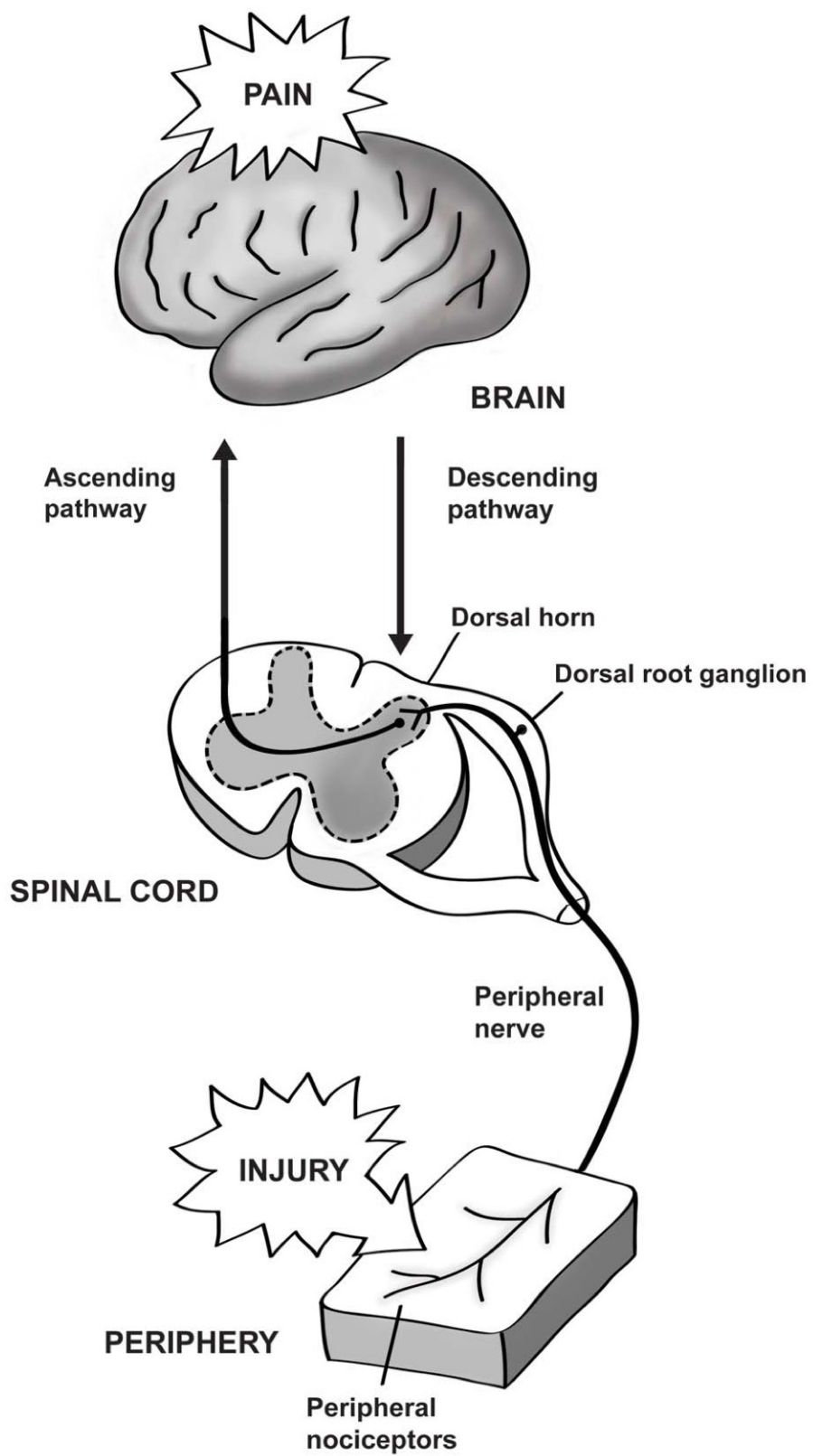
Fig 1: The nociceptive pathway

The nociceptive pathway

1.   **Periphery** *(Fig 2 and 3)*

- Pain receptors (nociceptors) are activated by intense thermal (heat or cold), mechanical (pressure) or chemical stimuli.

- This results in activation of pain nerves called Aδ and C nerves.

- Tissue injury causes release of chemicals - the "inflammatory soup" (e.g. hydrogen ions, prostaglandins, substance P). The chemicals increase / amplify the pain signal and this process is called peripheral sensitization.

- The pain signal travels along the Aδ and C nerves, through the dorsal root to the dorsal horn of the spinal cord.
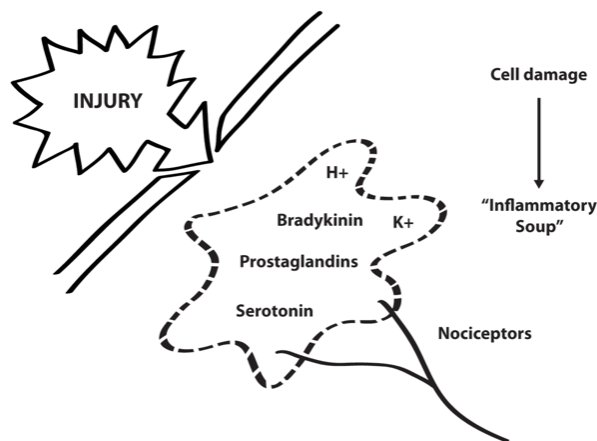
Fig 2: "Inflammatory soup" and stimulation of nociceptors
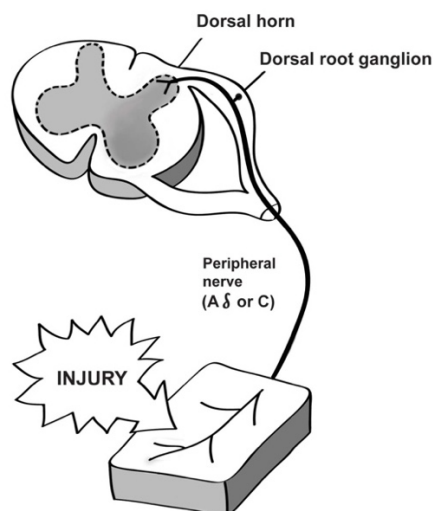
Fig 3: Transmission of pain signal from the periphery to the dorsal horn

2. Spinal cord *(Fig 4)*

- The dorsal horn of the spinal cord is the *first relay station*. This is a vital area for two main reasons:

  — The Aδ and C nerves connect (synapse) with *second order* nerves.
  — There is input from other peripheral and spinal cord nerves than can modulate the pain signal.

- The second order nerves cross to the other side of the spinal cord and travel up the spinothalamic tract to the thalamus at the base of the brain.
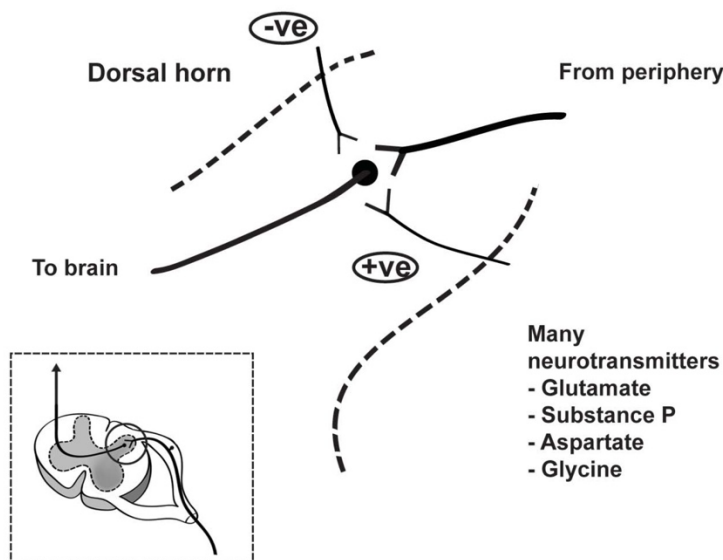
Fig 4: Dorsal horn connections

3.   **Brain** *(Fig 5)*

- The thalamus is the *second relay station.* There are many connections with other parts of the brain, including:
  — Cortex
  — Limbic system
  — Brainstem

- The cortex, limbic system and brainstem all contribute to pain perception.

