Pain Assessment in Children

Professor Alison Twycross
Head of Department for Children’s Nursing
September 2016

Learning outcomes
By the end of the session participants will:
• Be able to describe the different strategies for assessing pain in children
• Understand how to use validated pain assessment tools for children of all ages
• Discuss the current best practice guidelines relating to pain assessment in children and reflect on current practices in this context

Overview
• Why assessing and managing pain in children matters
• Strategies for assessing pain in children
• Pain assessment tools
• Current practices v best practice guidelines
• Putting what we have learnt into practice
Discussion point:
Why is it important to assess and manage pain in children effectively?
What are the consequences if we don’t?

Physiological consequences of unrelieved pain
• Pain produces a physiological stress response that includes increased heart and breathing rates to facilitate the increasing demands of oxygen and other nutrients to vital organs.
• Failure to relieve pain produces a prolonged stress state, which can result in harmful multisystem effects. (Middleton 2003)

Physical effect of unrelieved pain 1
• Rapid, shallow, splinted breathing, which can lead to hypoxaemia and alkalosis
• Inadequate expansion of lungs and poor cough, which can lead to secretion retention and atelectasis
• Increased heart rate, blood pressure and myocardial oxygen requirements, which can lead to cardiac morbidity and ischaemia
Physical effect of unrelieved pain 2
- Increased stress hormones (e.g. cortisol, adrenaline, catecholamines), which in turn increase the metabolic rate, impede healing and decrease immune function
- Slowing or stasis of gut and urinary systems, which leads to nausea, vomiting, ileus and urinary retention
- Muscle tension, spasm and fatigue, which leads to reluctance to move spontaneously and refusal to ambulate, further delaying recovery

Psychological effects of unrelieved pain
- Anxiety, fear, distress, feelings of helplessness or hopelessness
- Avoidance of activity, avoidance of future medical procedures
- Sleep disturbances
- Loss of appetite

Other effects of unrelieved pain
- Prolonged hospital stays
- Increased rates of re-admission to hospital
- Increased outpatient visits

(World Health Organization 1997; Australian and New Zealand College of Anaesthetists 2015)
Acute pain becoming chronic pain

- The incidence of chronic postsurgical pain is between 15-30% of (adult) patients (Gupta et al. 2011).
- 13% of children undergoing orthopaedic surgery developed chronic post-operative pain (Fortier et al. 2011).
- The prevalence of chronic pain after inguinal hernia repair in children was 5.1% (Kristensen et al. 2012).

The stages of pain management

1. Assess child's pain
2. Select appropriate pain-relieving interventions
3. Implement pain-relieving interventions
4. Evaluate the effectiveness of interventions
The stages of pain management (Twycross and Williams 2014)

- Assess child’s pain
- Evaluate the effectiveness of interventions
- Select appropriate pain-relieving interventions
- Implement pain-relieving interventions
- Evaluate the effectiveness of interventions

What strategies can be used to ascertain whether a child is in pain?

Methods of assessing pain in children
The three approaches to measuring pain are:
- self-report (what the child says)
- behavioural (how the child behaves)
- physiological indicators (how the child’s body reacts)

(Stinson 2009)
Using behavioural cues to assess children’s pain

Behavioural pain assessment tools
Should be used:
• With infants, toddlers, preverbal, cognitively impaired and sedated children (von Baeyer and Spagrud 2007).
• If the child is overtly distressed no meaningful self-report can be obtained at that point in time (Stinson 2009).

What behavioural cues can be used to ascertain whether a child is in pain?
Behavioural indicators of pain

- Increased clinging
- Unusual quietness
- Loss of appetite
- Restlessness
- Whimpering
- Sobbing
- Lying “scared stiff”
- Lethargic

Individuals differ in how they express pain, so it is important to ascertain what a child’s normal behaviour is. Children’s self-reports of pain do not always correlate strongly with their behaviour [31; 43; 62].

An assessment is based solely on behavioural observations will only provide an estimate of how much pain the child is experiencing.

What physiological cues can be used to ascertain whether a child is in pain?
**Physiological indicators of pain** (Sweet and McGrath 1998)

<table>
<thead>
<tr>
<th>Observation</th>
<th>Change in observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart rate</td>
<td>Increases when in pain (after an initial decrease)</td>
</tr>
<tr>
<td>Respiratory rate</td>
<td>There is conflicting evidence about whether there is an increase or decrease – but there is a significant shift from baseline</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>Increases when a child is in acute pain</td>
</tr>
<tr>
<td>Oxygen saturation</td>
<td>Decreases when a child is in acute pain</td>
</tr>
</tbody>
</table>

Other physiological indicators include sweating and dilated pupils.

