

Care of Burns in Scotland

National Managed Clinical Network

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Paediatric guideline: Management of pain in burn injury

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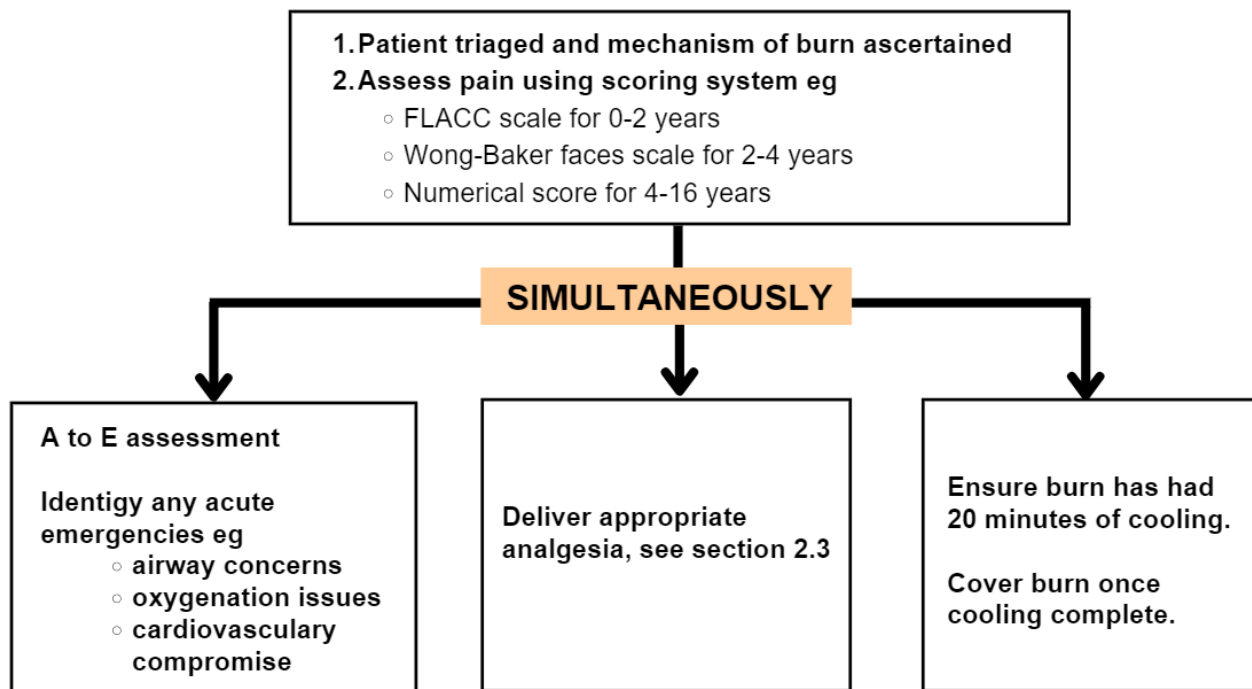
NOTE

This guideline is not intended to be construed or to serve as a standard of care. Standards of care are determined based on all clinical data available for an individual case and are subject to change as scientific knowledge and technology advance and patterns of care evolve. Adherence to guideline recommendations will not ensure a successful outcome in every case, nor should they be construed as including all proper methods of care or excluding other acceptable methods of care aimed at the same results. The ultimate judgement must be made by the appropriate healthcare professional(s) responsible for clinical decisions regarding a particular clinical procedure or treatment plan. This judgement should only be arrived at following discussion of the options with the patient, covering the diagnostic and treatment choices available. It is advised, however, that significant departures from the national guideline or any local guidelines derived from it should be fully documented in the patient's case notes at the time the relevant decision is taken.

