Assessment of acute and chronic pain

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Abstract

Acute and chronic pain states overlap in chronology and pathophysiology but both can remain under-managed. Assessment aims to elucidate underlying diagnosis and/or pain generators that can then guide treatment strategies. Assessment should be repeated to assess efficacy of treatments and the presence of side effects. Self-report questionnaires are available to assist in diagnosis and monitoring of pain and its related dimensions but they do not replace a thorough assessment by an experienced clinician.

Keywords Acute; assessment; chronic; neuropathic; nociceptive; pain; pain measurement; questionnaires

Royal College of Anaesthetists CPD Matrix: A1503, 1D01, 2DO2, 2E03, 3E00

Learning objectives

After reading this article, you should know:

- the biopsychosocial model of pain assessment for acute/chronic/cancer pain
- why pain assessment should be repeated
- nociceptive pain, neuropathic pain, peripheral and central sensitization
- common tools used in pain assessment
- how to assess pain in special circumstances

Despite the efforts of palliative care and in- and out-patient pain teams, the incidence of post-surgical acute and chronic pain remains high. At least one-third of patients with cancer rate their pain as either moderate or severe[1] and it is estimated that 14 million people live with chronic pain in England alone.[2]

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

… an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.[3]

When this is considered, the complexity of pain assessment or measurement becomes apparent. Pain is an individualized, subjective experience modulated by past events, genetic, physiological, psychological, social, cultural and environmental factors. There is no objective measure.

Pain assessment needs to be thorough, reliable and accurate to enable effective and individualized care, but one must consider the purpose of pain assessment and the person being assessed. Throughout life, pain is generally associated with tissue damage. If we rest, it gets better. If it doesn't, we seek help to fix the underlying damage and, as a by-product, the pain then goes away. Part of the assessment is therefore diagnostic. What is the underlying condition? Can a pathological process be reversed or altered with a subsequent reduction in pain?

Sadly, there are many patients suffering pain with conditions where the pathological process cannot be altered, the effective treatments are not suitable for that individual, or the diagnosis remains elusive. In all three of these circumstances, the focus moves from treatment of the underlying condition and more to management.

The traditional categories of pain have become blurred. Pain is rarely a pure nociceptive or neuropathic process but a mixture of different pathophysiologies including sensitization (Box 1). Acute pain is generally considered to be of less than 3 months' duration at which point it becomes chronic, although this is an arbitrary definition. A more useful definition of chronic pain is that it persists beyond the period expected of healing.

A complete pain assessment starts with a history, moves on to an examination and review of any relevant investigations.

Definitions

Nociceptive pain: Pain that arises from actual or threatened damage to non-neural tissue and is due to the activation of nociceptors.[3] Pain is often described as 'burning'.

Neuropathic pain: Pain caused by a lesion or disease of the somatosensory nervous system.[3] Specific features of neuropathic pain include pain descriptions of 'tingling', 'shooting' or 'electric shock'. The presence of positive findings such as allodynia (a stimulus that would not normally provoke pain) or hyperalgesia (increased sensitivity to pain) or negative findings such as weakness or numbness also support a diagnosis.

Sensitization: Increased responsiveness of nociceptive neurons to their normal input, and/or recruitment of a response to normally subthreshold inputs.[3]

Central sensitization: Increased responsiveness of nociceptive neurons in the central nervous system to their normal or subthreshold afferent input.[3]

Peripheral sensitization: Increased responsiveness and reduced threshold of nociceptive neurons in the periphery to the stimulation of their receptive fields.[3]

Box 1

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The pain history

The pain history can fall within a wider medical assessment or be the main focus. Its aims are to establish a diagnosis and guide treatment. Treatments are then repeatedly evaluated.

The biopsychosocial approach remains a useful framework to construct a pain history:

'Bio' refers to the biological aspects of the pain itself — the 'what, where, when, worse and sore?' or 'SOCRATES' (Table 1).

'Psycho' refers to psychological factors, 'SAD' and any previous mental illness (Table 2). They can also be referred to as 'yellow flags' (Box 2). The degree to which these factors are relevant vary with circumstances, but they should not be neglected during an acute pain assessment.

'Social' (Table 3) again varies in importance according to the circumstances. It examines aspects of 'work, rest and play' (Table 3).

The pain history provides a structure on which pain can be assessed and therefore managed. It allows three fundamental questions to be answered:

- Is the pain acute, acute on chronic or chronic?
- Is the underlying mechanism nociceptive, neuropathic, due to central sensitization or is it a mixed picture?
- Are there 'red flags' (Box 2) that require further investigation?