- The cortex is important for localisation of pain (i.e. awareness of the site of tissue injury).

- The limbic system is responsible for many of the emotions we feel when we experience pain (e.g. anxiety, fear).

- The brainstem plays an important role in reflex responses to pain and coordination of pain modulation.
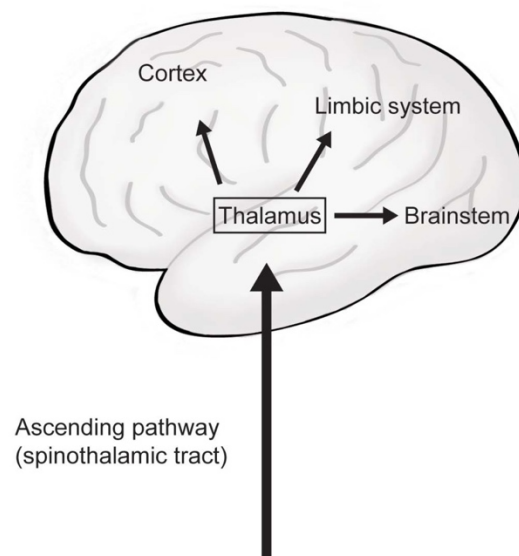
Fig 5: Brain connections

4. **Modulation** *(Fig 6)*

- The pain signals can be changed (modulated) in the spinal cord or the brain.

- In the dorsal horn of the spinal cord, peripheral pain nerves or spinal cord nerves can either increase (excite) or reduce (inhibit) pain.

- A major descending inhibitory pathway travels from the brainstem down the spinal cord to the dorsal horn where it inhibits pain signals from the periphery.
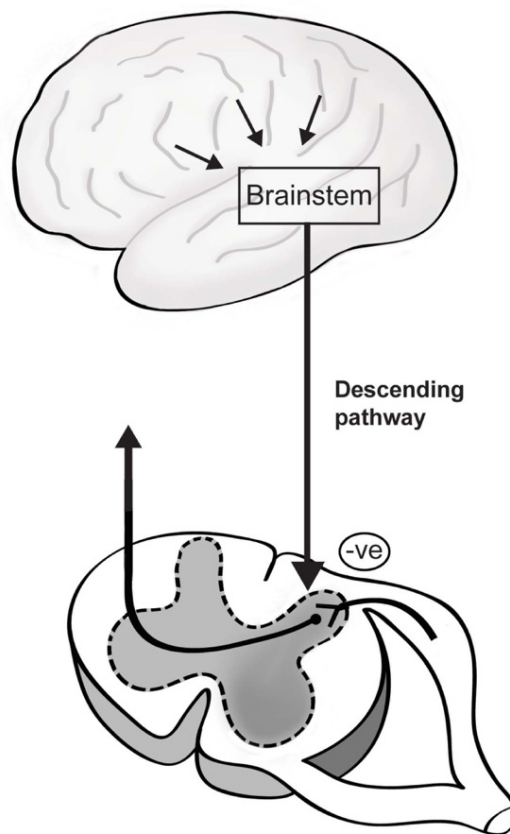
Fig 6: Descending pain modulation

What happens in neuropathic pain (pathological pain)?

The International Association for the Study of Pain (IASP) defines neuropathic pain as:

> **"Pain caused by a lesion or disease of the somatosensory nervous system."**

The lesion or disease results in abnormal pain signals travelling to the brain and abnormal perception of pain.

Pain may occur spontaneously (no stimulus) or pain may result from stimuli that are normally non-painful (e.g. light touch). Psychological changes (e.g. increased anxiety) may also contribute to the pain.

Unlike nociceptive pain, neuropathic pain does not have a protective function.

Mechanisms:

There may be anatomical or chemical changes in the peripheral or central nervous system. Examples include:

- Abnormal nerve tissue, e.g. stump neuroma after amputation
- Abnormal firing of pain nerves
- Changes in chemical signaling at the dorsal horn
- Abnormal nerve connections in the dorsal horn
- Loss of normal inhibitory function

Examples:

- Nerve trauma, amputation
- Diabetic neuropathy
- Invasive cancer (e.g. uterine cancer invading the lumbosacral plexus)
- Chronic pain following prolonged, poorly treated acute pain

Note: *Woolf's classification (page 13) divides pathological pain into neuropathic and dysfunctional. In clinical practice, it is often difficult to distinguish between the two types of pathological pain, however the principles of treatment are similar for both. In EPM, we use the term "neuropathic" to describe both types of pathological pain.)*

QUESTIONS

1. Give an example of a person experiencing nociception without pain and someone experiencing pain without nociception.

2. How quickly do nociceptors transmit information compared with other sensory nerves?

3. Nausea and vomiting are sometimes associated with pain. What is the mechanism for this?

4. What is central sensitization? How does it occur?

EXTRA FOR EXPERTS

Pain Terms

Allodynia
Pain due to a stimulus that does not normally cause pain (e.g. light touch)

Analgesia
Absence of pain in response to a stimulus that normally causes pain.

Dysaesthesia
An unpleasant abnormal sensation.

Hyperalgesia
Increased pain in response to a stimulus that normally causes pain.

Peripheral sensitization
Increased sensitivity (excitability) of peripheral nociceptors.

Central sensitization
Increased sensitivity (excitability) of nerves within the central nervous system. Normal inputs begin to produce abnormal responses, e.g. spread of pain sensitivity beyond an area of tissue damage.

PAIN TREATMENT OVERVIEW

Because many factors contribute to the amount and type of pain we feel, it is often necessary to use a combination of treatments to manage an individual patient's pain.

Both non-pharmacological and pharmacological treatments are important.

Name at least 10 non-pharmacological treatments that can be used to treat pain.

Name at least 10 pharmacological treatments that can be used to treat pain.

Non-pharmacological treatments

Both physical and psychological factors affect how we feel pain.
Treatments include:

- Physical

  — RICE (rest, ice, compression, elevation) of injuries
  — Surgery (e.g. for drainage of abscess, removal of inflamed appendix)
  — Acupuncture, massage, physiotherapy

- Psychological

  — Explanation
  — Reassurance
  — Counselling

Pharmacological treatments

Medicines are often the mainstay of treatment. Different medicines work on different parts of the nociceptive pathway and it is often important to use a combination of medicines. In addition, combining medicines may result in fewer side effects, e.g. prescribing regular paracetamol in addition to morphine allows the dose of morphine to be reduced, resulting in fewer morphine-related side effects.

What is a placebo treatment?

A placebo treatment involves giving a patient a medicine that has no pharmacological effect (e.g. giving an injection of saline for pain). Because psychological factors are very important, the patient's pain may improve.

Non-pharmacological treatments can also have a placebo effect.

If the placebo treatment works, this does not mean that the patient did not have pain in the first place or that the patient was lying! The placebo effect is a very valuable component of many health treatments.

Classification of pain medications (analgesics)

Note: Refer to the appendices for individual medication information and doses.

