

Pain assessment in children

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Abstract

Acute pain in children can occur following trauma and injury or secondary to medical and surgical intervention. Before acute pain can be effectively treated, it must be accurately assessed. In spite of many years of research to enhance our understanding of pain, the assessment of pain in children continues to be a challenge and is often inconsistent and suboptimal in many organizations. Pain and its perception are multi-factorial, hence an approach to pain assessment and treatment must also be multi-faceted and multidisciplinary. Painful experiences are dynamic, with huge inter- and intra-individual variation; therefore pain assessment tools must be adaptable, reproducible and accurate to accommodate such variation. This article outlines the different tools available for pain assessment in infants and children (excluding neonates).

Keywords Acute pain assessment; assessment tools; children; pain

Royal College of Anaesthetists CPD Matrix: 1D01, 1D02, 2D05, 2D02

Pain is defined as ‘an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage’ (International Association for the Study of Pain, www.iasp-pain.org). This definition was subsequently modified to encompass those who may have difficulty communicating such pain, and now includes the statement that ‘the inability to communicate in no way negates the possibility that an individual is experiencing pain and is in need of appropriate pain-relieving treatment’.

Pain is a highly complex and personal experience that has numerous influencing factors, such as previous experience of pain, culture and social support network. Hence pain is a fluctuating, dynamic experience that has both inter- and intra-individual variance. As a result, children may have trouble in understanding, expressing and communicating about their pain, and their level of emotional and cognitive development can dramatically influence this.

Pain can have both psychological and physiological adverse effects that can occur during the acute phase, with long-term consequences if not appropriately managed. The plasticity of the developing nervous system in conjunction with immature

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Learning objectives

After reading this article, you should be able to:

- recognize the importance of assessing acute pain in children
- identify the adverse effects of pain in children
- determine the most appropriate pain assessment tool to assess acute pain in an infant or child of any age and stage of development

descending modulatory pathways may predispose children with unmanaged pain to issues such as hyperalgesia and chronic pain. It is therefore of paramount importance to accurately assess and treat pain so as to minimize such potential detrimental adverse effects. It is difficult to treat a modality that is not clearly defined; therefore accurate assessment of pain is crucial to the effective treatment. The effectiveness and adverse effects of treatment must be evaluated at regular intervals, modified as required, and documented.

Assessment of pain

The accurate assessment of pain is multi-factorial and requires a systematic approach. One approach that is recommended is called QUESTT:

Question the child

Use the age and developmentally appropriate pain-rating scales

Evaluate behaviour and physiological changes

Secure parental involvement

Take the cause of pain into account

Take action and evaluate results

QUESTT initiates a structured approach to pain assessment and is self-explanatory, although a few points should be noted. In the ideal situation the child should be questioned before the painful episode occurs to establish the child’s expectations, perceptions and previous experiences of pain. This is obviously only possible in the elective scenario and only applies to children of appropriate age and development. This enables the clinician to get an idea of at what level the child thinks they will need pain medications. Furthermore it allows familiarization with specific words that they use for describing pain. The most appropriate pain assessment tool can be determined and explained to the child and parent(s), prior to the painful experience. Involving the family is of great importance, as too are having some knowledge of the child’s condition and an understanding of how stressful the whole experience can be for all those involved.

Measurement of pain

Three components of pain assessment in children are self-report, behavioural observation and physiological measures. The most reliable indicator of pain is a combination of all three, known as a multi-dimensional pain assessment.

Self-report is sometimes referred to as the gold standard of assessment as it is the only direct measure of pain.¹ Many self-report pain assessment tools are available (Table 1) and each has advantages and disadvantages. Self-report pain assessment

