



Managing paediatric pain in general practice

Key points

- It is essential to anticipate and pay attention to paediatric pain.
- Prompt use of pain-reduction strategies should be emphasised at the start of the physician–patient relationship.
- Pain commonly seen in the outpatient setting can be categorised as pain associated with infection, normative pains, musculoskeletal injury and pain associated with procedures.
- Paediatric pain should be treated using the World Health Organization two-step strategy.
- Children with chronic pain should be referred to a paediatric pain specialist.

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Identifying and managing pain appropriately in children is a challenging but vital role for GPs. Both pharmacological and nonpharmacological interventions can help relieve and decrease paediatric pain.

Children can remember painful experiences, and this can affect how they experience future painful episodes in their childhood and may extend even to their adult lives.¹ Pain experienced in infancy causes unnecessary suffering and can lead to long-lasting consequences.²⁻⁵ As early as 23 weeks of gestation, the neural pathways are mature enough to perceive pain, and because the inhibitory pathways that modulate pain are still immature, preterm infants experience greater pain than older infants and adults.⁶⁻⁸

Evidence also shows that repeated painful procedures early in life may lead to permanent alterations in the developing central nervous

system, increasing pain responses later in life and possibly contributing to the development of chronic pain.⁹ It must be noted that some children may not complain of pain, but this does not mean that pain is not being experienced.¹⁰

A review by the World Health Organization (WHO) has identified pain in the paediatric setting as an important public health problem.¹¹ It is therefore imperative that pain, especially in this age group, be anticipated and managed appropriately. This article will discuss treatment strategies to manage pain commonly encountered in general practice, discuss the WHO guidelines in the treatment of pain in the

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paediatric age group and outline referral criteria to the paediatric complex pain clinic.

Commonly encountered pain in the outpatient setting can be categorised as pain associated with infection (e.g. otitis media, pharyngitis and viral infections of the mouth), normative pains (e.g. colic, growing pains), musculoskeletal injury (e.g. sprains) and pain associated with procedures (e.g. injections, laceration repair) (Table).

PAIN ASSOCIATED WITH INFECTION

Otitis media

There have been few studies examining pain caused by otitis media despite it being a common reason for GP visits. Otitis media and its complications affect as many as 73% of Australian Indigenous children by the age of 12 months.¹² It has been suggested that in these cases NSAIDs may be more effective than paracetamol.¹³ Topical pain-relieving ear drops that generally comprise an anaesthetic such as benzocaine and an analgesic such as phenazone can provide a rapid response for severe acute ear pain. Short-term use of topical 2% lignocaine two to three drops applied to the tympanic membrane has also been shown to be effective.¹⁴

Pharyngitis

Acute pharyngitis remains one of the most common presentations in children to primary care providers.¹⁵ Recent data from the Bettering the Evaluation and Care of Health (BEACH) program show that 4% of all symptomatic presentations to GPs were for throat complaints, second only to cough at 7%.¹⁶

There is limited research on the use of analgesics to treat children with pharyngitis. Ibuprofen administered around the clock may be more efficacious than paracetamol.¹⁷ The role of corticosteroids remains controversial, because they offer limited benefit for the treatment of antigen-positive streptococcal pharyngitis.¹⁸ The safety and efficacy of topical local anaesthetics is unclear.

Viral mouth infections

Painful infectious mouth conditions such as gingivostomatitis are common in children (Figure) and often result in a visit to the GP. Although this condition is self-limiting, painful

TABLE. COMMONLY ENCOUNTERED PAIN IN THE OUTPATIENT SETTING

Cause	Examples
Infection	Otitis media Pharyngitis Viral infections of the mouth
Normative	Colic Growing pains
Musculoskeletal injury	Sprains
Procedures	Injections Laceration repair

ulcerative lesions and inflamed mucosa can decrease oral intake and lead to dehydration. The primary goal of therapy in acute care is the relief of pain from ulcerative lesions and inflamed mucosa.¹⁹ Analgesic medications may be prescribed and administered around the clock, timed to reach peak effect at mealtimes. Topical analgesics are effective (e.g. lignocaine 2% liquid or gel) for their numbing properties; however, because of pharyngeal numbing they carry a theoretical risk of aspiration and the possibility of the child biting his or her buccal mucosa.²⁰

PAIN ASSOCIATED WITH NORMATIVE PROCESSES

Colic

Colic is a term used to describe why infants cry excessively for no apparent reason during the first three months of life. Colic is one of the most distressing problems of infancy; it is distressing for the infant, parents and healthcare providers. Colic resolves in most infants by three to four months of age. Although the cause of colic is unknown, there seems to be agreement that abdominal distress is associated with aerophagia and distension. There is no medication available to resolve colic and no other proven standard therapy.²¹ The measures that can be undertaken by clinicians are to minimise parental distress, maintain bonding and offer reassurance as to the absence of long-term consequences.²²

In children and adolescents, recurrent abdominal pain is also a common complaint. The prevalence has been estimated at 0.3 to 19% in Western populations.²³ Identification and



Figure. Gingivostomatitis in a baby.

treatment of contributing biopsychosocial factors provides the best opportunity to break the pain cycle.