1.   Simple analgesics

- Paracetamol / acetaminophen (Pamol, Panadol, Tylenol)
- Non-steroidal anti-inflammatory medicines (NSAIMs)
  — Aspirin
  — Ibuprofen (Brufen, Nurofen)
  — Diclofenac (Voltaren)

2.   Opioids

- Mild opioids
  — Codeine
  — Tramadol (also acts on descending inhibitory pathways)
- Strong opioids
  — Morphine
  — Pethidine (Demerol)
  — Oxycodone

3.   Other medications

- Tricyclic antidepressants
  — Amitriptyline
  — Nortriptyline
- Anticonvulsants
  — Carbamazepine (Tegretol)
  — Sodium valproate (Epilim)
  — Gabapentin
  — Pregabalin
- Local anaesthetics
  — Lignocaine / lidocaine (Xylocaine)
  — Bupivacaine (Marcaine)
- Others
  — Ketamine
  — Clonidine

Where do pain medications work?
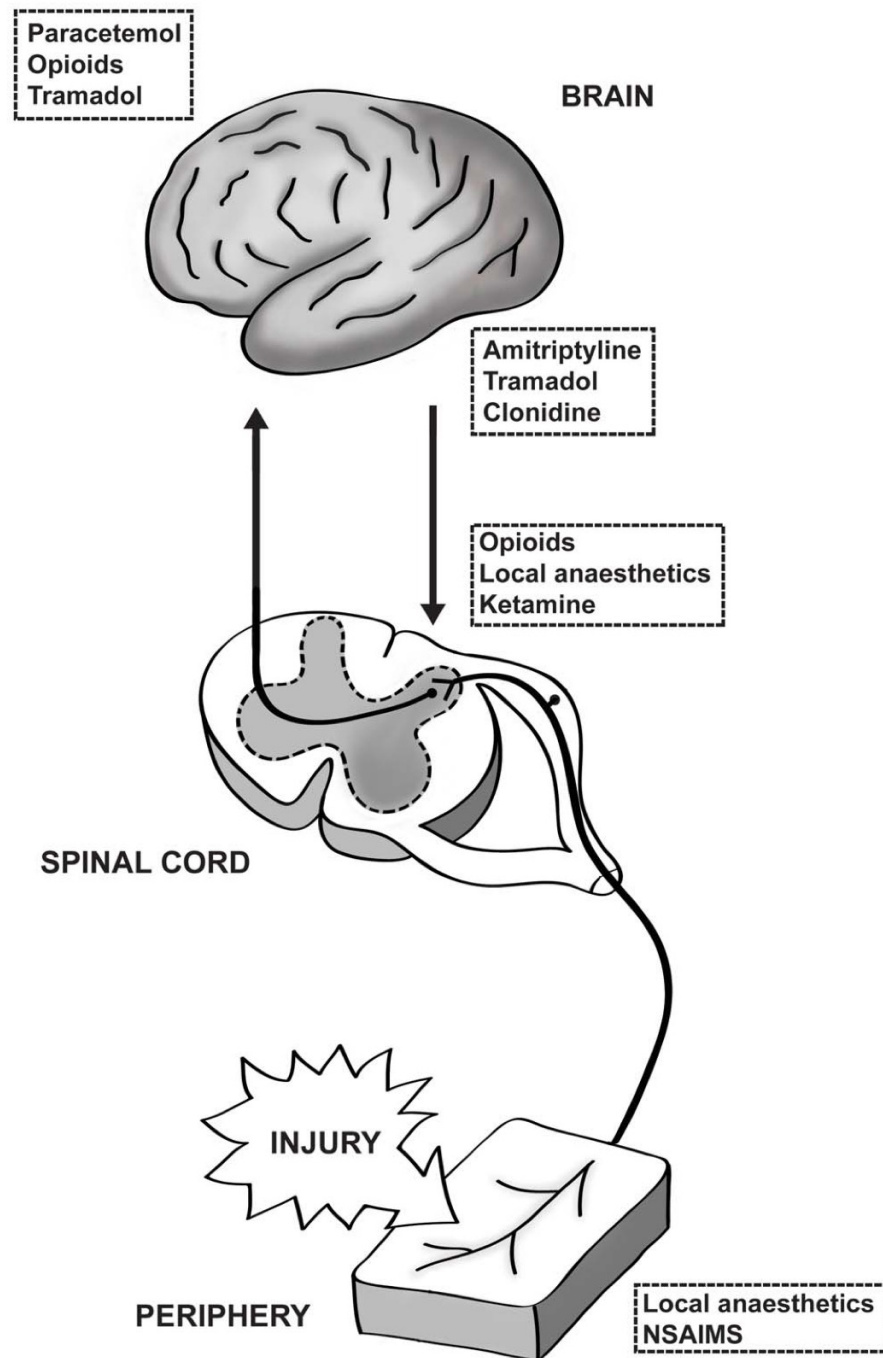
Fig 7: Sites of actions of pain medications

How do pain medications work?

Simple analgesics	
Paracetamol	Change prostaglandin levels in the brain
NSAIMs	Mainly work by changing prostaglandin levels in the periphery, thereby reducing inflammation
Opioids	
Codeine	Acts on opioid receptors in the brain and spinal cord
Tramadol	Acts weakly on opioid receptors, also increases descending inhibitory signals in the spinal cord
Morphine, pethidine, oxycodone	Act on opioid receptors in the brain and spinal cord
Other analgesics	
Tricyclic antidepressants	Increase descending inhibitory signals in the spinal cord
Anticonvulsants	"Membrane stabilisers", probably work by reducing abnormal firing of pain nerves
Local anaesthetics	Temporarily block signalling in pain nerves in periphery (e.g. infiltration or nerve block) or spinal cord (e.g. spinal block)
Ketamine	Blocks NMDA receptors in the brain and spinal cord (especially in the dorsal horn)
Clonidine	Increases descending inhibitory signals in the spinal cord

USING PAIN MEDICATIONS

Medication effectiveness

The effectiveness of an individual analgesic medication depends on the type of pain. Table 1 shows the usefulness of some analgesic medications for treating different types of pain.

It is important to note that combinations of medications are usually required, e.g. paracetamol plus morphine for severe acute nociceptive pain.

	Acute nociceptive mild	Acute nociceptive severe	Acute neuropathic	Chronic non-cancer	Chronic cancer
Paracetamol	+++	++	+	+	+
NSAIMs	++	++	+	+/-	+/-
Codeine	++	+	-	-	+/-
Tramadol	++	++	++	+	+
Morphine	-	+++	++	--	+++
TCAs	-	-	++	++	++
Anticonvulsants	-	-	++	+	+

Table 1: Analgesic usefulness

--   Not useful, may be harmful
-     Not usually useful or not indicated
±   Occasionally useful
+   Useful, mildly effective
++   Useful, moderately effective
+++   Useful, highly effective

TCAs = Tricyclic antidepressants

Cancer pain

Use the WHO Ladder (Fig 8 and Appendix 3). This was developed for pain that is getting worse over time as the cancer progresses. The steps on the ladder are:

1. **Mild pain**
   Use simple analgesics.

2. **Moderate pain**
   Continue simple analgesics. Add codeine or tramadol.

3. **Severe pain**
   Continue simple analgesics. Add a strong opioid, usually morphine.

The WHO Ladder emphasizes regular, oral administration of medications.

