Assessment of patients with chronic pain

Meyer HP, Kenny PT
Department of Family Medicine, Kalafong Hospital, University of Pretoria
Correspondence to: Prof Helgard Meyer, e-mail: Helgard.Meyer@up.ac.za

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Introduction

Pain has always been the most common reason why patients seek medical attention. A World Health Organization survey of ± 26 000 primary care patients on five continents demonstrated a prevalence of *persistent pain* (lasting longer than three months) in 22% of participants, mostly associated with marked reduction in several indicators of well-being (e.g. interference with activities and psychological functioning).[1]

Acute pain serves a protective purpose, mostly signals injury or disease and has obvious value for survival. It protects the individual from further injury and promotes healing after injury. Untreated acute pain may cause unnecessary suffering and increase morbidity. There is also increasing recognition that untreated acute pain may induce long-term changes in the peripheral and central nervous system, known as *central sensitisation*.

These changes *("plasticity")* in the nervous system alter the body's response to further pain impulses and it may become more sensitive to pain stimuli.[2,3] Once central sensitisation has taken place, even light pain stimuli may activate pain perception (*hyperalgesia*). This has led to recognition of acute pain as the *fifth vital sign*, which should be assessed and monitored with the same vigilance as blood pressure, temperature, pulse rate and respiratory rate e.g. in patients after surgery or other forms of trauma.[4]

Acute pain can be reliably assessed with one-dimensional tools, such as numeric rating scales or visual analogue scales (see later). Chronic pain assessment should not be limited to pain severity, but should also include pain-related functional interference and the emotional impact of the pain. It is, therefore, a more demanding task than assessing acute pain.[2,5]

Chronic pain: definitions and basic mechanisms

The current definition of pain as proposed by the International Association of the Study of Pain (IASP) is as follows: *"Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage."*[6] This definition identifies the complex and multidimensional experience of pain (in particular chronic pain). The definition includes a psychological dimension and also indicates that pain is not necessarily an indication of underlying tissue damage. The modern paradigm of pain mechanisms and management has moved away from the concept of a specific pain pathway as the source of pain, to intricate brain mechanisms which integrate *biological* (sensory), *emotional* and *cognitive* factors during the processing and experience of pain.[2]

Chronic pain has been defined as pain that persists for longer than the time expected for healing (usually taken to be three months).[7] Chronic pain may thus persist long after the tissue trauma which has triggered its onset has resolved (e.g. in neuropathic pain and fibromyalgia), and may be present in the absence of obvious ongoing tissue damage.[8]

Chronic pain may be associated with underlying "organic" disease, e.g. osteoarthritis *(nociceptive pain)* and carpal tunnel syndrome *(neuropathic pain).* However, many chronic pain patients have pain disorders not associated with obvious underlying "organic" pathology, e.g. headache disorders, irritable bowel syndrome, primary dysmenorrhoea, fibromyalgia, non-specific chronic back pain and others. Chronic pain is, therefore, regarded as a dysfunctional response in these patients (not warning them of underlying disease or injury) and has been widely acknowledged as a disease in its own right which should be assessed and managed appropriately.[9]

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The pain processing system *(nociception)* was historically conceptualised as a hard-wired pain pathway which reproduces a pain sensation in direct proportion to the extent and the severity of the peripheral painful stimulus. This reductionist view, based on the work of René Descartes (1596-1650), the famous French philosopher, evolved into the *biomedical approach* to pain management, which regards a specific underlying "organic" lesion as the only source of pain. According to this approach, pain is regarded as a warning signal of tissue injury and, if conservative treatment fails, some surgical intervention will correct the problem. This outdated approach is still evident today and one of the reasons for inappropriate pain management, even in modern times.[10] According to this approach, chronic pain without an obvious underlying identifiable cause is regarded as "psychological", creating a false dichotomy that pain is either physical (or real) or psychological (in the mind). It is currently accepted that both psychological and biological factors are relevant in most chronic pain disorders, although the balance between organic pathology and psychosocial contributions may differ in different disorders and individuals.[2,10]