Previous therapies, both successful and unsuccessful, can then be elucidated for drug and non-drug treatments (interventional, surgical, physical, psychological and alternative). The full medical history can then be completed along with a relevant examination, and review of self-report questionnaires and investigations. An appropriate management plan can then be formed.

Acute pain assessment

Acute pain is often the consequence of injury or disease and generally improves with healing and rest. It is encountered in a wide variety of clinical circumstances, e.g. postoperative, trauma and medical illness. It is also increasingly common to find patients with chronic pain complaints in an acute setting.

Acute pain is generally considered to be nociceptive, but it can be neuropathic or a combination. The cause is often known, but the clinician should be alert to a differential diagnosis. There are

"Bio" assessment of pain

Bio	
What	Character of pain - sharp, throbbing, ache, electric shock
Where	Site and radiation - body map diagrams can be useful, deep or superficial
When	Chronology - onset: sudden or gradual, circumstances e.g. post surgical, trauma, infection, traumatic life events, duration: constant or intermittent, pattern and evolution.
Worse	Aggravating and relieving factors
S = Score	Pain intensity at rest and movement, Verbal Rating Score (VRS)/Numerical Rating Score (NRS). At worst and on average.
O = Other	Associated factors - nausea, drowsiness, numbness, weakness
R = Red Flags	Symptoms needing urgent investigation e.g. Non accidental injury, cauda equina syndrome, compartment syndrome, dissecting aneurysm (Box 2)
E = Experiences/ Expectations	Have you had the pain before? What do you think is the cause? What are your expectations of treatment.

Or **SOCRATES**:

- **S**ite — Where is the pain? Or the maximal site of the pain.
- **O**nset — When did the pain start, and was it sudden or gradual? Include also whether it is progressive or regressive.
- **C**haracter — What is the pain like? An ache? Stabbing?
- **R**adiation — Does the pain radiate?
- **A**ssociations — Any other signs or symptoms associated with the pain?
- **T**ime course — Does the pain follow any pattern?
- **E**xacerbating/relieving factors — Does anything change the pain?
- **S**everity — How bad is the pain?

Table 1

Red and yellow flags

Red flags: Are warning signs that mandate further investigation. They were first associated with use in back pain, where red flags highlighted symptoms of cancer, infection, trauma, cauda equina or other underlying medical condition. They are now used in a wider context, although they do demonstrate low sensitivity.[8,9]

Yellow flags: Are psychological factors that have been shown to be indicate a risk of long term chronicity and disability. They include catastrophizing, attitudes that pain indicates harm, thoughts that passive as opposed to active treatments are the answer, a tendency to depression, reduced activity and social withdrawal. Social or financial problems can also be considered to be a 'yellow flag'.[9]

Box 2

'Psycho' assessment of pain

Psycho	
S = Stress	How does stress affect the pain?
A = Anxiety	Are you troubled with anxiety?
D = Depression	During the last month have you been feeling down, depressed or hopeless?
	During the last month have you often been bothered by having little interest or pleasure in doing things?
	Previous mental illness
	History of alcohol, smoking and illicit drug use

Table 2

'Social' assessment of pain

Social	
Work	What is your occupation? Do you enjoy your work?
Rest	Who is at home with you? How does pain affect your sleep?
Play	What activities do you enjoy? How does pain affect your function? What does the pain prevent you from doing?

Table 3

patient, societal, psychological and economic reasons to treat acute pain. One of the consistent risk factors in the development of chronic pain is the presence of high levels of acute pain.

Assessment needs to be made for static pain (pain at rest) and dynamic pain (pain on movement, deep breathing or coughing). Previous medications are particularly relevant as a patient may already be on opioid therapy. Less time is spent on psychological aspects, although undiagnosed mental illness or societal issues can be communicated by complaints of uncontrolled acute pain.

Chronic pain assessment

Chronic pain is pain that persists for over 3 months.[4] A more useful concept is pain that persists beyond the period expected of healing. Neuropathic pain is more common in chronic pain states. Psychological factors can also be more prominent. Tissue healing has often occurred and there may be no hallmarks of tissue injury, but there may be signs of neuropathic pain.