Additional medications may be required, for example:

- Strong opioids and NSAIMs for acute on chronic bone pain
- Tricyclic antidepressants or anticonvulsants for acute or chronic neuropathic pain
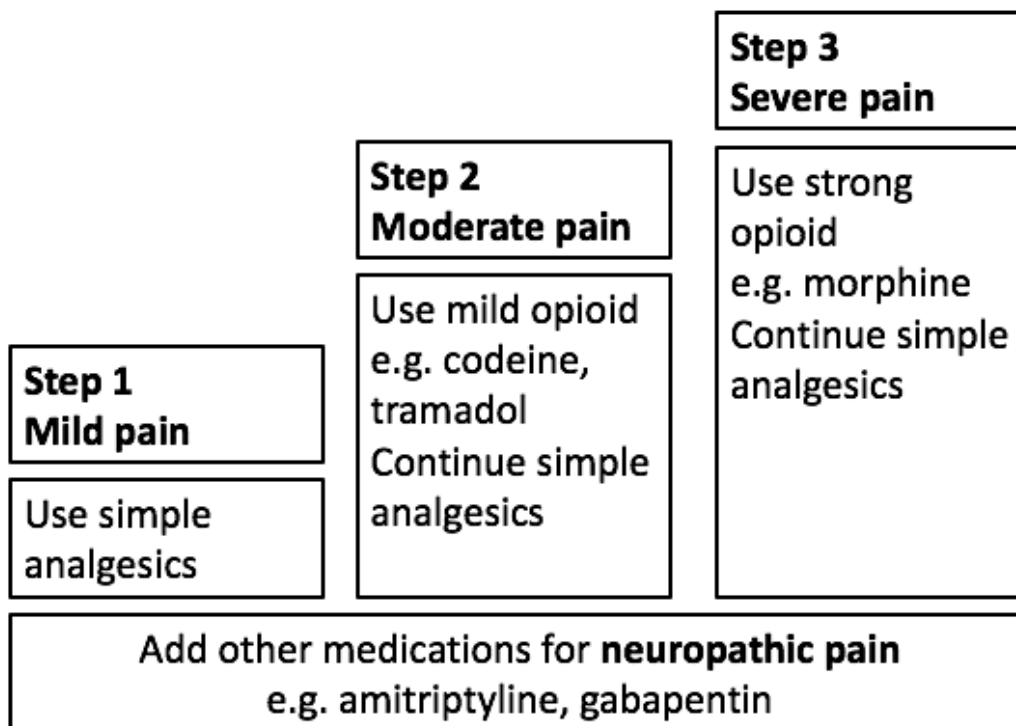
Fig 8: WHO Ladder (modified)

Nociceptive pain

For acute, severe, nociceptive pain, use the Reverse WHO Ladder (Fig 9). Start at the top of the ladder and step down (reduce the strength of analgesics) as the pain improves:

1. **Severe pain**
   Use a strong opioid plus simple analgesics.

2. **Moderate pain**
   Continue simple analgesics. Change from strong opioid to codeine or tramadol.

3. **Mild pain**
   Stop opioids but continue simple analgesics.

Step 3 Severe pain		
Use strong opioid e.g. morphine Also use simple analgesics	Step 2 Moderate pain	
	Use mild opioid e.g. codeine, tramadol Continue simple analgesics	Step 1 Mild pain
		Continue simple analgesics
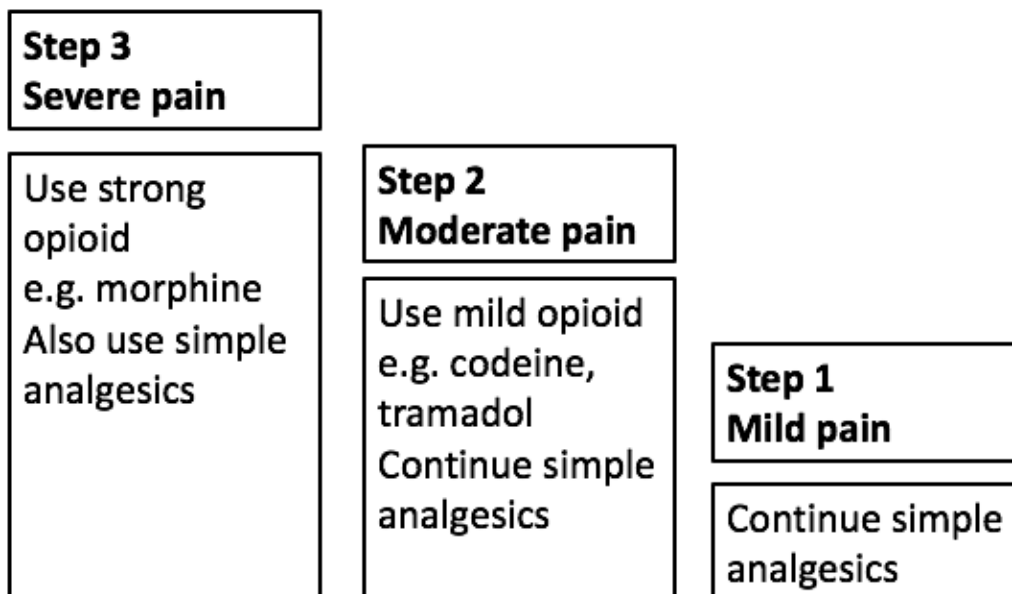
Fig 9: Reverse WHO Ladder

Neuropathic pain

Tricyclic antidepressants and anticonvulsants are likely to play an important role. Simple analgesics may also be helpful.

Tramadol may be useful because of its action on descending inhibitory pathways.

Occasionally, strong opioids are helpful in acute, severe, neuropathic pain, but they may not be particularly effective and their use should be frequently reassessed.

Chronic non-cancer pain

Pharmacological treatment for this group may be complicated because there are nociceptive and neuropathic features. Tricyclic antidepressants and anticonvulsants may be helpful. It is important to consider the potential side effects of long term administration of medications, e.g. NSAIMs.

In general, strong opioids should be **avoided** in chronic non-cancer pain.

Non-pharmacological treatments are usually very important.

QUESTIONS

1. How does a placebo medication reduce a person's pain?
2. How does acupuncture work?
3. What is the best medication for severe, acute, nociceptive pain?
4. Why are membrane stabilizing medications effective for some types of neuropathic pain?

USING THE RAT SYSTEM

R = Recognize
A = Assess
T = Treat

+ Reassess (Repeat RAT)

1.   RECOGNIZE

We sometimes forget to ask whether the patient has pain and sometimes patients don't or can't tell us. If you don't look or ask, you don't find!

Does the patient have pain?

- Ask
- Look (frowning, moving easily or not, sweating?)

Do other people know the patient has pain?

- Other health workers
- Patient's family

2.   ASSESS

To treat pain better, we need to think about the cause and type of pain. We may be able to better treat the injury that is causing the pain. We may also be able to choose better medications to treat the pain itself.

- **HOW SEVERE IS THE PAIN?**

  - What is the pain score?
    — At rest
    — With movement

  - How is the pain affecting the patient?
    — Can the patient move, cough?
    — Can the patient work?

- **WHAT TYPE OF PAIN IS IT?**

  Is the pain acute or chronic?

  The cause of acute nociceptive pain may be very obvious but chronic pain may be more complicated. In chronic pain, psychological factors may be more important and the pain may have both nociceptive and neuropathic features.

  The pain may be "acute on chronic" (e.g. fracture in a patient with chronic cancer pain).

  Is the pain cancer pain or non-cancer pain?

  Does the patient's disease explain the pain?

  There may be an obvious cause of the pain that requires specific treatment. For example:
  — Fracture needing splinting or surgery
  — Infection needing cleaning and antibiotics

Is the pain nociceptive, neuropathic or mixed?