Contents

1. Flow chart for pain management.....	3
2. Presentation in minor injury or emergency department	3
2.1. Assessment	4
2.2. Management with non-pharmaceutical techniques.....	4
2.2.1. Cooling	5
2.2.2. Covering.....	5
2.3. Acute management of pain in ED	5
2.3.1. Pain ladder	5
2.3.2. Intra-nasal treatments	6
2.3.3. Considerations for very young babies	6
3. Movement of patient.....	7
3.1 Going home with a minor burn.....	7
3.2 Being admitted to site	7
3.3 Transfer to a regional burn unit.....	7
4. Procedural/ interventions.....	8
4.1. Pharmacological techniques	8
4.2. Non-pharmacological techniques	9
5. Day-to-day management	10
5.1. Pain score $\leq 3/10$	10
5.2. Pain score $> 3/10$:.....	11
6. Long-term or chronic pain management	12
6.1 Chronic pain after Burn Injuries	12
7. Management of pruritus in burned children	13
8. Resources/ references	14
9. Appendix	15
9.1. FLACC scale.....	15
9.2. Wong-Baker pain scale.....	16
9.3. Numerical score.....	16

1. Flow chart for pain management



2. Presentation in minor injury or emergency department

Burns in children are an extremely common presentation to emergency departments and minor injury units. The majority of paediatric burns occur secondary to scalds, followed by contact and then flame.

Initial assessment, history-taking and management should start simultaneously. When taking the history, it is essential to understand the mechanism of the burn as this will guide initial management.

The child will be easier to assess and manage once their pain is under control. Therefore, initial analgesia and first aid cooling and covering should be commenced as soon as possible. Early consideration of the best location to manage the patient, will allow for efficient first aid intervention. Factors to consider include whether the patient requires resuscitation and what cooling facilities are available, such as showers, baths and sinks.

Non-accidental injury should always be considered as part of the full assessment of burns in children. Where there are concerns, early discussion with the local safeguarding team is recommended- refer to the COBIS Guideline on Non-accidental Burns and Scalds in Children (search for 'non-accidental' on cobis.scot.nhs.uk).

2.1. Assessment

Early assessment of distress vs pain when children present with burns can be challenging. The usual guidance applies with age-appropriate assessment and re-assessment of pain. Remember that pain is the 5th vital sign and is present on the bottom of the PEWS chart. All scoring systems should be used as a guide; the parent will be one of the best monitors of their child's level of pain and distress.

Pain from burn injuries can be broken down into background pain, breakthrough pain, and procedural pain – it is important to differentiate which the child is experiencing (or is anticipated to experience) and treat accordingly to minimise distress.

The following scoring systems are recommended for the various age groups (see appendix):

- **FLACC system** for 0 – 2 years of age or non-verbal children
- **Wong-Baker FACES scale** for 2 – 4 years of age
- **Numerical score** or a **self-rating scale** (mild/moderate/severe) for 4 – 16 years of age.

Pain should be reassessed whenever observations are recorded, and proactive offering of analgesia should take place.

2.2. Management with non-pharmaceutical techniques

Pain is often identified as the most feared and distressing component of burn care for children and their families. At all points of the patient journey the use of non-pharmacological techniques should be considered in conjunction with pharmacology. Families, play therapists, nursing staff, and other team members play key roles in reducing anxiety by suitable preparation. The personality, previous experience, and analgesic preferences of the child will influence management strategies.

Age-appropriate techniques should be used in all children with pain. These include:

- Parental presence and comforting touch when possible
- Engaging infant/child/young person with distraction therapy (e.g., video, music, toys, blowing bubbles, storytelling, counting)
- For infants- swaddling, feeding, skin to skin care and dummy use
- Breathing techniques

2.2.1. Cooling

Cool the burn. Hold the burned area under cool (not cold) running water or apply a cool, wet compress until the pain eases. Do not use ice. The area of tissue damage should be cooled with cool running water for 20 minutes.

