Managing post-operative pain in children

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Overview

- Why managing pain in children matters
  - Misconceptions
  - Consequences of poor pain management
- How well do nurses manage pain in children?
- Assessing pain in children
  - RCN guidelines
  - Pain assessment tools
- Pain-relieving interventions
  - Analgesic drugs
  - Non-drug methods

Misconception 1

- Infants do not feel as much pain as adults

- Pain pathways (although immature) are present at birth and pain impulses are able to travel to and from the pain centres in the brain (Wolf 1999; Coskun and Anand 2000; Fitzgerald 2000).

- Neonates exhibit behavioural, physiological and hormonal responses to pain (Franck 1986; Hogan and Choonara 1996; Carter 1997; Abu-Saad et al. 1998; Stevens 1999).

Misconception 2

- Infants cannot feel pain because of an immature nervous system

- Complete myelination is not necessary for pain to be felt (Volpe 1981).
- Painful stimuli are transmitted by both myelinated and unmyelinated fibres (Volpe 1981; Craig and Grunau 1993).
- Incomplete myelination implies only a slower conduction speed in the nerves, which is offset by the shorter distances the impulse has to travel (Volpe 1981; Anand and Hickey 1987).
- Noxious stimuli have been shown to produce a cortical pain response in preterm babies (Bartocci et al. 2006; Slater et al. 2006).

Misconception 3

- Young children cannot indicate where pain is located

- Children as young as 4 years old can demonstrate on a body chart where they hurt without knowing the names of body parts (Van Cleve and Savedra 1993).

- Children are able to report the intensity of pain by the age of 3-4 years (Harbeck and Peterson 1992).

Misconception 4

- Active children are not in pain
- A child engaged in playing activities cannot be in pain

- Increased activity is often a sign of pain (Eland 1985).
- Children are particularly gifted in the use of distraction and use play as a diversion and as a coping mechanism (Eland 1985; McCaffery and Beebe 1989).

Misconception 5

- Sleeping children cannot be in pain
- Sleep may be the result of exhaustion because of persistent pain (Hawley 1984).

Physical effects of unrelieved pain

- 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.
- Increased stress hormones (e.g. cortiosol, 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

- Behavioural disturbances – fear, anxiety, distress, sleep disturbance, reduced coping, developmental regression.

(Twycross 2009)

Consequences of poor pain management

- Boys, circumcised without anaesthesia as neonates, reacted significantly more intensely to vaccinations than uncircumcised boys ($p>0.001$) (Taddio et al. 1997).
- Very low birth weight children rated medical pain intensity significantly higher ($p<0.004$) than psychosocial pain; their early experiences appear to have affected their later perceptions of pain (Grunau et al. 1998).
- In children hospitalized for an acute burn there was a significant association between the dose of morphine received while in the hospital and a 6-month reduction in PTSD symptoms (Saxe et al. 2001).
- Babies of diabetic mothers demonstrated significantly greater pain behaviours at venepuncture for newborn blood screening ($p=0.04$) (Taddio et al. 2002).

Children's views

- Children felt that nurses needed to take a more active role in pain management and needed to communicate with children about their pain (Alex and Ritchie 1992).
- In Doorbar and McCleary's (1999) study children indicated that:
  - pain was poorly managed in hospital
  - healthcare professionals needed to listen to what children were saying about their pain.
  - nurses needed to communicate with children about their pain and felt that better explanations about what to expect were needed.
  - it was sometimes difficult to convince others that they were in pain.
- Children wished the nurses had given them more/stronger analgesic drugs, as soon as they asked for them, and would like nurses to ask them about their pain on an hourly basis (Polkki et al. 2003).

Nurses' pain assessment practices

- Nurses do not consistently assess pain; pain management not based on systematic assessment (Jacob and Puntillo 1999).
- Rather than asking the child how much pain they were in, nurses managed pain using a set of behavioural milestones (Byrne et al. 2001).
- Nurses did not routinely assess pain; when pain scores were recorded this was usually the nurse's perception (Twycross 2007).