Neuropathic pain is more likely in some situations:

— Diabetes
— Nerve injury (including amputation)
— Chronic pain

Ask about specific symptoms:

— Burning or shooting pain
— Pins and needles, numbness
— Phantom limb pain

c) WHAT OTHER FACTORS ARE CONTRIBUTING TO THE PAIN?

- Physical factors
  — Underlying illness
  — Other illnesses

- Psychological and social factors
  — Anger, anxiety, depression
  — Lack of social supports

3. TREAT

Treatment can be divided into non-pharmacological and pharmacological treatments. Both types of treatment are important.

Many factors may be contributing to an individual patient's pain, so there is no set list of treatments. The exact treatments will depend on the individual patient, the type of injury or disease, the type of pain and other factors contributing to the pain.

a) NON-PHARMACOLOGICAL TREATMENTS (for both nociceptive and neuropathic pain)

- Physical

  — Rest, ice, compression and elevation of injuries (RICE)
  — Surgery may be required
  — Nursing care
  — Acupuncture, massage, physiotherapy

- Psychological

  — Explanation and reassurance
  — Input from social worker or pastor, if appropriate

b) PHARMACOLOGICAL TREATMENTS

- **Nociceptive pain**

  — Consider paracetamol, NSAIMs, tramadol, codeine, morphine
  — Use combinations, e.g. paracetamol + NSAIM + opioid
  — Use the Reverse WHO Ladder for acute, severe pain. Start at the top – consider small doses of morphine IV to control pain early. Step down the ladder as pain improves.
  — Use the WHO Ladder for progressive cancer pain. Start at the bottom and step up!

- **Neuropathic pain**

  — The WHO Ladder and Reverse WHO Ladder may not work very well
  — Consider using a tricyclic antidepressant (amitriptyline) or anticonvulsant (carbamazepine or gabapentin) early. Tramadol may also be helpful.
  — Don't forget non-pharmacological treatments

4. REASSESS

It is essential to reassess the patient to assess whether your treatment is working. Repeat RAT.

Remember to record your assessment of severity. Pain is the 5th vital sign!

QUESTIONS

1. What are the three components of "Assess"?

2. Are non-pharmacological treatments more effective in acute or chronic pain?

3. Do NSAIMs have a role in chronic pain management?

RAT EXAMPLES

EXAMPLE 1

A 32-year-old man caught his right hand in machinery at work. He presents with a compound fracture of his hand.

How would you manage his pain using RAT?

---

1.   RECOGNIZE

- Pain easily recognized
- Obvious cause, patient likely to be distressed

2.   ASSESS

- **Severity**
  — Pain may be moderate to severe

- **Type**
  — Acute pain, musculoskeletal (non-cancer) cause
  — Nociceptive mechanism, pain described as sharp, aching
  — Possibility of neuropathic pain is nerve injury

- **Other factors**
  — Other factors may be contributing to the pain (e.g. anxiety, infection if old injury)

3.   TREAT

- **Non-pharmacological treatments**

  — Reduce inflammation (immobilisation, sling)
  — Surgery will probably be necessary
  — Prevention or treatment of infection
  — Explanation and reassurance

- **Pharmacological treatments**

    — Pain will be improved by simple medications (e.g. paracetamol) but may need to add other medications
    — Regular paracetamol (1G four times daily)
    — Consider adding codeine (30-60mg four-hourly)
    — NSAIMs will reduce inflammation but may affect bone healing
    — Morphine is effective and may be necessary if severe pain

4.   REASSESS

- Repeat RAT
- Record pain scores

Summary

Moderate to severe, acute pain due to injury, nociceptive mechanism

- **Treat the injury**
- **Regular simple analgesics**
- **Morphine if severe pain**

EXAMPLE 2

A 55-year-old woman presents with a large breast tumour with spread to her spine. She has severe pain.

How would you manage her pain using RAT?

---

1. RECOGNIZE

- Patient may have pain in both her breast and back.
- New severe back pain may not be recognized.
- Ask the patient about her pain symptoms!

2. ASSESS

- Assessment may be difficult because of two types of pain.
- **Severity**
  — Both breast pain and back pain may be severe.
- **Type**
  — Chronic cancer pain getting worse over time, acute musculoskeletal pain caused by spinal metastases (e.g. collapse of vertebra with nerve compression)
  — The pain may have both nociceptive and neuropathic features. Neuropathic symptoms may be present especially if nerve compression – burning, pins and needles
- **Other factors**
  — Multiple factors may be contributing to the pain – physical, psychological and social.
  — Try and explore these with the patient and her family.

3. TREAT

- **Non-pharmacological treatments**

  — Treatment of breast tumour – nursing care, possibly surgery, treatment of infection
  — Psychological or social support
  — Other treatments?

- **Pharmacological treatments**
  - — Regular simple analgesics + opioid
  - — If possible, control acute, severe pain with IV morphine
  - — Convert to oral morphine when pain controlled
  - — Consider amitriptyline if features of neuropathic pain (especially if poor sleep)

4.   REASSESS

- Repeat RAT
- Record pain scores

Summary

Severe, acute on chronic pain. Mixed cause – chronic cancer pain and acute musculoskeletal pain. Nociceptive and neuropathic mechanisms.

- **Assessment may be difficult**
- **Non-pharmacological treatments are important**
- **Regular simple analgesics**
- **Control acute severe pain with IV morphine, then change to regular oral morphine**
- **Amitriptyline may be helpful**

> **EXAMPLE 3**
>
> A 51-year-old man has a 2-year history of lower back pain which sometimes radiates down his right leg. He fell recently and is now having problems walking.
>
> ***How would you manage his pain using RAT?***

1. RECOGNIZE

- Patient may not show outward signs of pain
- Other people may think that the patient is avoiding work.
- Ask the patient about his symptoms!

2. ASSESS

- **Severity**
  - Pain may be moderate to severe
  - Measure his pain score, e.g. by using Verbal Rating Scale Visual Analogue Scale.

- **Type**
  - Chronic pain, musculoskeletal (non-cancer) cause
  - There may have been a recent injury causing acute-on-chronic pain.
  - The pain may be difficult to localise and have both nociceptive and neuropathic features (e.g. burning, pins and needles)

- **Other factors**
  - Multiple factors may be contributing to the pain – physical, psychological and social.

3. TREAT

- **Non-pharmacological treatments**

  - Rest is often not helpful in chronic back pain
  - Occasionally, there may be an acute on chronic problem that needs surgical treatment (e.g. prolapsed disc)
  - Acupuncture, massage and physiotherapy may be helpful
  - Psychological or social support
    - Work issues
    - Family issues

- **Pharmacological treatments**

    — Regular paracetamol and NSAIM may be helpful, especially if acute on chronic pain.
    — In general, morphine is not helpful for chronic back pain. Occasionally, morphine may be needed for acute severe nociceptive pain.
    — Consider amitriptyline if features of neuropathic pain (especially if poor sleep).

4.   REASSESS

- Repeat RAT
- Record pain scores

Summary

Moderate to severe, acute on chronic non-cancer pain, mixed neuropathic and nociceptive mechanisms

- **Assessment may be difficult**
- **Non-pharmacological treatments are important**
- **Regular simple analgesics**
- **Morphine usually not helpful (unless severe nociceptive pain)**
- **Amitriptyline may be helpful**

CASE DISCUSSIONS

CASE 1

A 22-year-old man fell off a truck and has a fractured right femur. There are no other obvious injuries. He says the pain in his thigh is very bad.

How would you manage his pain using RAT?

CASE 2

A 44-year-old woman with known cervical cancer is admitted to hospital because she can't look after herself at home.