A multitude of brain regions (known as the *pain matrix*) are activated following a noxious stimulus. Rather than registering the pain signal to produce pain in the somatosensory cortex, the brain matrix will "construct" the pain experience through the integration of multiple inputs, which may include biological (organic) factors, pain memories, cognitive factors (e.g. catastrophising), present and past psychological events and even sociocultural influences.[2,11-13]

The biopsychosocial model in chronic pain

The modern paradigm of pain assessment and management has moved from the biomedical to the broader and more comprehensive *biopsychosocial approach*, where the pain experience integrates input from sensory, emotional and the cognitive domains.[2,6,14] Much of the current biopsychosocial approach is based on the publication of the *gate-control theory (GCT)* by Melzack and Wall in 1965, and subsequent work which demonstrated that incoming pain impulses can be modulated at the spinal cord as well as by descending input from higher centres. Later research confirmed the substantial impact of psychological and cognitive factors on pain perception.[15-17]

The biopsychosocial model thus views chronic pain as the result of a dynamic interaction between biological, psychological and social factors.[18,19] Each individual experiences pain uniquely. This pain experience is modulated by emotions and cognition, and also by previous pain experiences and sociocultural influences.[18] The complexity of pain is particularly evident when it persists over a period of time and the above factors interact to modulate a patient's report of pain and perceived disability. Psychosocial and behavioural factors may also contribute to poorer intervention outcomes in certain patients, therefore a biopsychosocial assessment is necessary before selection of patients for interventions.[20,21]

The biopsychosocial paradigm which has emerged in recent years provides a comprehensive understanding of chronic pain as a complex phenomenon, often beyond the level of obvious underlying pathology. Assessment of a patient in chronic pain should therefore be multidimensional.[22]

Assessment of a chronic pain patient

It is important to assess pain for diagnostic purposes, as well as to identify comorbidities in order to initiate appropriate management.

In addition to the huge direct burden of chronic pain on a patient's quality of life and productivity, comorbidities (e.g. mood disorder) are also common and may contribute to poor treatment outcomes.[22] Although chronic pain patients are often stigmatised as "malingering" or "compensation seeking", there is little evidence to support this.[20,23] However, it remains important to assess emotions, behaviours and psychosocial comorbidities which may have a significant impact on the course and outcome of chronic pain disorders.[20]

In a developing healthcare system such as in South Africa, primary healthcare providers are in the most favourable position to be responsible for the initial assessment and management of patients with chronic pain.[23] A pain clinician may be assisted in this regard by other primary healthcare providers to form a core team, which may include a physiotherapist, occupational therapist, behavioural therapist, biokineticist and others.

Patients with more complicated disorders, such as failed back surgery syndrome and complex regional pain syndrome, those undergoing medicolegal evaluations and patients who respond poorly to initial management should be referred to an acknowledged interdisciplinary pain centre for assessment and management.

Evaluation of a patient with chronic pain

History

The patient's history is the most important initial source of information and self-reporting of pain remains the most reliable indication of pain.

Important aspects in the evaluation must include the following:

- Location (pain drawing).
- Radiation.
- Onset/precipitating event.
- Duration.

- Pain characteristics (e.g. "burning", "shooting", "throbbing").
- Exaggerated pain sensation (hyperalgesia).
- Aggravating/relieving factors.
- Associated symptoms (comorbidities).
- Previous history.

Psychosocial history

The following should be addressed:

- What does the pain mean to the patient? (Beliefs, anxieties, expectations, attitudes.)
- How does the pain impact on sleep, mood (anxiety/depression), finances, family life and social life?
- How does the situation in the workplace affect the pain?
  - Which stressors are present?
  - Is the patient involved in litigation?
  - Is the patient seeking compensation for a work-related incident which precipitated the pain disorder?
- Full medication history (including over the counter products and alcohol).

Intensity (pain scale)

The pain scales are used to measure the pain intensity.

Unidimensional pain scales

Chronic pain cannot be measured by objective external means, and a *patient report* must be used.[24] Pain is a unique and very personal experience, therefore we have to accept the patient's report. *Simple (unidimensional) pain scales* are often used and have demonstrated validity across a variety of pain disorders.