Cancer pain assessment

Several forms of cancer pain have been described. Pain can be somatic or visceral, nociceptive or neuropathic, and inflammatory or ischaemic. It can be directly related to the cancer, due to infiltration, compression, metastasis or secondary to a paraneoplastic neuropathy. It can also be as a result of treatment. Cancer pain should also be distinguished from pain in a patient with cancer (i.e. pain due to comorbidities or other reasons not the cancer). The temporality of the pain is important. Is there a constant or variable background pain? Is there episodic breakthrough pain (a transient flare of pain that occurs spontaneously or as the result of a trigger)? The assessment influences the treatment strategy.

The clinician should also be aware that patients with cancer may under-report pain due to a fear of distracting their doctor from the cancer, concerns over addiction or misplaced thoughts of 'strong pain killers' hastening death. Spirituality and planning for death may also be relevant in palliative cases.

Questionnaires in pain assessment

Pain is a multidimensional subjective experience with no objective measures but attempts have been made to measure its various dimensions to complement the pain history. Pain assessment tools include unidimensional and multidimensional tools. Tools can also help with the diagnosis of neuropathic pain and assess other factors such as anxiety, depression, catastrophizing, function, fear avoidance behaviour and impression of change. They provide quantitative data that can be used to assess against the general population, over time or after treatments. In acute and chronic pain states an inappropriate focus can be made of pain intensity. Patients can have a successful intervention, which results in an increase in functional ability with no reduction in pain intensity as patients increase their activity to a similar level of pain intensity.

Unidimensional tools

In 1996 the American Pain Society instituted the 'Pain as a 5th Vital Sign' campaign. Its aims were laudable: high pain scores, assessed by unidimensional tools, required action. Unfortunately, this had the unintended consequence of encouraging opioid administration and subsequent over-sedation and the opioid epidemic that America is now experiencing.[5] A joint commission report stated that 'using numerical pain scales alone to monitor patients' pain is inadequate' and stressed 'the importance of how pain affects function'.[6]

Despite this a core part of an assessment of pain is intensity, at baseline and then again after an intervention. The most frequent measures of intensity are the numerical rating scale (NRS), verbal rating scale (VRS) and the visual analogue scale (VAS) (Figure 1).

The NRS is a single item 11-point rating scale from 0 to 10. Zero represents 'no pain' and 10 the 'worst pain imaginable'. It is easy to use and understand. The VRS replaces numbers with descriptive words, from 'no pain' to 'very severe pain'. The words are then assigned a numerical intensity value, e.g. 0 = no pain; 1 = mild; 2 = moderate; 3 = severe; 4 = very severe. It is easy to use but does require an ability to discriminate between verbal descriptors. The VAS is a 100 mm long line with 'no pain' at one end and 'worst pain imaginable' at the other. Patients place a mark on the line to represent their intensity of pain. It requires understanding, the ability to make a mark on the line and equipment (paper, pen and ruler).

The Initiative on Methods, Measurement, and Pain Assessment in Clinical Trials (IMMPACT) recommends the 11-point

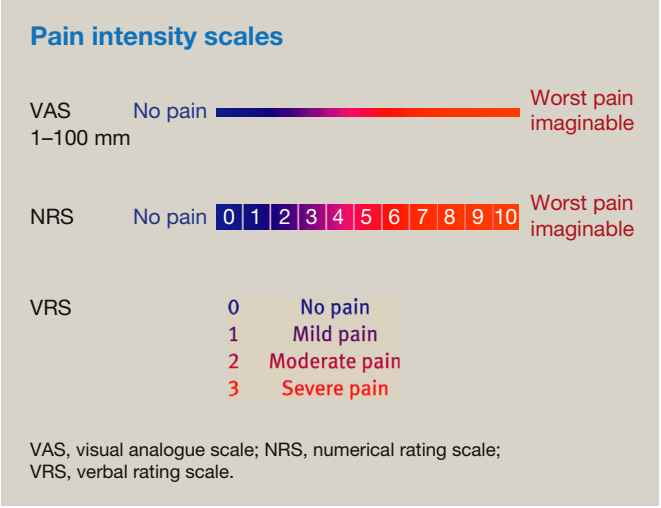

Figure 1

NRS scale and a reduction of two points is considered clinically meaningful pain relief.[7]

Multidimensional tools

Multidimensional tools acknowledge that there is more to pain than just intensity. They are instruments to uncover or confirm issues to be addressed in more depth. One of the first and most commonly used is the McGill Pain Questionnaire (MPQ). The MPQ, also available as a short form (MPQ-SF), provides information on the sensory, affective and evaluative dimensions of the pain experience.