How would you manage her pain using RAT?

CASE 3

A 60-year-old man has just had a laparotomy for bowel obstruction. He is now lying very still and appears to be in severe pain.

How would you manage his pain using RAT?

CASE 4

A 5-year-old girl has advanced bone cancer that has spread from her leg to her spine. She cries most of the time and is frightened of injections.

How would you manage her pain using RAT?

CASE 5

A 49-year-old man with longstanding diabetes has to have a below knee amputation for gangrene. You see him four weeks after the amputation and he complains of leg pain.

How would you manage his pain using RAT?

CASE 6

A 9-year-old boy with probably appendicitis is waiting for an operation.

How would you manage his pain using RAT?

CASE 7

A 24-year-old woman presents to a clinic with a two-year history of severe headache. Doctors told her 6 months ago that there is "nothing wrong inside her head".

How would you manage her pain using RAT?

CASE 8

A 12-year-old girl was admitted three days ago with burns to her chest and abdomen. She needs dressing changes every 2-3 days.

How would you manage her pain using RAT?

NOTES

APPENDICES

Appendix 1: Medicine Formulary for Adults

Note: Exact formulations (e.g. tablet strength) may vary.
        Exact morphine doses will depend on the individual patient.

Abbreviations:
- IM = intramuscular, IV = intravenous, PO = oral, PR = rectal,
  SC = subcutaneous
- OD = once daily, BD = twice daily, TDS = three times daily,
  QDS = four times daily

1.   Simple Analgesics

Medication	Uses	Problems	Adult dose
Paracetamol / acetaminophen (Pamol, Panadol, Tylenol)	Generally very safe Good for mild pain but can be useful for most nociceptive pain Usually need to add other medications for moderate to severe pain Also used to lower body temperature in fever	Not all patients are able to take oral liquids or tablets Can cause liver damage in overdose	Usually given PO but can be given PR PO or PR: 1G (two 500 mg tablets) QDS Maximum dose: 4G per 24 hours

Aspirin	Can be used with paracetamol
	
	Good for nociceptive pain
		Not all patients are able to take oral tablets
		
		Side effects:
		
		    Gastro-intestinal problems, e.g. gastritis
		
		    Kidney damage
		
		    Fluid retention
		
		    Increased risk of bleeding
			PO: 600 mg
			
			(two 300 mg tablets) 4-6 hourly
			
			Maximum dose: 3.6 G per 24 hours

Diclofenac (Voltaren, Voltarol)	As above for aspirin	As above for aspirin, but can be given IM or PR	PO: 25-50 mg TDS PR: 100 mg OD IM: 75 mg BD Maximum dose: 150 mg per 24 hours
Ibuprofen (Brufen, Nurofen)	As above for aspirin	As above for aspirin	PO: 400 mg TDS or QDS
Naproxen (Naprosyn)	As above for aspirin	As above for aspirin	PO: 500 mg BD

2. Opioids

Medication	Uses	Problems	Adult dose

Codeine	Generally very safe
	
	Often added to paracetamol and/or NSAIM for moderate pain
		Not all patients are able to take oral liquids or tablets
		
		Similar side effects to other opioids:
		
		    Constipation
		
		    Respiratory depression in high dose
		
		Misunderstandings about addiction
		
		Different patients require different doses (variable dose requirement)
			Usually given PO
			
			but sometimes given IM
			
			PO or IM: 30-60 mg 4-hourly

Tramadol (Tramal)	Can be used with paracetamol and/or opioids for nociceptive pain Sometimes helpful for neuropathic pain Less respiratory depression and constipation than morphine	Not widely available Nausea and vomiting Confusion	PO or IV: 50-100 mg QDS

Morphine	Very safe if used appropriately	Similar problems to other opioids:	Can be given PO, IV, IM or SC
	Often added to paracetamol and/or NSAIM for moderate to severe pain	Constipation	Different patients require different doses
	Oral morphine very useful for cancer pain	Sedation and respiratory depression in high dose*	Oral dose is 2-3 times the injected dose
	In general, should be avoided in chronic non-cancer pain	Nausea and vomiting	PO (fast): 10-30 mg 4-hourly (e.g. for controlling cancer pain)
	Available as either fast release tablets or syrup, or slow release tablets	Myths about addiction	PO (slow): BD dosing (may need high doses for cancer pain)
		Oral dose is not the same as the injected dose	IV: 2.5-10 mg (e.g. during or after surgery)
		*Monitor RR and sedation, especially in elderly patients and patients receiving other sedating medications	IM or SC: 2.5-10 mg 4-hourly
			Use a lower dose (e.g. half-dose) in elderly patients
Pethidine (Demerol)	As above for morphine	As above for morphine	PO: 50-100 mg 4-hourly
	Often added to paracetamol and/or NSAIM for moderate to severe pain	Seizures caused by metabolite (norpethidine) if high dose given for more than 24 hours	IV or IM dose about 10 times morphine dose
			IV: 25-50 mg (e.g. during or after surgery)
			IM or SC: 50-100 mg 4-hourly
			Use a lower dose (e.g. half-dose) in elderly patients
Oxycodone (Oxynorm, Oxycontin)	As above for morphine	As above for morphine	PO (fast): 5-10 mg 4-hourly
	Can be used for cancer pain	Not widely available	PO (slow): 10 mg BD, increased as needed
	Available as fast release (Oxynorm) or slow release (Oxycontin)		*Use a lower dose (e.g. half-dose) in elderly patients*

3. Other Analgesics (in alphabetical order)

Medication	Uses	Problems	Adult dose
Amitriptyline	Useful in neuropathic pain. Also used to treat depression and improve sleep	Sedation Postural hypotension (low blood pressure) Anticholinergic side effects: Dry mouth Urinary retention Constipation	PO: Usually 25 mg at night "Start low, go slow", especially in elderly patients (e.g. start at 10 mg, increase every 2-3 days as tolerated)
Carbamazepine (Tegretol)	Anticonvulsant ("membrane stabiliser") Useful in neuropathic pain	Sedation Unsteadiness Confusion in high dose	PO: 100-200 mg BD, increased to 200-400 mg QDS as tolerated "Start low, go slow", especially in elderly patients
Clonidine	May be useful if pain is difficult to treat	Not widely available Sedation Hypotension	IV: 15-30 mcg 15-minutely up to 1-2 mcg/kg PO: 2 mcg/kg
Gabapentin	Anticonvulsant ("membrane stabiliser") Useful in neuropathic pain	Sedation	PO: 100 mg TDS, increased to 300-600 mg TDS as tolerated Maximum dose: 1800 mg per 24 hours
Ketamine	May be useful in severe pain (nociceptive or neuropathic) Also used as a general anaesthetic	Sedation (only need small dose for pain relief) Dreams, delirium, hallucinations	IV: 5-10 mg for severe acute pain SC infusion: 100 mg over 24 hours for 3 days, can be increased to 300 mg, then 500 mg per 24 hours
Sodium valproate (Epilim)	Anticonvulsant ("membrane stabiliser") Useful in neuropathic pain	Gastro-intestinal side effects, sedation	PO: 200 mg 8-12-hourly

Appendix 2: Paediatric Medicine Doses

Note: Exact formulations (e.g. tablet strength) may vary.
Exact morphine doses will depend on the individual patient.