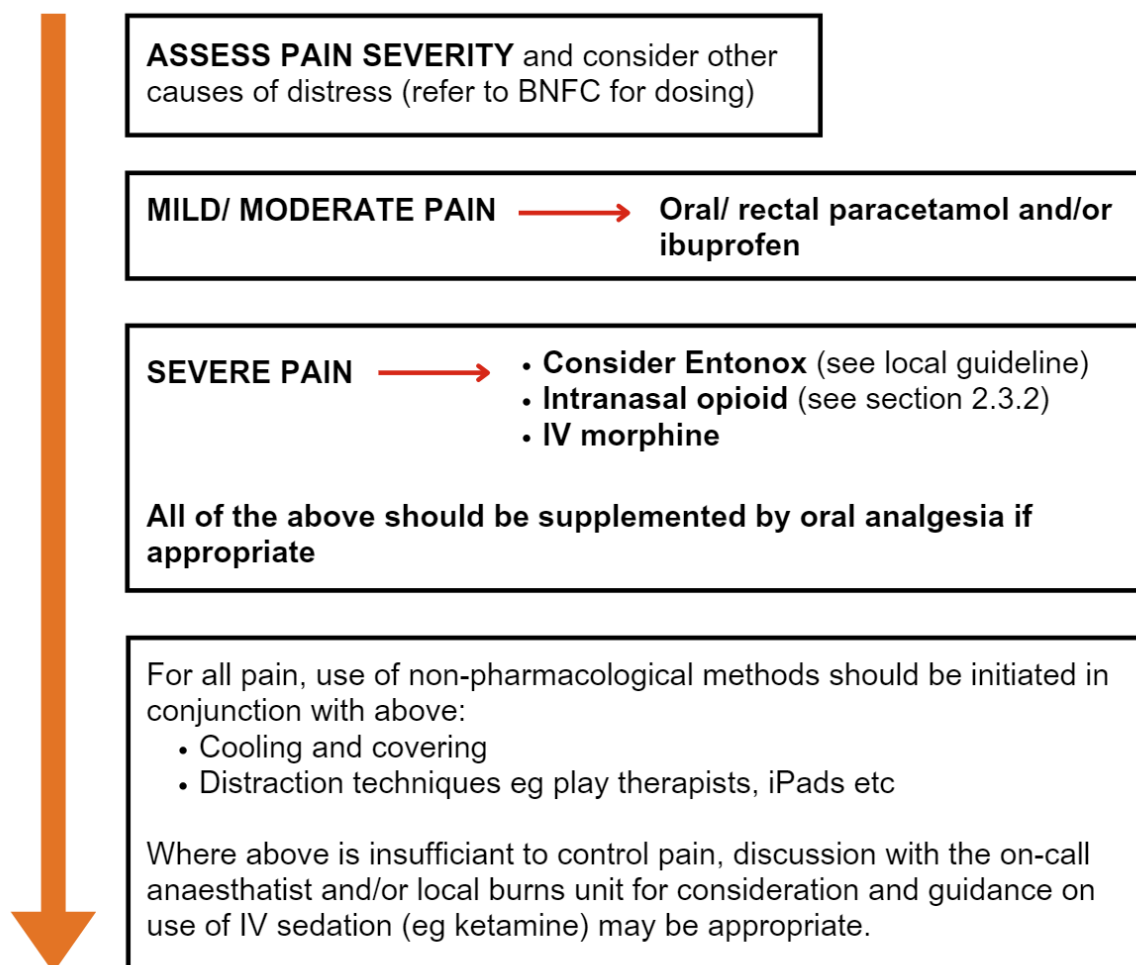
2.2.2. Covering

Cover the burn with plastic cling film lengthways along the burn. Do not wrap circumferentially.

2.3. Acute management of pain in ED

In the emergency department, assessing pain is part of the initial management of burns. Pain can be severe, and it is essential to administer appropriate analgesia within 20 minutes of arrival to the ED. Pain can be multifactorial in children and is heightened by distressing environments and fear. A multi-faceted approach to pain management is therefore recommended, including use of distraction techniques in conjunction with pharmacological interventions.

2.3.1. Pain ladder



2.3.2. Intra-nasal treatments

To be included as part of the first-line treatment of severe pain in a child (without IV access).

Intra-nasal FENTANYL

Dose = 1.5 micrograms/kg (repeat after 30mins if needed).

Preparation: If no local protocol is available, refer to NHS Greater Glasgow & Clyde guidance¹.