Nurses' pain management practices

- Pain medications given.
- Pain scores recorded occasionally; often no correlation between this and interventions used.
- Limited use of non-drug methods.
- Limited communication between nurses and child/ parent about pain.
- Evaluation of effectiveness of interventions rarely carried out.
- Limited documentation about pain.

(Twycross 2007; Twycross & Collis 2011; Twycross et al. 2011)

Pain assessment: 3 steps

1. Record a pain history
2. Assess the child's pain
   (using a developmentally appropriate tool)
3. Reassess the pain
   (having given time of pain-relieving interventions to work)

(Stinson 2009)

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)

Self-report tools

Are considered the *gold standard* and should be used with children who are:

- old enough to understand and use self-report scale (for example, 3 years of age and older)
- not overtly distressed

(Stinson et al. 2006)

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).
- The child's pain can be estimated using a behavioural pain assessment tools until the child is less distressed (Stinson 2009).

Behavioural indicators of pain

- Changed behaviour
- Irritability
- Flat effect
- Unusual posture
- Screaming
- Reluctance to move
- Aggressiveness
- Disturbed sleep pattern
- Increased clinging
- Unusual quietness
- Loss of appetite
- Restlessness
- Whimpering
- Sobbing
- Lying "scared stiff"
- Lethargic

Physiological indicators of pain

(Sweet and McGrath 1998)

OBSERVATION	CHANGE IN OBSERVATION
Heart rate	Increases when in pain (after an initial decrease)
Respiratory rate	There is conflicting evidence about whether this increases or decreases, but there is a significant shift from baseline
Blood pressure	Increases when a child is in acute pain
Oxygen saturation	Decreases when a child is in acute pain

Other physiological indicators of pain include sweating and dilated pupils.

Pain assessment using 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)

