The Assessment of Pain in Paramedic Practice

BY BILL LORD BHIthSc, GDipCBL, MEd, PhD
Reviewed by Christopher Ebright, BEd, NREMT-P; Dawnelle Mathis, BS, NR-P; Travis Witt, MPPA, EMF-P; Owen T. Traynor, MD; Lindsay Eakes, BS, NRP; John Pierce, MBA, NRP

Introduction

The alleviation of pain is one of the most important components of paramedicine. Effective pain management relies on clinical practice guidelines and a scope of practice that enables independent clinical decisions. Yet despite the availability of pharmacological and non-pharmacological interventions that have demonstrated efficacy in prehospital pain management, the alleviation of pain is highly dependent on the provider’s ability to identify, measure, and interpret this symptom.

Pain affects more Americans than diabetes, heart disease, and cancer combined. This symptom is typically associated with chronic pain syndromes, cancer-related pain, and inadequate postoperative pain control but is also a common finding in individuals with an acute illness or injury. Pain is a common finding in patients requiring care provided by EMS and will often be the chief complaint that has resulted in a call for assistance.

Research from North America has shown that up to 30% of patients transported by ambulance have moderate to severe pain. However, information regarding pain severity is not commonly documented on patient care records. Inability to assess pain may be one reason for the lack of data, and this has been cited as a barrier to effective analgesia in paramedic practice. If paramedics do not actively seek information to identify the presence of pain, this symptom may be missed. The lack of data regarding pain severity is particularly prevalent in cases involving children. In a study published in the 2008 issue of Prehospital Emergency Care that evaluated paramedic assessment of pain in pediatric trauma, just one of 696 patient care records included a pain score derived from a validated pain assessment tool. Even in the air medical setting, few pediatric patients have pain scores documented.

Assessment of pain severity has been called the “fifth vital sign.” This phrase was initially coined by two researchers in a 1997 American Journal of Nursing article in an effort to highlight the need to routinely question and examine patients for evidence of pain. Standardized recording of pain severity using validated and age-appropriate pain severity is useful in the following ways:

1. Identifying pain when the patient may not volunteer the existence of pain or when the patient is unable to self-report due to age, cognitive impairment, or language difficulties;
2. Guiding the selection of appropriate interventions to alleviate pain; and
3. Evaluating the efficacy of analgesia through documentation of trends in pain severity over the duration of care.

The assessment of pain provides important information about the injury or illness an individual is experiencing. For example, a sudden onset of chest pain may indicate myocardial ischemia, but this pain may also result from an injury to the chest or a diverse range of diseases. As such, a focused clinical examination is required to make
a clinical decision regarding appropriate interventions. This includes decisions regarding the management of the pain.

In some EMS systems, the recording of pain severity and reduction of pain severity score has been established as a key clinical performance indicator. When organizational policy mandates assessment of pain severity and documentation of pain severity score, compliance is high. Several Australian EMS agencies have established benchmarks for reduction in pain severity. In the United Kingdom, research has identified relief of pain as one of the most important clinical outcomes in paramedic practice. Although change in pain severity is an important clinical performance indicator, this requires routine or mandatory recording of pain severity in all patients, including documentation of a zero pain score when the patient reports no pain.

Minimum standards for pain reduction should be based on the change in pain score required to obtain a perceptible difference. Research has shown that the Minimum Clinically Significant Difference (MCSD) in pain severity is 1.5 on an 11-point Numeric Rating Scale, or a proportional change of 25%. Kendrick, who used a prospective study of analgesia in patients presenting to the Department of Emergency Medicine at Maine Medical Center, and used MCSD as the primary outcome, reported a MCSD of 1.39. Bijur reported MCSD was 1.5 or a change of 25% from the initial pain score in another prospective study of patients aged 65 years or greater presenting to a U.S. emergency department.