Or intra-nasal Diamorphine

Dose = 0.1mg/kg (repeat after 15mins if needed).

Preparation: Dilution with water is required, based on weight. Refer to local guidelines if this is what is available for intra-nasal use, particularly where an atomiser is not available for delivery of drug. If no local protocol is available, refer to NHS Greater Glasgow & Clyde guidance¹.

Both fentanyl and diamorphine should be given via an atomiser, but diamorphine can be administered without an atomiser.

2.3.3. Considerations for very young babies

Neonates can be difficult to assess from a pain perspective, coupled with concerns about apnoea if opioid-based analgesia is considered. However, there remain good non-pharmacological options for pain relief in this age group.

Opioid-based analgesia is not routinely used for unintubated babies below the post-conceptual age of 60 weeks due to risk of apnoeic episodes. Paracetamol and non-pharmacological options remain the core form of pain relief for this age group with burns injuries:

- Administration of oral sucrose² (effective within age group 0-18 months) can be useful for reducing pain and distress temporarily in babies during dressing changes or anticipated painful examinations, as can the act of non-nutritive sucking or breastfeeding.
- Keep the neonate with the parent and minimise separation where possible.
- Encouraging swaddling and kangaroo care to promote the release of endogenous opioids, therefore providing relief and calming the baby.

If a neonate is thought to be experiencing sufficient pain to require treatment with opioid-based medications, they should be cared for in a high-dependency area or a setting with apnoea monitoring during this period, including staff members trained in neonatal resuscitation. Bolus doses of morphine should be reduced to 25-50 micrograms/kg. The key risks are apnoea and airway obstruction.

3. Movement of patient

Continued management of pain in the paediatric burn patient should run parallel to therapeutic management of the child's burn injury.

3.1 Going home with a minor burn

Children with minor burns (superficial dermal <3%TBSA) will usually have mild-moderate pain that can be managed in the community. Simple, regular analgesia (i.e. paracetamol, ibuprofen) should suffice, along with non-pharmacological measures for relief as in section 2.2. All children with minor burns should be discharged with safety-netting advice & links to the COBIS patient information leaflet 'Looking after your burn injury'³ for ongoing care.

3.2 Being admitted to site

Children with burns requiring admission may experience moderate or severe pain. Pain scores should be assessed and documented regularly as part of the PEWS chart.

Regular, simple analgesia should be prescribed and continuously reviewed. Stronger analgesic agents may be administered as required if simple analgesia does not suffice. Oral options may be tried first, and where these are deemed insufficient IV options exist i.e. nurse controlled analgesia (NCA) or patient controlled analgesia (PCA). Adjuncts may be used after consultation with local pain management services.

Where these children require dressing changes as an inpatient, additional procedural analgesia may be administered as per guidance in Section 4 of this guideline.

Children with severe burns (>10% TBSA) may require intubation and ventilation, if their pain and distress is unmanageable with non-anaesthetic dosing of analgesic agents where there is concern re: cardiorespiratory compromise.

3.3 Transfer to a regional burn unit

In Scotland there are four regional burn units: Glasgow, Edinburgh, Dundee and Aberdeen. Pain management and burn care should continue throughout the transfer, as started by the location where the child first presents.

For non-intubated children the usual assessment of pain and options for analgesia apply.

Intubated and critically unwell children with severe burns may require a higher morphine maintenance infusion (30-60mcg/kg/hr). Consider a loading dose of IV morphine when the infusion is commenced while awaiting transfer. **Clonidine** or **dexmedetomidine** may be a useful adjunct (use the ScotSTAR paediatric calculator for dosing guidance). Minimise moving and handling where possible, especially of the areas affected.

4. Procedural/ interventions

Children with burns often require repeated, often extremely painful dressing changes. A significant proportion of dressings will be carried out under anaesthesia.

The decision to not use anaesthesia will be determined by multiple factors including:

- The size of the burn
- The age of the child
- Anticipated duration of the dressing change
- Patient preference

If a procedure is performed when the child is awake– a combination of pharmacological and non – pharmacological techniques should be used.