Pain assessment tools

The revised FLACC

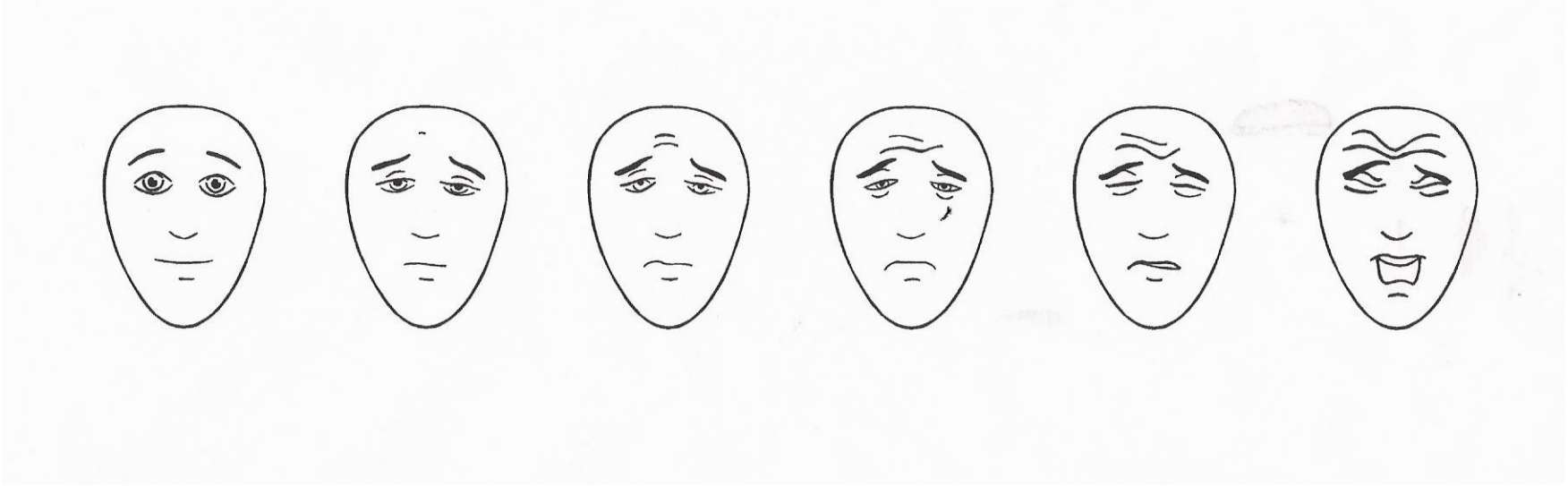
THE *revised* FLACC SCALE		
FACE		
0	**1**	**2**
No particular expression or smile **Individual behaviour:**	Occasional Grimace or frown, withdrawn, disinterested *Appears sad or worried* **Individual behaviour:**	Frequent to constant frown, clenched jaw, quivering chin *Distressed- looking face; expression of fright or panic* **Individual behaviour:**
LEGS		
0	**1**	**2**
Normal position or relaxed *Usual tone & motion to limbs* **Individual behaviour:**	Uneasy, restless, tense *Occasional tremors* **Individual behaviour:**	Kicking or legs drawn up *Marked increase in spasticity, constant tremors or jerking* **Individual behaviour:**
ACTIVITY		
0	**1**	**2**
Lying quietly, normal position, moves easily *Regular, rhythmic respirations* **Individual behaviour:**	Squirming, shifting back & forth, tense *Tense or guarded movements; mildly agitated (e.g. head back and forth, aggression); shallow, splinting respirations, intermittent sighs* **Individual behaviour:**	Arched, rigid or jerking *Severe agitation; head banging; shivering (not rigors); breath holding, gasping or sharp intake of breaths, severe splinting* **Individual behaviour:**
CRY		
0	**1**	**2**
No cry, awake or asleep **Individual behaviour:**	Moans or whimpers, occasional complaint *Occasional verbal outburst or grunt* **Individual behaviour:**	Crying steadily, screams or sobs, frequent complaints *Repeated outbursts, constant grunting* **Individual behaviour:**
CONSOLABILITY		
0	**1**	**2**
Content relaxed **Individual behaviour:**	Reassured by occasional touching, hugging or "talking to", distractable **Individual behaviour:**	Difficult to console or comfort *Pushing away care giver, resisting care or comfort measures* **Individual behaviour:**

Interpreting the Score Total ?/10			
0	**1-3**	**4-6**	**7-10**
Relaxed and comfortable	**Mild discomfort**	**Moderate discomfort**	**Severe pain or discomfort or both**

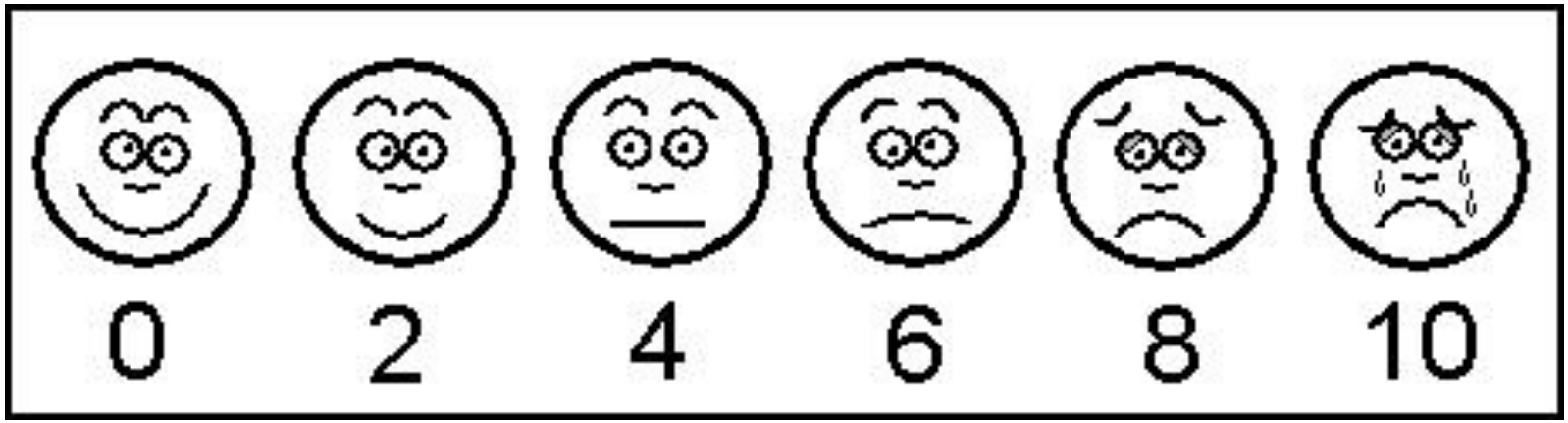
The *revised* FLACC observational pain tool: improved reliability and validity for pain assessment in children with cognitive impairment. Pediatric Anaesthesia 2006 16: 258-265