Based on this data, a reduction in pain severity of ≥30% of initial pain score using an 11-point verbal numeric rating scale was the primary outcome of interest in “Effectiveness of morphine, fentanyl, and methoxyflurane in the prehospital setting,” an Australian study of paramedic-initiated analgesia published in the 2010 issue of Prehospital Emergency Care.

Early assessment and management of pain is especially important because unrelieved pain may be associated with significant morbidity that includes the development of chronic pain syndromes. Situations in which pain assessed by paramedics has been associated with more effective treatment include cases of suspected acute myocardial infarction. In addition, there is a humanitarian dimension to the alleviation of pain, with the relief of pain having been established as a basic human right.

Assessment of Pain

The initial survey of the patient’s health status follows the primary survey and identification of the chief complaint or disability. This involves a focused clinical examination and history of the events leading up to the call for assistance. This should include standard questions about previous episodes and medications. In addition, it should include asking questions to obtain the following information:

- The region where the pain is felt;
- Whether the pain radiates and, if so, the pattern of radiation;
- The quality of the pain;
- Factors that provoke and palliate the pain, and
- The temporal nature of the pain.

Several mnemonics can be used to guide the assessment of pain. OPQRST is one that is commonly used to develop a clinical impression of the patient’s complaint. (See Table 1 below for explanation of what OPQRST stands for.)

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<tbody>
<tr>
<td>P</td>
<td>Provokes/Palliates</td>
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<tr>
<td>Q</td>
<td>Quality</td>
</tr>
<tr>
<td>R</td>
<td>Region/Radiates</td>
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<tr>
<td>S</td>
<td>Severity</td>
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<tr>
<td>T</td>
<td>Time</td>
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The information derived from this process will help guide management decisions. It is important to ask open-ended questions rather than questions that result in a “yes” or “no” answer.
ended questions rather than questions that result in a “yes” or “no” answer.

- **Onset of the event**: Ask the patient what they were doing when the pain was first noticed. Was the onset of pain abrupt, or did it gradually intensify over time. Has it been constant or sporadic? If it’s sporadic, how frequently is it?

- **Provokes/Palliates**: Ask the patient whether anything exacerbates or relieves the pain. This could include posture, movement or analgesics taken prior to paramedic arrival.

- **Quality**: Ask the patient to describe the nature of the pain, such as whether it is sharp and well localized, or dull, cramp-like and diffuse. This helps to discriminate between visceral and musculoskeletal origin of the pain.

- **Radiates**: Avoid asking the patient whether their pain radiates because they are unlikely to understand this term. Instead, ask the patient to identify the location of the source of the pain, and to indicate whether the pain spreads to other body areas, for example the groin, back or shoulder.

- **Severity**: Use a reliable and validated pain severity scale or tool to enable the patient to describe the “unpleasantness” of their pain experience.

- **Time**: Ask the patient to assess the onset of the pain and its duration, as well as whether they have experienced similar pain and, if so, what caused it.\(^{19}\)

Each component of the OPQRST evaluation should be assessed in the setting of reported or suspected pain.

Pain is a complex personal experience, with both sensory and emotional components that may be expressed by the sufferer in the form of verbal report and/or behavioral cues. However, the expression of pain is mediated by a diverse range of personal and environmental factors. These are responsible for significant interpersonal variations in the way the individuals react to the unpleasant sensation of pain. Factors that can affect the expression of pain include:

- Age;
- Gender;
- Culture and social norms;
- Prior pain experiences;
- The context in which the pain occurs;
- Perceived control over the pain, and
- The consequences of persistent pain.\(^{20,21}\)

It is important to acknowledge the significant interpersonal variations in the ways people express pain, and paramedics should avoid using their own expectations of “normal” pain behavior to validate the patient’s report of pain. Research has shown that health professionals tend to underestimate pain.\(^{22}\) Underestimation may be exacerbated by a failure to control for the provider’s personal beliefs and attitudes, which may affect the provider’s assessment of the patient’s self-report and pain-related behavior. For example, there may be cultural or social stereotypes regarding the expression of pain. If the patient’s expression of pain varies from these accepted norms, the provider might form an inaccurate impression of the patient’s complaint. This may lead to errors in clinical decisions due to the effect of bias.\(^{23}\)

**Measurement of Pain**

Healthcare professionals should use a validated pain scale to assist the patient in describing their pain. Although several scales are available to rate pain severity, some of them are impractical for the prehospital setting. The following seven scales are practical for field use.