• *Visual analogue scale (VAS)*

No pain **Worst pain imaginable**

The VAS is presented as a horizontal 100 mm line with anchor words at each end. The patient is asked to place a mark on the line at a point which best represents his/her pain and the response is measured from the left-hand anchor.

VAS may be applied in the vast majority of clinical and experimental pain settings. Most patients find it easy to use and results can also be used to define treatment effects.

• *Numerical rating scale (NRS)*

0 1 2 3 4 5 6 7 8 9 10

No pain **Worst pain imaginable**

The **NRS** assigns numbers to the levels of pain between the two extremes of the pain experience. The patient identifies a number which best represents his/her pain intensity.[25] There is evidence that the elderly find the NRS easier to use than the VAS and neither clear vision, nor a pen and paper, is required.[26]

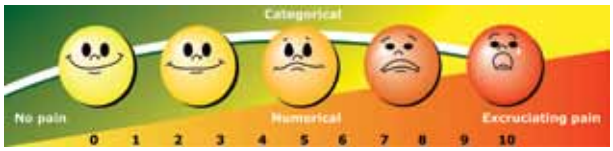
A reduction in VAS or NRS of at least 30-50% is usually regarded as clinically meaningful in research or clinical settings.

• *Verbal rating scale (VRS)*

The VRS stratifies pain intensity according to descriptors commonly used by patients, and is easy for patients to use.

• *Faces pain rating scale*

This remains the most popular method for obtaining pain ratings from children and cognitively impaired or illiterate adults.



Multidimensional pain scales

In accordance with the biopsychosocial concept of chronic pain, the initial assessment of a patient with chronic pain should at least include the patient's experience of pain severity, the emotional impact and pain-related functional interference, preferably over an extended period of at least three months.[27] Using only a unidimensional pain scale in the context of a complex chronic pain disorder will be inappropriate and important features will be missed. The *functional interference* of pain with daily activities may result in decreased activities, reduction in muscle tone, "fear avoidance" behaviour and avoiding responsibilities, which may worsen the pain experience and increase the likelihood of disability.[27]

There is no gold standard multidimensional pain scale, but the scale which is used should at least detect function–limiting pain, also referred to as "important unrelieved pain".[28] The *Brief Pain Inventory* is a generic measure of pain-related function which has been validated in many pain disorders.[28]

• *The Brief Pain Inventory (BPI)*[3,28]

The BPI was developed from *the Wisconsin Brief Pain Questionnaire* and assesses pain severity and the degree of interference with function. Most patients can complete it in 2-3 minutes using 0-10 NRS. Patients are asked to rate their:

  - Pain intensity "now", "at its worst", "least" and "average" over the last 24 hours.
  - Pain location on a body chart.
  - Pain characteristics.
  - Pain relief with current treatment.
  - Interference with seven aspects of life (listed below) during the past week, each on an NRS.
- General activity.
- Walking (or mobility in a wheelchair).

- Normal work activities.
- Social relations.
- Mood.
- Sleep.
- Enjoyment of life.

The BPI interference score is the average of these seven items and a score of ≥ 5 is usually used as a cut-off for moderate to severe pain interference.

Other standardised assessment instruments include:

- The *Treatment Outcomes in Pain Survey* (TOPS) questionnaire, which is an elaborate and well validated tool in patients with chronic pain.[25]
- The *McGill Pain Questionnaire* and the *short form McGill Pain Questionnaire* (SF-MPQ).[29] The SF-MPQ consists of 11 sensory (sharp, shooting, etc) and 4 affective descriptions (anxious, fearful, etc) which the patient has to rate on a scale of 0 to 3.
- *Neuropathic pain screening tools.*[30] Primary healthcare providers often have time constraints that preclude a meticulous neurological examination in patients with suspected neuropathic pain and it may therefore be difficult to detect a nerve lesion clinically. In this scenario, validated screening tools are often used to distinguish between nociceptive and neuropathic pain, e.g. LANSS pain scale, DN-4 and NPQ questionnaires, which may assist in deciding if neuropathic pain is the dominant mechanism in the patient's pain presentation.
- *Short form-36 (SF 36*). The SF-36 provides an overview of the impact of a medical problem on a patient's functioning in physical, social and emotional domains of life.[19,25] Research studies have shown SF-36 scores which indicate a lower quality of life in certain chronic pain patients than in patients with heart disease and diabetes mellitus.[24]
- The *Beck Depression Inventory (BDI*) is a brief (<5 minutes) test with a high sensitivity to screen for the presence of a depressive disorder, as is the *Zung Self-Rating Depression Scale*.[27]
- The *Opioid Risk Tool* (ORT) is a self-administered questionnaire which measures the risk factors associated with *substance abuse* in patients being considered for long term opioid therapy.[31]
- Condition-specific assessment instruments includes the *Owestry Low Back Pain Questionnaire* and *the Health Assessment Questionnaire* (HAQ) measuring arthritis severity.[32]

Physical examination

The physical examination complements the history-taking to identify the etiology and associated features of the pain disorder. The physical examination should target the *musculoskeletal* and *neurological* systems which are the most frequent causes of chronic pain[33] and should comprise the following:

- *General* physical examination.
- Examination of any *painful region.*
- *Musculoskeletal* examination. Examination of the musculoskeletal system includes the joints, muscles and spine. The range of motion of the cervical and lumbar area should be assessed, as well as the presence of movement-evoked pain. The spinous processes and paraspinal muscles should be palpated, including a search for the presence of tender points and/or myofascial trigger points.[8,33]
- *Neurological* examination. The neurological examination should focus on the area identified through the pain history. If *sensory abnormalities* are detected in an area of nerve innervation correlating with the patient's pain, it is a strong predictor for the diagnosis of *neuropathic pain.*
- *"Negative" sensory signs* include diminished light touch and vibration sense. *"Positive" sensory signs* include hyperalgesia (increased response to a painful stimulus) and allodynia (pain due to a stimulus that does not normally provoke pain, e.g. movement of a cotton swab).[30]

The following aspects should also be assessed during the neurological evaluation:

- Mental status: general impression, cognitive status evaluation, behaviour/mood.
- Motor testing: muscle strength/atrophy,muscle tone, walking on the heels and toes.
- Sensory testing: cold and hot water (to detect thermal allodynia), cotton wool and brush,blunt needle, vibration sense.
- Tendon reflexes.

Special investigations

Special investigations may be useful to diagnose treatable causes of chronic pain, e.g. painful peripheral neuropathy secondary to HIV/AIDS or Vitamin B12 deficiency.