Princess Margaret Hospital for Children, Pain Services. September 2007.

The faces pain scale
(Hicks et al 2001)

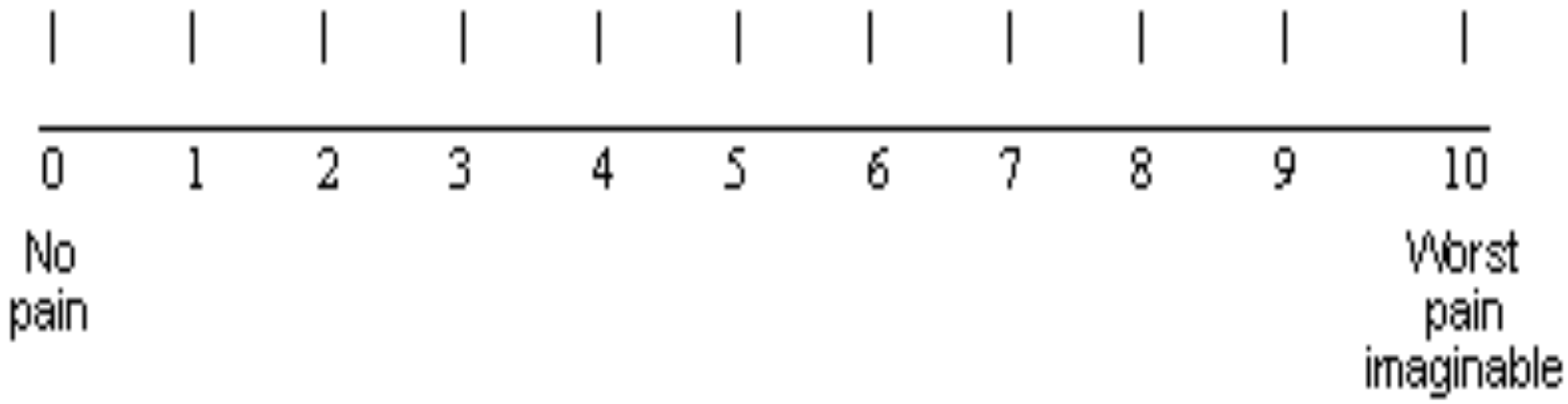


The faces scale
(Wong and Baker 1989)



From: http://www.healthyroadsmedia.org/images/pain.JPG

Numerical scale



http://patientsafety.uchc.edu/images/image_painscale.gif

Analgesic drugs

Analgesic Drugs

- Paracetamol - mild pain
- NSAIDs for mild to moderate pain e.g. ibuprofen; diclofenac
- Weak opioids for moderate to severe pain – e.g. codeine
- Strong opioids for severe pain – e.g. morphine sulphate; diamorphine; fentanyl