**VNRS:** The Verbal Numeric Rating Scale (VNRS) is an 11-point scale that is applicable for field providers.\(^5\) This scale is now commonly used by EMS agencies in Australia and the UK. To use the VNRS, instruct the patient to choose a number between zero and 10 to represent the severity of their pain. Advise the patient that zero represents no pain and 10 is the worst pain imaginable. Avoid using reference to previous episodes of pain, such as childbirth, for “10” because the intention is to rate the present pain, which may be more severe than any previous episodes or experiences.

Use of the VNRS may appear straightforward, but differences in cognitive ability associated with extremes of age and cognitive impairment due to degenerative diseases, such as dementia, may complicate this process.\(^{24}\) In addition, language barriers may introduce additional challenges in understanding the patient’s pain experience. Situations of this type may require the use of different pain scales to overcome the limitations of standard scales.

**ARS:** The Adjective Response Scale (ARS) is also recommended for use in paramedic practice.\(^{25}\) It uses
standard terms to indicate the level of pain severity—“None,” “Slight,” “Moderate,” “Severe,” or “Agonizing.” This may be preferred if the patient cannot understand a request to use a number to describe their pain severity. However, the ARS may not be responsive to significant changes in pain, making it more difficult to validate the efficacy of any analgesic interventions. Limitations of this scale include cultural and language barriers.

**VAS:** The Visual Analogue Scale (VAS) is typically used as a 100 mm line with text anchors at either end of the line. (See Figure 1, below.) The patient makes a mark on the line and the result is read in millimeters (for example, a mark around the midpoint of the line may be calculated to be 50 mm. This score correlates well with the VNRS: A 50 mm on the VAS is similar to 5/10 on the VNRS. 26

A slide scale is also available. When using this device, move the slider to the “no pain” point and ask the patient to move the slider to a point that represents their current level of pain severity. The result is read on the reverse of the scale in millimeters. Research has confirmed the validity and reliability of the VAS for assessing acute pain in adults and children aged seven years or older. 27,28

**Special Populations**

The use of a pain scale for self-reports of pain severity demands the cognitive ability to quantify a subjective experience. This requires a degree of abstract reasoning that young children and patients with cognitive impairment may find challenging. This places these populations at risk of unrecognized and untreated pain. Research has identified this as a problem when treating infants and children in paramedic practice settings. 29

When attempting to measure pain severity in children, a numerical rating scale (0-10) should be understood in children aged eight years and older. 30 In younger children, such as pre-verbal infants, it is difficult to differentiate between pain associated with a medical condition and the distress associated with hunger and fatigue. In this instance, a pain scale should be used to rate behavioral cues associated with pain.

**FLACC Scale:** The Facial expression, Leg movement, Activity; Cry, and Consolability (FLACC) Scale has been researched in children aged two months to seven years, has been shown to be a valid and reliable tool, and is one that is currently used and recommended for use in the prehospital setting. (See Table 2, below.) 31 Several other pain scales are available for the assessment of pain in infants and children, but few have been trialed in paramedic practice. 32