4.1. Pharmacological techniques

There should be local protocols in place for the administration of pharmacological agents for procedural pain, which should stipulate the required monitoring and contra-indications to the technique. The protocols should also have a clear plan for cessation of the procedure if the technique is unsuccessful.

Children should have observations taken at regular intervals following administration of the following agents.

Agents which may be used include:

Inhaled nitrous oxide

Suitable for co-operative children aged > 6years (refer to local guidelines for instructions for use)

Midazolam

Oral midazolam 0.5mg/kg 30 minutes prior to planned dressing change

Oral Opiates

Oral morphine/oxycodone 0.1- 0.3mg/kg 30 minutes prior to planned dressing change. Oxycodone is slightly more potent but is generally used as equipotent to Morphine.

Oxycodone has less sedative effect compared with morphine, so for the best procedural conditions it should be given alongside a benzodiazepine.

Intranasal fentanyl or diamorphine

Refer to Section 2.3.2 above.

IV Opiates

If the patient has IV access, it would be preferential to give morphine intravenous as it has 100% bioavailability by this route (oral bioavailability around 35%). IV doses should be titrated to effect, and given with appropriate safe monitoring in place. A sensible initial titration would be to give 100mcg/kg in 20-50mcg/kg aliquots. It can then be titrated to clinical effect, and more given if needed.

If the child has a PCA or NCA in place, a one press bolus would normally deliver 20mcg/kg. This can also be used to titrate up prior to dressing changes.

Naloxone

Naloxone should be immediately available for the reversal of opiate toxicity including respiratory depression and arrest. The recommended dose is

- 400mcg for respiratory arrest,
OR
- 1mcg/kg for respiratory depression (RR <20 under 1yr, RR <10 for over 1yrs, or SpO2 <90%)

4.2. Non-pharmacological techniques

There is a growing body of evidence for the efficacy of non-pharmacological techniques in reducing procedural pain including:

- Play therapy
- Distraction
- Guided imagery
- Hypnosis
- Massage
- Immersive virtual reality

5. Day-to-day management

Pain score should be regularly assessed and documented, with re-assessment following any intervention.

Analgesia should be administered **regularly**.

5.1. Pain score $\leq 3/10$

Give Paracetamol and Ibuprofen.

Ibuprofen should not be used in children requiring fluid resuscitation.

Paracetamol dosing:

Age	Route	Dose	Interval	Maximum daily dose
0-3 months	Oral	10-15 mg/kg	6-8 hourly	60 mg/kg/day
	Rectal	15-20 mg/kg	8 hourly	
> 3 months	Oral	15-20 mg/kg	4-6 hourly	75 mg/kg/day
	Rectal	15-20 mg/kg	6 hourly	

Ibuprofen dosing:

Age	Route	Dose	Interval	Maximum daily dose
0-3 months or up to 5kg	NOT RECOMMENDED			
> 3 months	Oral	5 mg/kg	6 hourly	30 mg/kg/day
		OR		
		10 mg/kg	8 hourly	30 mg/kg/day

5.2. Pain score > 3/10:

Add Morphine or Oxycodone.

First line management is likely to be Oral Morphine Solution (10mg/5ml): **0.1-0.3mg/kg per dose**.

Morphine/oxycodone may be administered by either:

- Immediate release Morphine/Oxycodone (Oramorph/Shortec or equivalent)
- Nurse Controlled Analgesia (NCA)
- Patient Controlled Analgesia (PCA)
- Continuous IV infusion

Ensure laxatives are commenced when opiates are started to avoid constipation.

Non-pharmacological techniques should still be considered for long-term treatment.

An increase in background analgesic requirements should be anticipated if skin has been taken for grafting.

6. Long-term or chronic pain management

Children with burn injuries often recover well and are not left with chronic pain. However, a small subset may go on to develop chronic pain 6 months from the initial burn insult. This is often neuropathic in nature and difficult to treat. There may be associated psychological impact related to scarring, reduced function due to contractures, and body image perception. The likelihood of developing chronic pain after a burn injury in adults⁴ was found to be increased if older, if the burn was full-thickness, higher %TBSA, warranted intubation and ventilation, or with a higher number of surgeries required.