**Pain assessment: physiological signs**

- On their own, physiological indicators do not constitute a valid clinical pain measure for children.
- A multidimensional tool that incorporates physiological and behavioural indicators, as well as self-report is, therefore, preferred whenever possible.

(von Baeyer and Spagrud 2007)
Self-report tools
Should be used with children who are:
• old enough to understand and use self-report scale
• not overtly distressed

(Stinson et al. 2006)

What pain assessment tools have you used in practice?

Assessing pain in neonates
The Premature Infant Pain Profile (PIPP) (Stevens et al. 1996)

**Indicators**
- Gestational age
- Behavioural state
- Oxygen saturation
- Brow bulge
- Eye squeezed (open or shut)
- Nasolabial furrow
- Nature of pain assessed
- Procedural
- Post-operative

**Advantages**
- Can be used with premature and term neonates
- Each indicator evaluated on a 4-point scale
- Validity of tools has been tested
- Takes gestational age into account (28-40 weeks)
- Scores may vary in relation to gestational age
- 7 pain measures
- Oxygen saturation may be affected by other factors

**Disadvantages**
- 7 pain measures
- Oxygen saturation may be affected by other factors
- Can be used with premature and term neonates
- Each indicator evaluated on a 4-point scale
- Validity of tools has been tested
- Takes gestational age into account (28-40 weeks)
- Scores may vary in relation to gestational age
- 7 pain measures
- Oxygen saturation may be affected by other factors


PIPP: 13 years on (Stevens et al. 2010a)

- Looked at 62 studies
- PIPP is a reliable and valid measure of acute pain in infants
- More work needed to look at clinical utility

Cautionary note

When neonates experience pain over a prolonged period they enter a state of passivity with:
- Few (if any) body movements
- An expressionless face
- Decreased heart rate
- Respiratory variation
- Decreased oxygen requirement

(Craig and Grunau 1993)
Assessing pain in pre-verbal children

### FLACC (original)  
(Merkel et al. 1997)

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

### CHEOPS (Children’s Hospital of Eastern Ontario Pain Scale)  
(McGrath et al. 1985)

- Crying, facial expression, verbalisations, torso activity, whether and how child touches wound, leg position
- Intended for use in children aged 1-7 years but has been used in children 4 months to 17 years
- Procedural and post-operative pain
- Indicators scored on a four-point scale (0, 1, 2, 3)
- Total score 4 - 13
CHEOPS (continued)

- Well established evidence of reliability, validity and ability to detect change (von Baeyer & Spagrud, 2007)
- Length of tool and confusing scoring system makes it complicated to use in everyday clinical practice (low/medium clinical utility)
- Cannot be used in intubated or paralysed patients

Assessing pain in verbal children
The Faces Pain Scale - Revised (Hicks et al. 2001)

The Faces Pain Scale (Wong and Baker 1989)

Using a faces pain scale (Hockenberry et al. 2005)

Explain to the child that each face is for a person who feels happy because he has no pain (hurt) or sad because he has some or a lot of pain.

Ask the child to choose the face that best describes how he/she is feeling.

- Face 0: is very happy because they don't hurt at all.
- Face 1: hurts just a little bit.
- Face 2: hurts a little more.
- Face 3: hurts even more.
- Face 4: hurts a whole lot more.
- Face 5: hurts as much as you can imagine, although you do not have to be crying to feel this bad.
Using faces pain scales with younger children

- Children aged 3-4 years may not always be able to use the standard faces pain scales (von Baeyer et al. 2013).
- There is no one test that can be used to screen children for their ability to use self-report pain scales (Besenik et al. 2007; von Baeyer et al. 2011).
- This needs to be considered when deciding on the best strategy for assessing pain in children of this age.

Assessing pain in children with cognitive impairment

Numerical scale

![Numerical Pain Scale](http://www.intelihealth.com/i/N/NumericalPainScale.gif)
Revised-FLACC (r-FLACC)

5 categories scored from 0-2, which results in a total score between 0 and 10:
• (F) Face
• (L) Legs
• (A) Activity
• (C) Cry
• (C) Consolability

Can be used for all non-verbal children

Clinical utility of r-FLACC more highly rated than other tools for children with neurologically impaired children (Voepel-Lewis et al. 2008).

The additional descriptors (in bold) are descriptors validated in children with cognitive impairment.

The nurse can review descriptors with the parents:
• Ask them if there are additional behaviors that are better indicators of pain in their child
• Add these behaviors to the tool in the appropriate category.

Revised-FLACC (r-FLACC)

Patients who are awake:
Observe for at least 1-2 minutes.
Observe legs and body uncovered.
If possible reposition the patient.
Touch the body and assess for tenseness and tone.