<table>
<thead>
<tr>
<th>Category</th>
<th>Score</th>
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<tbody>
<tr>
<td><strong>Face</strong></td>
<td></td>
</tr>
<tr>
<td>No particular expression or smile</td>
<td>Occasional grimace or frown, withdrawn, or disinterested</td>
</tr>
<tr>
<td><strong>Legs</strong></td>
<td></td>
</tr>
<tr>
<td>Normal position or relaxed</td>
<td>Uneasy, restless, or tense</td>
</tr>
<tr>
<td><strong>Activity</strong></td>
<td></td>
</tr>
<tr>
<td>Lying quietly in a normal position and moves easily</td>
<td>Squirming, shifting back and forth, and tense</td>
</tr>
<tr>
<td><strong>Cry</strong></td>
<td></td>
</tr>
<tr>
<td>No cry (awake or asleep)</td>
<td>Moans or whimpers with the occasional complaint</td>
</tr>
<tr>
<td>Consolability</td>
<td>Content and relaxed</td>
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Wong-Baker FACES® Pain Rating Scale: This has been validated in children aged three years or older.34 (See Figure 3, below.)

EMS providers can use this scale to assist patients in visually identifying the severity of their current level of pain.

- **Instructions for Use:** Explain to the person that each face is for a person who has no pain (hurt) or some, or a lot of pain.
- Tell the person, "Face 0 doesn’t hurt at all. Face 2 hurts just a little bit. Face 4 hurts a little bit more. Face 6 hurts even more. Face 8 hurts a whole lot. Face 10 hurts as much as you can imagine, although you don’t have to be crying to have this worst pain."
- Ask the person to choose the face that best depicts the pain they are experiencing.

**EVENDOL Scale:** The recently developed and tested Evaluation Child Pain Scale, which is abbreviated form of the French for “evaluation child pain”, has demonstrated excellent validity for the assessment of pain in children aged less than seven years in the emergency department.35 The scale has not yet been validated in the prehospital setting. An evaluation of the strengths and limitations of the various pain scales has been undertaken by Jennings and colleagues, and this should be used to inform clinical practice guidelines for the assessment of pain in the prehospital setting.36

A range of pain severity assessment tools exist for older patients with cognitive impairment. Advanced dementia is a common disease in the elderly and is associated with difficulty in understanding instructions required to rate pain using the VNRS or VAS. This situation may require the use of a tool that rates behavioral cues associated with pain.

**Abbey Pain Scale:** This has been designed to assess pain in older adults with dementia who cannot verbalize their pain experience. Although not commonly used by paramedics, the scale should be in use in aged care facilities. Paramedics should ask nursing staff whether they use the tool, and if so, if they can use it to assist with the assessment of the patient’s pain.24

Behavioral cues should also be used to assess for evidence of pain in patients with impaired level of consciousness due to injury or disease. Just because a patient cannot verbalize pain does not mean they are not experiencing pain.24,37

**Evaluation of Pain**

Evaluation is the process of combining all the information gathered to form a clinical impression, which leads to a decision about how best to manage the pain. Although this looks like a systematic and objective process, the complex nature of pain and the paramedic’s personal beliefs about it may confound this process.

The assessment and measurement of pain severity produces data that is quite different from the data obtained during the measurement of weight, blood pressure or temperature. This is because it is impossible to use scientific metrics to directly measure another person’s personal experiences, in the same way that it is not possible to directly measure “depression,” “happiness,” or other aspects of mood or emotions. Indirect measures of pain (and other symptoms, such as nausea) can be made by asking the patient to rate the experience compared with normal health or mood. Although this enables an estimate of the dimension of the reported experience, and allows for observation of trends over time, confusion may occur if health professionals treat the numbers as
objective data. This is particularly true if the data is used to compare differences between individuals. It is important to remember that the use of a pain score enables a conversation between the paramedic and the patient to better understand the personal significance of the pain. It is the patient who is judging this, not the paramedic.

A perceived mismatch between the pain score that a patient reports and the paramedic’s observation of the patient may occur in some cases, particularly where there is no observable injury or disease associated with pain. For example, the patient may show little overt behavior but still be reporting severe pain. This may be a normal behavioral response for this patient and may not represent a sign of malingering or untruthful reporting of symptoms. When a patient states that they have severe pain, there is no scientific (e.g., reliable, repeatable and objective) way of disproving this report, particularly in the prehospital setting, where patient history is often limited. As a respected pain researcher and patient advocate once said, “pain is what the patient says it is.” As such, providers need to accept what the patient says. But experience has shown that paramedics and other health professionals may engage in unnecessary and unhelpful inter-patient comparisons of pain-related behavior and reported pain scores in an attempt to validate the patient’s report of pain or to believe the patient. It should be noted that a major barrier to effective analgesia in paramedic practice has been identified as “a preoccupation with potential malingering.”