Multi-modal analgesia

- Where several different types of analgesic drugs with different mechanisms of action are used in combination to optimise the analgesic effect, which:
  - allows for lower drug doses, thus minimises the adverse effects of analgesics
  - gives more balanced analgesia
  - allows analgesia to be individualised to the patient or patient group
  - targets pain at different points of pain pathway

(Duedal and Hansen 2007; Pyati and Gan 2007)

Reye's Syndrome

- Use of aspirin in children with viral illnesses is associated with an increased risk of developing Reye's Syndrome (acute encephalopathy with liver damage), although the degree of causality is questioned.

- Thus it is not recommended that aspirin be used in children under 16 years in the UK.

(Dowden 2009)

Codeine

- Up to 47% of children under 12 years lack the enzyme to convert codeine to morphine, thus receiving little or no analgesic effect (Williams et al. 2002).

Pethidine

- Should avoid using pethidine (demerol) in children due to the incidence of adverse effects

(Dowden 2009)

Addiction

Psychological dependence on drugs with drug seeking and drug using behaviour that is characterised by cravings, compulsion, loss of control and lack of concern for social or health consequences (ANZCA 2005).

Drug delivery methods

Intravenous infusion

- Some children will have a continuous infusion of an opioid following surgery
- Hourly observations should be recorded of:
  - pulse, respiratory rate, volume delivered, oxygen saturation, pain score, sedation score, nausea and vomiting
- Within prescribed guidelines the infusion rate can be adjusted to maintain the child in a pain free state and minimise side effects
- This is best accomplished by the prescription being written as a sliding scale

Epidural analgesia

- Used in children of all ages to manage pain following major surgery to the chest, abdomen or lower limbs (Dowden 2009b).

- Most commonly given via a continuous infusion but can also be given via intermittent bolus or via patient controlled epidural anaesthesia (ANZCA 2005).

Epidurals – Hourly observations

- Pain intensity
- Pulse
- Respiratory rate and oxygen saturation
- Temperature
- Blood Pressure
- Level of block
- Sensation
- Motor movement
- Site of epidural
- Sedation
- Side effects of drugs
- Volume infused used
- Patency of IV cannula

Patient Controlled Analgesia (PCA)

- PCA is used for the management of moderate to severe pain in children over five years. In some instances children as young as four years can manage PCA, but this is uncommon (McDonald and Cooper 2001)

To use PCA the child must:

- have the cognitive ability to associate pressing the PCA button with receiving pain relief
- be physically able and willing to press the button to control their pain

PCA: Hourly observations

- Pulse
- Respiratory rate
- Volume infused
- Oxygen saturation
- Pain score
- Sedation score
- Incidents of nausea and vomiting
- Number of *hits*
- Number of good *hits*

Nurse Controlled Analgesia (NCA)

- Used in children unable to use a PCA
- An opioid infusion with the ability to administer controlled boluses of the drug at times of increased pain
- Nurses should consult the child and their parents about the need for extra analgesia but it is the responsibility of the nurse to *press the button* (administer the drug)
- The same hourly observations are carried out as when using PCA

Non-drug methods

Distraction

- Distraction appears to be useful tool for reducing children's pain (e.g. Tanabe et al. 2002; Patel et al. 2006; Sinha et al. 2006; Bellini et al. 2007)
- However, many of the studies use small samples and there are inconsistent results
- A recent Cochrane review of both cognitive-behavioural and cognitive interventions for the management of needle-related pain found *distraction* to be particularly effective (Uman et al. 2006).

Relaxation

- Relaxation has been identified as an effective coping strategy for procedural, chronic or on-going pain (Holden et al. 1999; Powers 1999; Larsson et al. 2005)

- A Cochrane review about the use of psychological treatments for chronic pain in children found relaxation was effective in reducing the severity and frequency of chronic headaches in children and adolescents (18 studies) (Eccleston et al. 2006).