Patients who are asleep:
Observe for at least 2 minutes or longer.
Observe body and legs uncovered.
If possible reposition the patient.
Reposition patient or observe activity, assess body for tenseness and tone.

Become what you want to be
Clinical utility of scales

<table>
<thead>
<tr>
<th>Tool</th>
<th>Utility</th>
</tr>
</thead>
<tbody>
<tr>
<td>rFLACC</td>
<td>Demonstrated feasibility for use in the acute care setting related to ease of use, etc. (Crosta et al. 2014).</td>
</tr>
<tr>
<td>NCCPC-R</td>
<td>Clinicians indicated NCCPC-R was too complex and long compared with other tools for use with this group of children (Hasek-Lavea et al. 2008).</td>
</tr>
<tr>
<td>Paediatric Pain Profile (PPP)</td>
<td>Use in the acute clinical setting limited by the length of time taken to complete the assessment and the teaching required prior to using it (Hunt and Franck 2011; Chen-Lim et al. 2012). Parents perceived it as more accurate even though difficult to use in the clinical setting (Chen-Lim et al. 2012).</td>
</tr>
</tbody>
</table>

Children with cognitive impairment

Experience more pain than previously thought and often daily

Pain due to:
- Underlying condition
- Higher rates of medical procedures
- Physiotherapy
- Communication difficulties

At increased risk of under-treated pain.

Pain behaviours in children with cognitive impairment

- Facial expression
- Vocalizations (e.g. moaning)
- Changes in postures and movements
- Physiological changes (i.e. sweating, pallor or flushing)
- Alterations in sleep and eating
- Change in mood and sociability

(McGrath et al. 1998; Fanurik et al. 1999)
Algorithm of pain assessment tools (RCN 2009)


What do current best practice guidelines tell us we should be doing in relation to assessing pain in children?


• Ask the child about their pain using a developmentally appropriate self-report pain tool (if possible)
• Involve the parents/caregivers
• Take the child’s behavioural cues into account
• Note any physiological cues that may indicate that the child is in pain
• Reassess pain following the implementation of pain-relieving interventions
• Document pain assessments
How do current practices compare to clinical guidelines?

<table>
<thead>
<tr>
<th>Study</th>
<th>Frequency of pain assessment</th>
<th>Reassessment of pain</th>
<th>Amount of pain children experienced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chart audit in Canadian Children’s Hospitals (Stevens et al. 2012)</td>
<td>69% of children - pain assessment documented. 29% of pain assessments with a pain tool only. 26% with narrative only. 13% with both.</td>
<td>Over half the children had more than one pain assessment recorded.</td>
<td>Mean pain intensity score was 2.8/10 but 33% of the children had moderate (4–6/10) or severe (7–10/10) pain intensity recorded.</td>
</tr>
<tr>
<td>Snapshot of care in an English hospital (Twycross and Cullis 2013)</td>
<td>Pain assessment tools sometimes used. Pain assessment tool was not always developmentally appropriate.</td>
<td>Reassessment of pain not always carried out.</td>
<td>82% of children indicated they had had moderate to severe pain while in hospital.</td>
</tr>
<tr>
<td>Audit of all children (n=265) in a Canadian tertiary children’s hospital on one day (Zhu et al. 2012)</td>
<td>63% of children had a documented pain assessment.</td>
<td>30% had 1 or 2 assessments recorded - reassessment did not always happen.</td>
<td>31.5% of children had moderate to severe pain in previous 24 hrs.</td>
</tr>
<tr>
<td>Observational study in a Canadian tertiary children’s hospital (Twycross et al. 2013)</td>
<td>Pain scores not recorded consistently. Regularly decreased with time since surgery.</td>
<td>An evaluation of effectiveness (reassessment) took place 15 (12%) times.</td>
<td>No information collected.</td>
</tr>
</tbody>
</table>
Any questions?

Scenario 1 – Alfie

• Alfie is 9 months old and has had surgery two days ago to repair a cleft palate. He is playing in his cot but is reluctant to drink.

• Which pain assessment tool(s) would you use to assess his pain and why?

Scenario 2 - Julie

Julie is an 8 year old girl who had an appendectomy yesterday. She has not had any analgesic drugs for 6 hours and is lying rigid in the bed.

• How much pain do you think Julie is in?

• What tools would you use to assess Julie’s pain?
Scenario 3 - Winston

- Winston is 5 years old and has just started school. He is able to communicate verbally as long as things are explained to him in a way he can understand. Winston can’t yet count to 10. He has come to the ED with abdominal pain.

- Which pain assessment tool(s) would you use to assess his pain and why?