The pharmacological options remain varied, and a pragmatic approach tailored to the patient's symptoms and needs remains the way forward.

6.1 Chronic pain after Burn Injuries

The approach to chronic pain is always two-pronged: pharmacological & psychological. Burn patients may have disfigurement and long-lasting scars that contribute to the perception and experience of pain. Consider referral to paediatric chronic pain services where simple analgesia and non-pharmacological management options have been exhausted.

Pharmacological agents remain the usual for acute-on-chronic pain experiences (simple analgesia, opioids, topical ibuprofen gel). Non-pharmacological measures such as cooling, silicone gel patches, massage therapy, or desensitisation therapy of the affected area may be tried.

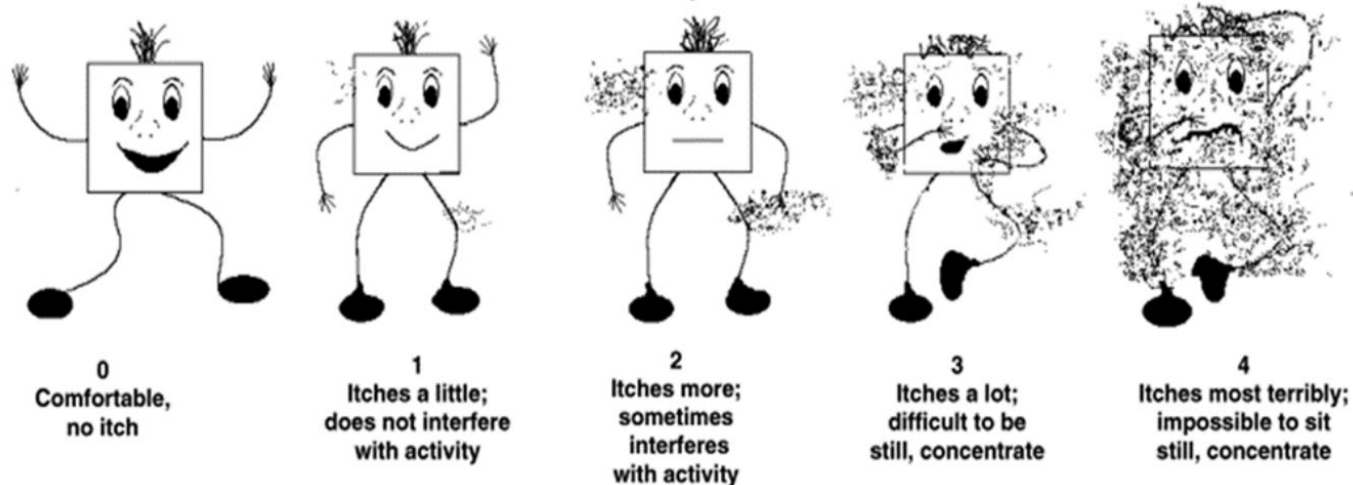
For more neuropathic-type pain, gabapentinoids, amitriptyline, oral clonidine or oral ketamine may be trialled where appropriate and after consultation with specialist services. Capsaicin cream (age >16 years) or lidocaine patches may be useful for localised areas of neuropathic pain, on keloid scars or over contractures.

7. Management of pruritus in burned children

Step 1	Moisturise and cool
Step 2	Regular emollients and massage
Step 3	Chlorphenamine Refer to BNFC for dosing.
Step 4	Consider adding Ondansetron Refer to BNFC for dosing.
Step 5	Consider adding Gabapentin Day 1: 5mg/kg once daily Day 2: 5mg/kg twice daily Day 3: 5mg/kg three times a day and continue at this dose
Step 6	Consider adding Cetirizine Refer to BNFC for dosing.
Adjunctive options	Silicone gel Topical steroids Clinical Psychology Antidepressants

Please see below the Itch Man Scale visual guide to assessing your patient's itch:

Itch Man Scale to Assess Itching in Pediatric Burn Patients



8. Resources/ references

1 *Pain in children- management in the ED*, NHS Greater Glasgow & Clyde, February 2022

<https://www.clinicalguidelines.scot.nhs.uk/nhsoggc-guidelines/nhsoggc-guidelines/emergency-medicine/pain-in-children-management-in-the-ed/>

2 *Sucrose (oral) for procedural pain management in infants*, The Royal Children's Hospital Melbourne, February 2021.

https://www.rch.org.au/rchcpg/hospital_clinical_guideline_index/sucrose_oral_for_procedural_pain_management_in_infants/#:~:text=Oral%20sucrose%20is%20a%20safe,tongue%20to%20reduce%20procedural%20pain

3 *Looking after your burn injury* patient information leaflet, Care of Burns in Scotland, 2022.

<https://www.cobis.scot.nhs.uk/wp-content/uploads/2022/05/2022-COBIS-Looking-after-your-burn-information-leaflet-V.1.pdf>

4 Klifto KM, Dellon AL, Hultman CS. *Prevalence and associated predictors for patients developing chronic neuropathic pain following burns*. Burns Trauma, May 2020.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7192663>

9. Appendix

9.1. FLACC scale

The Face, Legs, Activity, Cry, Consolability (FLACC) scale can be used for babies and children aged 0 to 2 years, or for non-verbal children and those who are unable to communicate their pain reliably.

	SCORE		
CATEGORIES	0	1	2
Face	Patient smiling or no particular facial expression	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 sob, frequent complaints
Consolability	Content, relaxed	Reassured by occasional touching, hugging or being talked to, distractable	Difficult to console or comfort

Each category (Face, Legs, Activity, Cry, Consolability) should be scored from 0 to 2, and all five scored added together. The scale below indicates the pain severity:

0 = no pain

1-3 = mild pain

4-7 = moderate pain

8-10 = severe pain

9.2. Wong-Baker pain scale

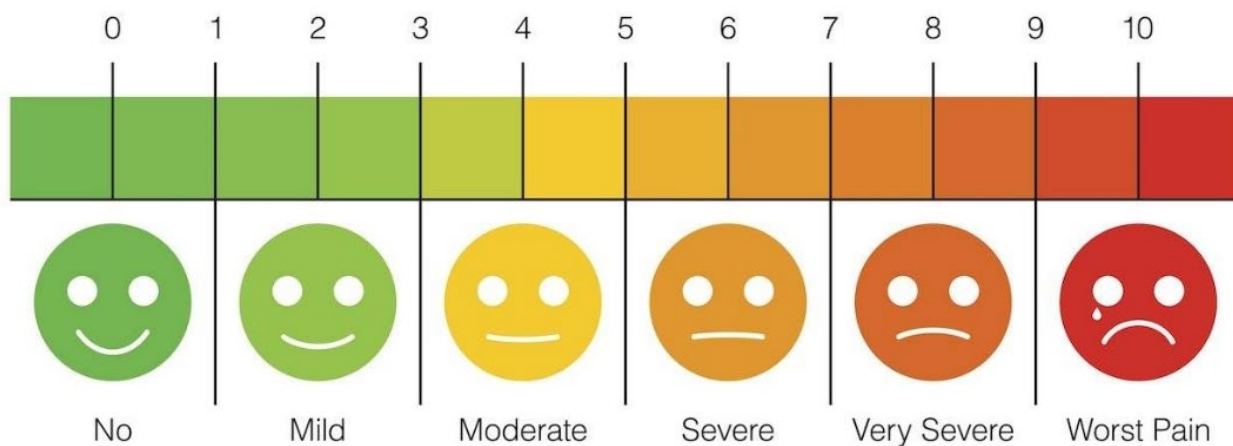
The Wong-Baker scale can be used with children aged 2 to 4 years.

Wong-Baker FACES® Pain Rating Scale



9.3. Numerical score

The numerical pain score can be used for children aged 4 to 16 years.



9.4.