Characteristics of frequently used self-reporting pain assessment tools

Scale	Components	Age Range	Pros	Cons	Comments
Wong-Baker FACES	6 faces (0–5) Value 0-10	3–18 years	Easy, quick	Confusion with ‘happiness’	Requires paper scale ^a
Faces Pain Scale Revised	6 mature faces (0–5) Value 0-10	4–12 years	Easy, quick	Confusion with ‘happiness’	Requires paper scale ^a
Pieces of Hurt	5 stones or poker chips	3–8 years	Simple	Time consuming	Requires pieces ^a
Multiple-sized Poker Chip	4 poker chips increasing in size	4–6 years	Simple	Time consuming	Requires chips ^a
Numerical Analogue	Verbal scale 0–5 or 0-10	8–18 years	Easy, quick	Requires numeracy	No props required
Visual Analogue	10cm line Scale 0–5 or 0-10	8–18 years	Easy, quick, versatile	Requires proportionality	Requires pen & paper ^a
Adolescent Paediatric Pain Tool	Body map drawing & word graphic scale	8–18 years	Detailed	Time consuming	Requires pen & paper ^a

^a Adjuncts may have cost, time and infection control implications.

Table 1

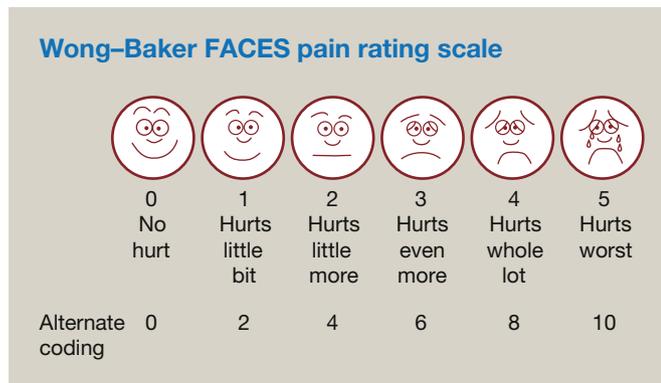


Figure 1

tools should be appropriate for the child’s age and developmental level; practical for use in the clinical setting; reproducible; reliable; valid; transferable between assessors and chosen in

collaboration with both the child and the parent/caregiver. Self-report pain assessment tools can be used in children aged 3 years and older. The self-report assessment tool and how to use it should be explained to the child in language that they can understand. If the FACES pain assessment tool is used (Figure 1) you must explain to the child what each face represents (for example, point to the smiling face and say that this is a happy face because he/she has no pain or it isn’t hurting at all). The child should then be asked to point to the face that best describes how they are feeling at that time. A similar technique can be used to explain the numerical analogue score; however, pain assessment involving numbers is more reliable in children who have an understanding of numerical order and value, which is thought to be present at around 8 years of age. Furthermore, during pain assessment the characteristics of the pain must also be sought, such as location, radiation, and alleviating and aggravating factors. It is also of value to establish what the child’s comfort and functional goals are, so that it is possible for them to perform activities of daily living.

Face, Legs, Activity, Cry, Consolability (FLACC) behavioural pain scale

Category	Score		
	0	1	2
Face	No particular expression or smile	Occasional grimace or frown, withdrawn, disinterested	Frequent to constant quivering chin, clenched jaw
Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking, or legs drawn up
Activity	Lying quietly, normal position moves easily	Squirming, shifting back and forth, tense	Arched, rigid or jerking
Cry	No cry (awake or asleep)	Moans or whimpers, occasional complaint	Crying steadily, screams or sobs, frequent complaints
Consolability	Content, relaxed	Reassured by occasional touching hugging or being talked to, distractable	Difficult to console or comfort

Note: each of the five categories is scored between 0 and 2, resulting in a total score of 0–10.

Table 2

Despite the availability of numerous self-report pain assessment tools there is some debate as to whether they can truly be classified as 'evidence-based'. However, since there are no other pain assessment tools available and because many studies^{2,3} have proven the validity, reliability and clinical utility of such tools, their use in paediatric clinical practice should be continued. One criticism of pain assessment tools is that many have not been validated in clinical practice to determine whether they are psychometrically sound. Therefore when utilizing such assessment tools, it should be remembered that all self-report pain assessment tools are highly complex and have numerous intricate psychometric properties.²

Behavioural observation pain assessment tools are available for use with preverbal or non-verbal children (e.g., PIPP, Premature Infant Pain Profile; NIPS, Neonatal/Infant Pain Scale; CHEOPS, Children's Hospital of Eastern Ontario Pain Scale). Face, Legs, Activity, Cry, Consolability (FLACC) is a commonly used observational pain score that assesses five different aspects of the child's behaviour. Each category is ranked on a three point scale (0–2), resulting in a summary score of 0–10 (Table 2).