Abbreviations:
- IM = intramuscular, IV = intravenous, PO = oral, PR = rectal,
  SC = subcutaneous
- OD = once daily, BD = twice daily, TDS = three times daily,
  QDS = four times daily

1.   Simple Analgesics

Paracetamol / acetaminophen	PO or PR: 15 mg/kg 4-hourly Maximum dose: 90 mg/kg per 24 hours (or 60 mg/kg per 24 hours for children under one year old)
Aspirin	PO: 15 mg/kg 4-6 hourly Not for children under 16 years old
Diclofenac	PO or PR: 1 mg/kg BD or TDS
Ibuprofen	PO: 5 mg/kg QDS
Indomethacin	PO: 0.5-1 mg/kg TDS
Naproxen	PO: 5-10 mg/kg BD or TDS Not for children under 2 years old

2.   Opioids

Codeine (**see below**)	PO: 0.5-1 mg/kg 4-hourly
Tramadol	PO or IV: 1-2 mg/kg QDS
Morphine – fast	IV: 0.02 mg/kg 10-minutely (e.g. after surgery) IM or SC: 0.1-0.2 mg/kg 3-4-hourly PO (fast release): 0.2-0.4 mg/kg 3-4-hourly (e.g. for controlling cancer pain)
Morphine – slow	PO (slow release): Start with 0.6 mg/kg BD, increase every 48 hours as required
Pethidine / meperidine	IV: 0.5 mg/kg 10-minutely (e.g. after surgery) IM: 1mg/kg 3-4-hourly
Oxycodone	IV, SC or PO (fast): 0.1 mg/kg 4-hourly PO (slow): 0.2-0.5 mg/kg BD

3.   Other Analgesics

Amitriptyline	PO: 0.5 mg/kg at night
Carbamazepine	PO: 2 mg/kg BD to TDS
Clonidine	PO: 2.5 mcg/kg as a pre-med for painful procedures
Sodium valproate	PO: 5 mg/kg BD to TDS Can be increased to 10 mg/kg/dose

Note:
In the United Kingdom and many other countries, **codeine is not recommended for** children aged less than or equal to 12 years.
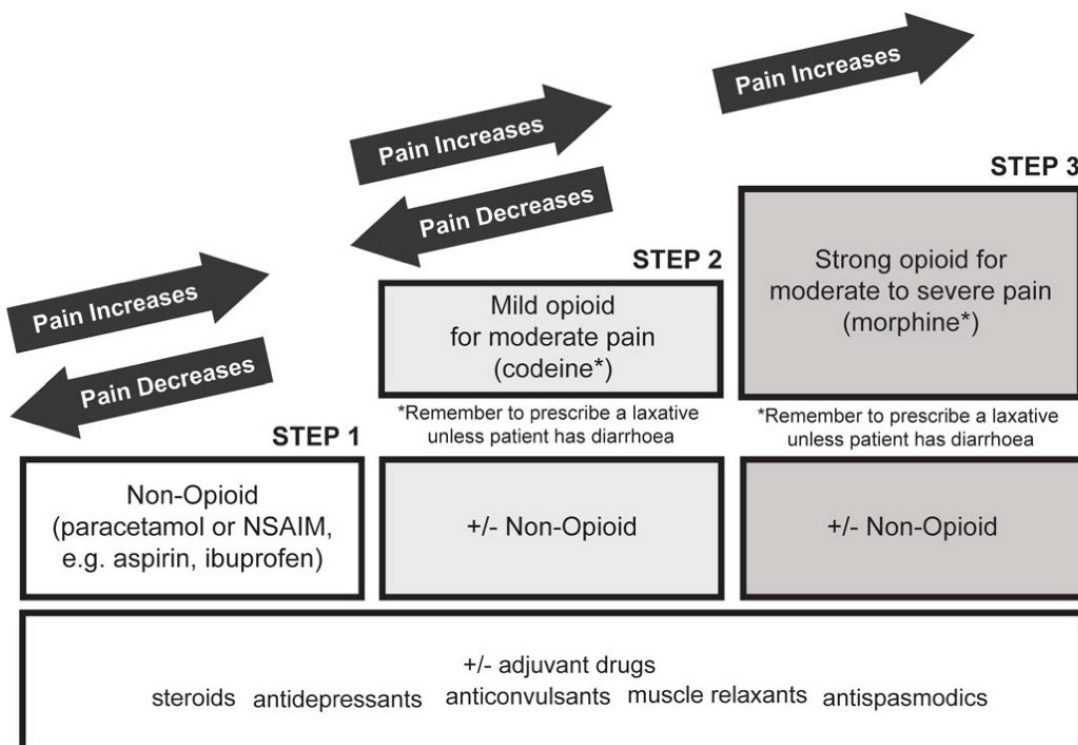
Appendix 3: WHO Analgesic Ladder

This "ladder" was developed by the WHO to mainly guide treatment of cancer pain. It may not work well for some other types of pain, e.g. neuropathic pain.

In cancer pain, the correct dose of morphine for an individual is the dose that provides the best pain relief with the minimum of side effects.

Medicines should be given:

1. By mouth – so that medicines can be taken at home.
2. By the clock – medicines are given regularly so that pain does not come back before the next dose.
3. By the ladder – gradually giving bigger doses and stronger medicines until the patient is pain-free.
4. For the individual – there is no standard dose of morphine. The correct dose is the dose that relieves the patient's pain.
5. With attention to detail – includes working out the best times to give medicines and treating side effects (e.g. giving a laxative to treat constipation).

The Analgesic Ladder for Pain Control

Pain Increases

Pain Increases

Pain Decreases

Pain Increases

Pain Decreases

STEP 3

STEP 2

Mild opioid
for moderate pain
(codeine*)

Strong opioid for
moderate to severe pain
(morphine*)

*Remember to prescribe a laxative
unless patient has diarrhoea

*Remember to prescribe a laxative
unless patient has diarrhoea

STEP 1

Non-Opioid
(paracetamol or NSAIM,
e.g. aspirin, ibuprofen)

+/- Non-Opioid

+/- Non-Opioid

+/- adjuvant drugs
steroids   antidepressants   anticonvulsants   muscle relaxants   antispasmodics

• Give analgesics • by the mouth • by the clock • by the ladder •

Appendix 4: Using Morphine for Cancer Pain

The most important medication for managing cancer pain is morphine. Acute severe pain may need to be controlled with morphine injections but this should be changed to oral morphine as soon as the pain is under control.

The oral morphine dose is 2-3 times the injected dose.

Steps for controlling pain with morphine:

1. Control severe pain quickly with injections or fast release oral morphine. Give 4-hourly as needed.

2. Work out morphine requirement per 24 hours.
   e.g.: Patient needing 5mg IM/SC morphine every 4 hours
         IM/SC morphine requirement per day = 6 x 5 mg = 30 mg
         Equivalent oral morphine dose is 2-3 times (60-90 mg)

3. Halve the total daily oral dose and give as slow release morphine twice daily.
   e.g.: Total daily oral dose = 60-90 mg
         Start with slow release morphine 30 mg PO BD
         Increase BD dose as needed and ensure that the pain is improving.

4. Continue to give extra fast release morphine 4-hourly if needed for "breakthrough pain". If frequent extra doses are needed, work out total daily dose and increase the slow release morphine dose.

Appendix 5: WHO Essential Medicines List

The following table is based on the WHO Model List, 16th edition (updated). Medicines useful for managing pain can be found in a variety of sections of the list (e.g. anticonvulsants, medicines used in mood disorders).