The measurement of pain severity is a process of enabling a communication with the patient so that they can describe their experience by attempting to quantify their level of pain, which helps the paramedic understand their current level of distress. The resulting number (if using a numerical scale) describes the patient’s pain at that point in time. Pain is a complex phenomenon involving biological, psychological and environmental dimensions that may change over time. As such it’s important to avoid references to prior pain experiences such as childbirth to establish a benchmark for very severe pain, particularly when assessing pain associated with a later, unrelated condition.

It is also unhelpful to compare the patient with others who express similar levels of pain severity. Pain is a uniquely individual experience, and the ways that individuals express their pain is highly variable. Again, the pain score is an attempt to initiate a conversation with the patient to better understand their current level of pain. This information should then be used to guide management decisions, which may include pharmacological and non-pharmacological interventions. In rare cases the paramedic may reach a clinical decision to withhold treatment for the pain. This should only occur where a risk/benefit analysis has been completed and the patient has been informed of the basis for withholding treatment. Again, this should be a rare situation because although there are contraindications for specific analgesics, there is no contraindication to the alleviation of pain.

Research has shown that paramedics are reluctant to administer opioids to patients without significant objective signs of pain being present. However, objective diagnostic tests to confirm the presence of pain are unavailable. Although the use of functional Magnetic Resonance Imaging (fMRI) can identify areas of the cerebral cortex that are active during episodes of pain, these areas are also active in some individuals who vicariously experience the pain suffered by others. Because of this, no reliable scientific means exists for validating an individual’s level of pain. In addition, the use of fMRI in an ambulance is impractical.

Educational resources used by paramedics suggest using vital sign changes to validate the level of pain severity experienced by an individual. In some settings, it is believed that severe pain must be associated with evidence of a sympathetic nervous system-mediated stress response. Paramedics and other health professionals often believe that patients with severe pain will be tachycardic and hypertensive in response to the pain, but research has shown a poor correlation between vital sign changes and pain severity. Therefore, such vital sign changes should not be used to confirm or rule out the presence of pain.

**Conclusion**

Health professionals have a tendency to underestimate the pain observed in patients. Research has also found that the degree of underestimation increases as clinical experience increases. It is not clear whether this is due to a “recalibration” of the emotional response to pain due to repeated exposure to patients with severe pain. This may be a natural response that protects the provider from the psychological stress of dealing with others’ pain and distress, enabling objective and dispassionate care. Although the reason for the underestimation is unclear, there is ample evidence that the assessment and management of patients in pain is affected by the caretaker’s beliefs, values and attitudes.

In paramedic practice, fear of malingering can alter the evaluation of the patient’s report of pain. Paramedics have reported disbelief of the patient’s report of pain where the associated behavior is inconsistent with the paramedic’s expectations. It is important to remember that it is difficult to confirm malingering without
accurate knowledge of the patient’s prior medical history, and this fear may adversely affect the quality of care if the characterization of the patient’s motives for seeking analgesia is incorrectly attributed to behavior associated with addiction.

Paramedics play an important role in the alleviation of pain in patients they care for. The effective management of pain relies on a focused assessment of the patient’s complaint, and the measurement of pain severity using reliable and valid tools. However, the evaluation of the data may be affected by personal beliefs about pain, and paramedics must be aware of the influence that cultural norms, bias and stereotyping can have on their clinical judgments and quality of care.

Improvements in the quality of care provided to patients in pain will depend on appropriate educational interventions that target knowledge of pain physiology, pharmacology and pain assessment, as well as evidence-based guidelines to support paramedic practice.

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References