The Non-Communicating Children's Pain Checklist-Revised (NCCPC-R) and the Paediatric Pain Profile (PPP) have been developed to aid the assessment and monitoring of pain in children with severe neurological impairment. Children that are unable to communicate their pain via speech are dependent upon their carers for the interpretation of their signs of pain. Such tools have been designed to pick up behaviours that are important indicators of pain. The PPP consists of a 20-item behaviour rating scale each rated on a 4-point scale, leading to a score out of 60. A score greater than 14 is associated with moderate-to-severe pain. The NCCPC-R scale observes the child over a 2-hour period and scores 30 behavioural traits, within seven categories, and a sub score greater than seven indicates pain. A specific postoperative version of the NCCPC-R is available.

Much information can be gained from general behavioural observation and should be a component of assessing pain in all age groups and of all neurological ability. It should include body posture, activity, facial expression, consolability and general appearance. Activity should include both the present and previous day and night activities. This information should be sought from both the child's parents and caregivers.

Since several behaviours that are associated with pain, such as grimacing and crying, are not always unique to painful experiences, other causes for these activities should be considered and excluded prior to being attributed to pain. For this reason behavioural observation is best used in conjunction with other measurements of pain (self-report and physiological parameters).

Physiological measures can aid the assessment and measurement of pain. However, like behavioural changes, they are not always specific to pain and other causes should always be considered and excluded where appropriate. Stress and pain cause an increase in activity in the sympathetic nervous system, which affects most systems within the body, especially the cardiovascular and respiratory system and produces many of the clinical signs seen (Box 1).

Adverse effects of pain

Cardiovascular system

- Tachycardia
- Systemic hypertension
- Increased cardiac output
- Increased afterload and myocardial work
- Increased myocardial oxygen demand

Respiratory system

- Tachypnoea/respiratory alkalosis
- Reduced vital capacity and lung expansion/risk of atelectasis
- Reduced alveolar ventilation/hypoxia
- Poor cough/retained secretions, risk of infection and hypoxia

Gastrointestinal system

- Reduced gastric emptying and motility
- Reduced oral intake
- Nausea and vomiting

Nervous system and psychology

Child: increased anxiety and distress

- Behavioural abnormalities, including sleep disturbances
- Eating disturbance
- Disorientation and confusion
- Ongoing pain that may lead on to chronic pain syndrome

Parent: guilt

- Frustration
- Anxiety
- Stress
- Sleep disturbance

Endocrine system

- Increased stress response and stress hormones
- Gluconeogenesis, glycogenolysis, hyperglycaemia and impaired glucose tolerance
- Negative nitrogen balance
- Increased anti-diuretic hormone -> reduced urine output and sodium & water retention
- Impaired immune response and reduced wound healing
- Hypercoagulation

Box 1

In our organization the most commonly used pain assessment tools are: FLACC for the preverbal and non-verbal children, and those under 3 years of age; revised FACES for those over 3 years of age and the numerical analogue scale for those with numeracy. Such tools are practical, quick, reliable, reproducible, and simple to perform in the clinical setting. They are used in conjunction with physiological measures by clinicians trained in their interpretation.

When using self-report, behavioural and physiological components of pain assessment, it should be possible to get an accurate assessment of pain in children of all ages and stages of growth and development. However, it is of significant importance that the appropriate assessment tools have been chosen, and adequate assessment and measurements taken by appropriately trained clinicians.⁴ This has been highlighted in The

Recognition and Assessment of Acute Pain in Children guideline produced by the Royal College of Nursing (2009).⁵

Most organizations now have dedicated paediatric acute pain teams to promote pain assessment and management. It is vital that audit and research is undertaken within each organization to better understand the challenges that clinicians face when assessing pain, and allow the necessary changes to be made to improve the assessment and management of pain in children. To achieve this it is recommended that individual organizations develop local policies and guidelines and also provide regular education for all clinicians involved in the management of acute pain in children. ◆

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