For the full list, see:
http://www.who.int/medicines/publications/essentialmedicines/en/

Analgesics, Antipyretics, Non-Steroidal Anti-Inflammatory Medicines (NSAIMs) (section 2)	
Non-opioids and NSAIMs (section 2.1)	
Acetylsalicylic acid (aspirin)	**Suppository:** 50 mg to 150 mg **Tablet:** 100 mg to 500 mg
Ibuprofen (>3 months)	**Tablet:** 200 mg; 400 mg
Paracetamol	**Oral liquid:** 125 mg per 5ml **Suppository:** 100 mg **Tablet:** 100 mg to 500 mg
Opioid Analgesics (section 2.2)	
Codeine	**Tablet:** 15 mg (phosphate); 30 mg (phosphate)
Morphine	**Injection:** 10 mg (morphine hydrochloride or morphine sulfate) in 1 ml ampoule **Oral liquid:** 10 mg (morphine hydrochloride or morphine sulfate) per 5 ml **Tablet:** 10 mg (morphine sulfate) **Tablet (prolonged release):** 10 mg; 30 mg; 60 mg (morphine sulfate)
Anticonvulsants, Antiepileptics (section 5)	
Carbamazepine	**Oral liquid:** 100 mg per 5 ml **Tablet (chewable):** 100 mg; 200 mg **Tablet (scored):** 100 mg; 200 mg

Valproic acid (sodium valproate)	**Oral liquid:** 200 mg/5 ml **Tablet (crushable):** 100 mg **Tablet (enteric-coated):** 200 mg; 500 mg

Medicines Used in Mood Disorders (section 24)

Amitriptyline	**Tablet:** 25 mg (hydrochloride)

Other Medicines

General Anaesthetics (section 1.1)

Ketamine	**Injection:** 50 mg (as hydrochloride) per ml in 10 ml vial
Nitrous oxide	**Inhalation**

Local Anaesthetics (section 1.2)

Bupivacaine	**Injection:** 0.25%; 0.5% (hydrochloride) in vial
Lidocaine (lignocaine)	**Injection:** 1%; 2% (hydrochloride) in vial
Lidocaine + epinephrine (lignocaine + adrenaline)	**Injection:** 1%; 2% (hydrochloride) + epinephrine 1:200 000 in vial

Antiemetic Medicines (section 17.2)

Dexamethasone	**Injection:** 4 mg/ml in 1-ml ampoule **Oral liquid:** 0.5 mg/5 ml; 2 mg per ml **Solid oral dosage form:** 0.5 mg; 0.75 mg; 1.5 mg; 4 mg
Metoclopramide (not in neonates)	**Injection:** 5 mg (hydrochloride)/ml in 2-ml ampoule **Tablet:** 10 mg (hydrochloride)
Ondansetron (>1 month)	**Injection:** 2 mg base/ml in 2-ml ampoule (as hydrochloride) **Oral liquid:** 4 mg base/5 ml **Solid oral dosage form:** Eq 4 mg base; Eq 8 mg base; Eq 24 mg base.

Appendix 6: Answers to Chapter Questions

What is Pain?

1. **From a biological point of view, why is it beneficial for pain to be unpleasant?**
   Nociceptive pain has a protective function. It acts as an early warning system, e.g. withdrawal of hand from a flame to prevent further injury. After injury, pain discourages contact and movement and promotes recovery.

2. **Give an example of pain where there is no obvious tissue damage.**
   Tension type headache, non-specific low back pain, fibromyalgia.

3. **Pain can influence emotions, but can emotions influence pain?**
   Yes, e.g. increased anxiety will increase a patient's perception of pain. Conversely, reduced anxiety will reduce pain.

Why Should We Treat Pain?

1. **Can the experience of pain make a person stronger in the long term?**
   Not usually. Unrecognized and untreated pain is generally not desirable because it can have negative physical and psychological consequences.

2. **What are the benefits of treating chronic low back pain in a 45-year-old man?**
   For the patient: Relief of suffering, improved function, fewer psychological problems.
   For his family: More engaged in family life, able to work and maintain income.
   For society: Productive member of society, fewer ongoing health costs.

3. **Is it necessary to treat pain in newborn babies?**
   Yes, babies still experience pain. It is therefore humane to treat pain. Benefits include reduced stress response, improved feeding, reduced parental anxiety.

Classification of Pain

1. **How can you tell when a patient's pain has gone from acute to chronic?**
   The pain has lasted for more than three months or the pain has lasted after normal healing.

2. **Give some examples of chronic, non-cancer, nociceptive pain.**
   Arthritis, non-united fracture, chronic toothache, non-healing skin ulcer. These conditions may also have some features of neuropathic pain.

3. **Give some examples of neuropathic pain.**
   Painful diabetic neuropathy, phantom limb pain, post-shingles pain, sciatica, chronic tension type headache, fibromyalgia.

Pain Physiology and Pathology

1. **Give an example of a person experiencing nociception without pain and someone experiencing pain without nociception.**
   Nociception without pain: General anaesthesia, psychological states overriding pain perception (e.g. religious trance).
   Pain without nociception: Pathological pain with abnormal sensory processing, e.g. trigeminal neuralgia, painful diabetic neuropathy.

2. **How quickly do nociceptors transmit information compared with other sensory nerves?**
   Slower than other sensory nerves. Conduction velocity of C fibres is 0.5-2 m/s, Aδ fibres 3-30 m/s, Aß fibres 30-75 m/s, Aα fibres 80-120 m/s

3. **Nausea and vomiting are sometimes associated with pain. What is the mechanism for this?**
   There are connections from pain pathways in the brainstem, limbic system and cortex to the vomiting centre (area postrema) in the medulla. The vomiting centre coordinates the act of vomiting.

4. **What is central sensitization? How does it occur?**
   Pathological pain state where there is increased sensitivity or excitability of nerves within the central nervous system. Pain can occur spontaneously (no peripheral input) or normally non-painful stimuli can become painful.

Pain Treatment

1. How does a placebo medicine reduce a person's pain?
If the person believes that the medicine will be effective, modulatory pathways will be activated and these will inhibit the pain signal and therefore reduce the persons' perception of pain.

2. How does acupuncture work?
The exact answer is unknown but acupuncture may work by causing release of endogenous opioids (endorphins) or by stimulating Aß fibres resulting in inhibition of the pain signal in the dorsal horn.

3. What is the best medication for severe, acute, nociceptive pain?
Morphine

4. Why are membrane stabilizing medications effective for some types of pathological pain?
They reduce sensitivity and/or spontaneous activity in damaged pain nerves.

Using the RAT System

1. What are the three components of "Assess"?
- How severe is the pain?
- What type of pain is it? (Acute or chronic? Cancer or non-cancer? Nociceptive or neuropathic?)
- Are there other factors?

2. Are non-pharmacological treatments more effective in acute or chronic pain?
Non-pharmacological treatments are important in both acute and chronic pain. In some types of chronic pain, non-pharmacological treatments have a much bigger role than pharmacological treatments, e.g. psychological therapy in chronic non-cancer pain.

3. Do NSAIMs have a role in chronic pain management?
Yes, but only if there is an inflammatory component. They should be prescribed at the lowest effective dose and for the shortest time to minimize the risk of side effects.

Appendix 7: More Information

EPM website

- Information about EPM, manual and slide downloads
- www.essentialpainmanagement.org

Acute Pain Management: Scientific Evidence

- Summary of evidence relating to acute pain management
- Available from ANZCA website (free download)
- www.fpm.anzca.edu.au/documents/apmse4_2015_final

Guide to Pain Management in Low-Resource Settings

- Detailed reference text
- Available from IASP website (free download)
- www.iasp-pain.org/FreeBooks

Worldwide Hospice Palliative Care Alliance website

- Resources relating to hospice and palliative care
- www.thewhpca.org/resources/

WHO Essential Medicines List

- Up-to-date list available from WHO website
- www.who.int/medicines/publications/essentialmedicines/en/

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