Relaxation

- For the young child relaxation may simply consist of holding the child in a comfortable well-supported position or rocking in a wide rhythmical arc in a rocking chair

- With older children relaxation will involve teaching the children to engage in progressive relaxation of the muscle groups

(Chen et al. 2000)

Other non-drug method of pain-relief

Include:

- Guided imagery (hypnosis)
- Positioning
- Sucrose solution

See Twycross (2009) for additional information

Parents and pain management

Parents and pain management

- Parents are able to identify their children's pain behaviours
- Parents may believe that the nurse would know if their child were in pain and leave pain management to them
- Parents, who had not seen their children in pain before, have reported difficulties knowing how to interpret their child's behaviour

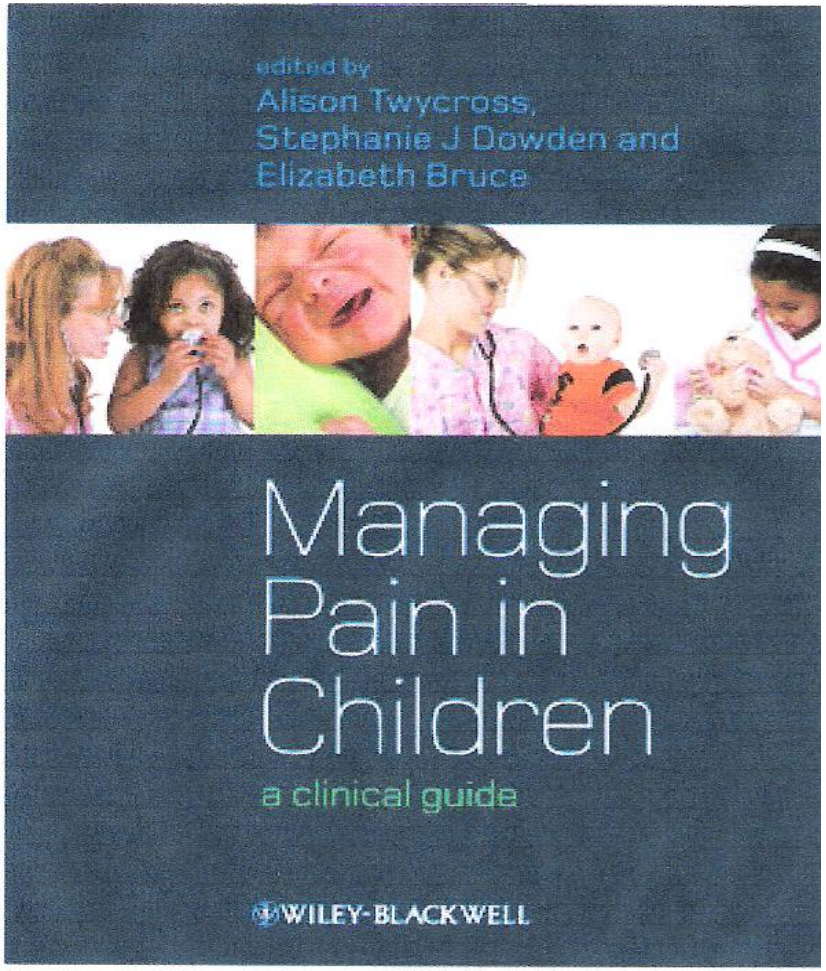
continued …….

Parents and pain management

- Children describe parental presence as being an excellent distracter from *things which hurt*
- When parents are taught how to distract their child during a painful procedure children experience less anxiety and pain
- Parents need to be prepared for their role in their child's pain management

(Greenberg et al. 1999; Manimala et al. 2000; Kleiber et al. 2001; Polkki et al. 2003)

Any questions?



- Twycross, A., Dowden, S.J. and Bruce, L. (eds.) (2009) *Pain Management in Children: A Clinical Manual*, Oxford, Wiley-Blackwell.

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