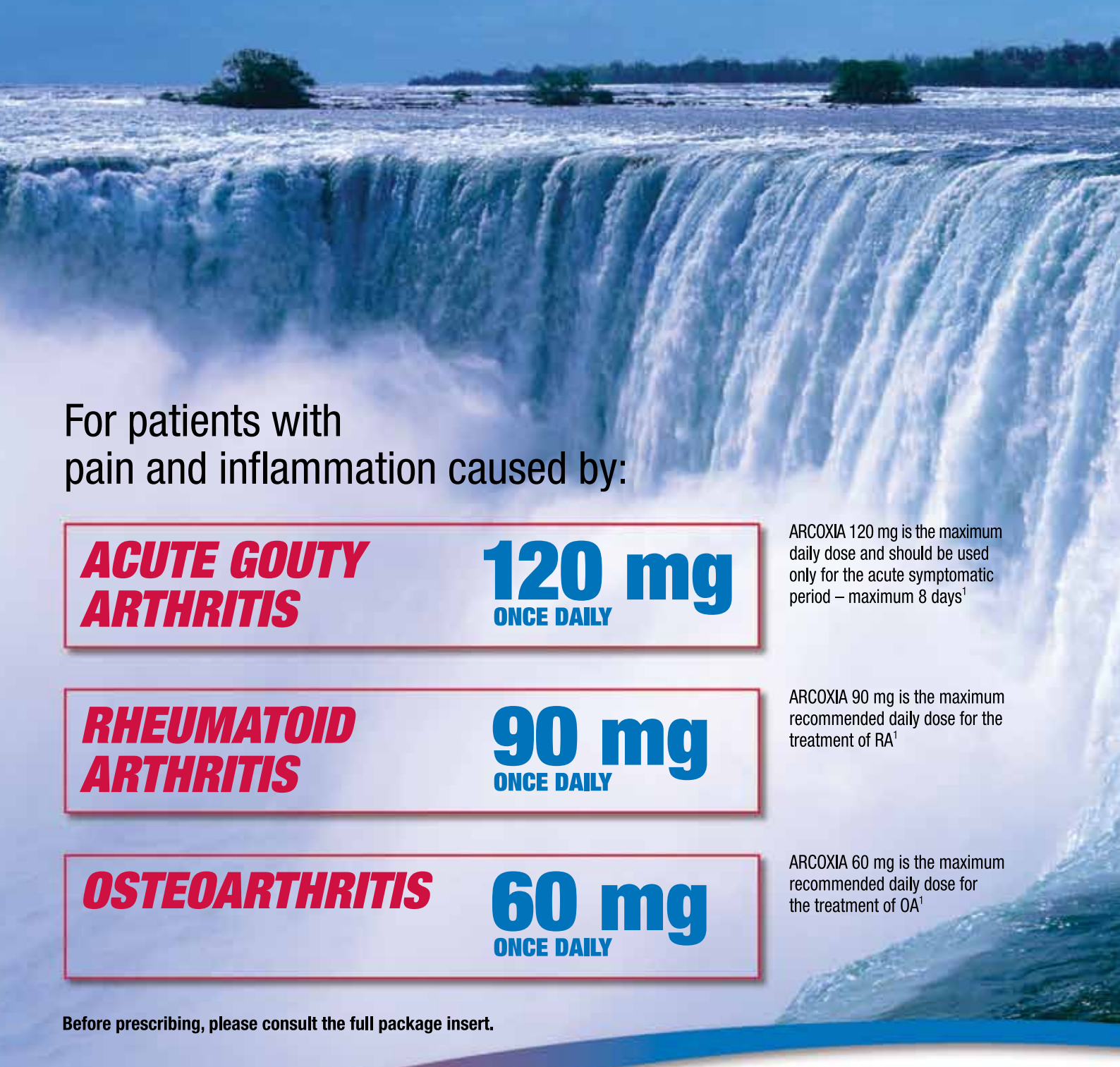
Nerve conduction studies may confirm a neuropathy in large myelinated fibres and *CT or MRI scans* may assist in identifying causes of nerve compression or infiltration.

Laboratory studies are mostly not diagnostic and are often normal in patients with neuropathic pain.

Biopsychosocial diagnosis

After taking the *history* and conducting an appropriate *clinical examination* a three stage biopsychosocial diagnosis is proposed:

- **"Bio":** What type of pain is the patient suffering from: nociceptive, neuropathic, dysfunctional or mixed?
- **"Psycho":** What are the beliefs, fears, attitude and expectations of the patient (also the presence of mood and related disorders)?



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- **"Social":** Which factors in the patient's family or work environment may contribute to his/her presentation, e.g. injury on duty, litigation or other compensation issues?

Conclusion

Comprehensive assessment is essential to select the most appropriate treatment strategy to improve a patient's chronic pain complaints and his/her functioning in various domains and quality of life.

Chronic pain consists of three dimensions: sensory, affective and cognitive. Assessment and management, therefore, needs to be undertaken according to a biopsychosocial approach. The affective and cognitive dimensions may be influenced by psychological factors such as mood disorders and catastrophising.

Assessment of a patient with chronic pain should not be viewed as a single event, but as a continuous process, although the initial assessment will be more comprehensive.[33]

Treatment monitoring includes *outcome assessment* and should be focussed on the 4 **A**s: **a**nalgesia, **a**ctivities of daily living, **a**dverse effects and **a**berrant behaviour (suggestive of drug abuse).[34]

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