Other tools include the Multidimensional Pain Inventory, Interference scale and Brief Pain Inventory.

Emotional distress

Pain and emotion are linked and many of the symptoms experienced in chronic pain are similar to those seen in depressive illnesses - fatigue, poor sleep and decreased libido. There are standardized questionnaires to assess depression, e.g. Patient Health Questionnaire (PHQ-9) and Beck Depression Inventory (BDI) for depression, and Generalised Anxiety Disorder Assessment (GAD 7) and Pain Anxiety Symptoms Scale (PASS) for anxiety.

Neuropathic pain screening questionnaires

To assist with the diagnosis of neuropathic pain, questionnaires such as Douleur Neuropathique 4 (DN4), Leeds Assessment of Neuropathic Symptoms and Signs (LANSS), and painDETECT and Standardized Evaluation of Pain (StEP) in neuropathic back pain are available. They give a score of how likely a neuropathic pain component is present but the gold standard remains an experienced clinician.

Pain Catastrophising Scale, functional assessment tools and quality of life

Pain catastrophizing refers to a negative bias about the individual's situation. The Pain Catastrophising Scale (PCS) can be considered a measure of an emotional response to pain and coping strategies. Several questionnaires are available for assessing functional outcomes related to back pain including The Oswestry Low Back Pain Disability Questionnaire (ODQ) and the Rowland Morris Disability Questionnaire (RMDQ). The Brief Pain Inventory assesses severity and impact on daily functions. Quality of life questionnaires assess 'well-being' and can include emotional, social and physical aspects. An example is the EQ-5D.

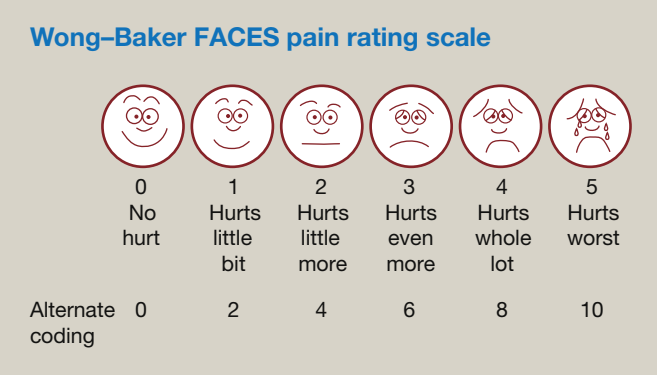

Figure 2

(For further information please see Outcome Measures https://www.rcoa.ac.uk/system/files/FPM-outcome-measures-2019.pdf.)

Pain assessment in special circumstances

Paediatric pain assessment

There are differences between adults and children that make pain assessment challenging. Broadly there are three stages of development, which need tailored pain assessment approaches.

- *Infants to 4 years.* Parental involvement is essential as self-report is at best unreliable in this age group. Pain assessment relies on observation, physiological and behavioural responses. These have to be interpreted with care as they can be influenced by concurrent illnesses or distress. Examples include the COMFORT Scale, CRIES, and the FLACC Scale.
- *Ages 4 – 8 years.* Children as young as 4 years can start to use self-report tools. The Faces Pain Scale (Figure 2) is often used in paediatrics and shows a close linear relationship with the VAS, assuming normal development.
- *Ages 8 years and above.* Can be assessed as an adult with appropriate adjustments.

Older patients, cognitive impairment and communication difficulties

Older patients may under-report pain and, due to altered pharmacokinetics, may be at greater risk of side effects. Patient expectations must be realistic and attention paid to multiple comorbidities and pre-existing medications that may be present. A collateral history from carers or family can be invaluable.

In patients with cognitive impairment, pain is reported less but not experienced less. Self-assessment tools can be used in most patients with mild to moderate cognitive impairment, although recall may be affected. Pain reporting in non-communicative patients is more challenging and observational tools are required but behaviours such as frowning, groaning, grimacing may not indicate pain. Tools available include the Faces Scale and Abbey Pain Scale.

Intensive care

Organ dysfunction may alter drug pharmacokinetics and prolonged infusions can lead to tolerance, dependence and accumulation of metabolites. Sedation requirements co-exist with analgesic requirements. Self-report scales should be used whenever possible in intensive care. When this is not possible observational and physiological scales should be used. Incorporation of formal assessments for pain, agitation and sedation tend to decrease pain, duration of ventilation and total sedation dose. ◆

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