Growing pains

Growing pains are recurrent, self-limited pains in the extremities occurring during the prepubertal growth years. A large community study in Australia reported a prevalence of 37% in children aged 4 to 6 years.²⁴ Comforting, local massage therapy during pain episodes or simple analgesia may be helpful. Occasionally, night-time use of a long-acting analgesic, such as naproxen at a dose of 10 to 20 mg/kg/day to be given eight to 12 hourly, may prevent episodes of pain at night. It can also be used during the day if parents can predict when an episode will occur.²⁵

PAIN ASSOCIATED WITH MUSCULOSKELETAL INJURIES

Musculoskeletal injuries account for 6% of primary care visits and of those more than 60% are related to acute trauma or overuse syndromes. The initial management is based on first aid principles, where the Rest, Ice, Compression, Elevation (RICE) strategy will help.²⁶

Cryotherapy using ice chips wrapped in cloth is the preferred management in the initial 48 to 72 hours. Ice should be applied to the affected area for 10 to 15 minutes at a time, three or four times a day. Compression of the affected area with a firm bandage decreases oedema formation.

NSAIDs are an appropriate choice for analgesia because inflammation is an

important component of pain in these patients. The use of opioid analgesia is indicated for patients with more severe pain and injury, such as fractures and severe sprains.

PROCEDURAL PAIN COMMONLY ENCOUNTERED IN GENERAL PRACTICE

Needle punctures are one of the most common procedures that children experience as part of routine medical care. Needle procedures include injections (intramuscular or subcutaneous), venepuncture and venous cannulations.

Pain from needle procedures related to immunisation can be the most painful and frightening experience that children undergo. It affects families and healthcare providers as well. There are numerous simple, effective and safe strategies to alleviate needle pain, which have been summarised as the '4Ps of pain control' (see the Box).²⁷

Procedural strategies

The best way to avoid pain is to simply avoid painful procedures or decrease the frequency. Numerous noninvasive technologies have been developed such as needle-free immunisation (e.g. intranasal flu vaccine, oral polio vaccine). Combining vaccines in a single injection is a useful way of reducing the number of separate injections.

Using a wider bore needle is not significantly more irritating than a smaller bore needle but facilitates a faster injection.²⁸ Longer needles are usually associated with less pain and local reaction.²⁹ If multiple injections have to be performed, give the most painful injection last. Injection techniques are paramount, with intramuscular injections favoured over subcutaneous injections because they allow rapid injection without aspiration.⁵

Pharmacological strategies

The use of topical local anaesthetics is effective in reducing the pain experienced by children during needle procedures. Local anaesthetics provide analgesia by blocking

THE 4PS OF PAIN CONTROL²⁷

- Procedural
- Pharmacological
- Psychological
- Physical

nociceptive transmission in nerve cells. Application may be noninvasive (e.g. topical creams) or through the traditional injection (invasive) method using 1% lignocaine. It is important to note that topical preparations require a contact time of between 20 and 60 minutes to provide reliable dermal anaesthesia because they rely on passive diffusion through the skin to achieve effect. Convenient commercial patch preparations are available with the local anaesthetic embedded within the delivery system, which is adhered to the skin overlying the injection site.

Other preparations are more tedious as they require an appropriate dose of anaesthetic over the skin to be covered by an occlusive dressing (e.g. transparent Opsite dressing). It may also be necessary to apply topical anaesthetic to more than one site if multiple injections are to be given. Care must be observed not to exceed recommended dosages when multiple applications are performed.

Needle procedures should be undertaken immediately after the required duration of contact and after removal of the anaesthetic and occlusive dressing. To avoid injecting a nonanaesthetised area, an appropriate nonallergenic skin mark can be made if injection cannot be performed immediately. The anaesthetic effect decreases after removal of the patch or occlusive dressing, and removal before 60 minutes has elapsed should be avoided.

Topical local anaesthetics have been under utilised in GP clinics for several reasons. They do not block all pain, and sensations of pressure and movement can be interpreted by the child as pain, which may be judged as a failure of the local

anaesthetics. The duration of contact required for topical anaesthetics to take effect may be impractical in the clinic; however, parents can be taught how to apply the anaesthetic before leaving home. Patches can be coloured or patches and occlusive dressings can be decorated with cartoon characters or other pleasant 'tattoos' to make the administration of topical anaesthetics less intimidating.

Injecting local anaesthetic adds another injection procedure and therefore another painful episode. However, the pain of the second needle puncture is lessened and therefore there is a net reduction in pain. Using refrigerant sprays (vapocoolant) may help with pain reduction, but they may not have the same prolonged analgesic effect as local anaesthetics.³⁰

Sweet solutions have also been used in infants up to one year of age although the mechanisms of action remain poorly understood. The administration of sucrose has been a frequently studied intervention for relief of procedural pain in neonates.³¹ It has been examined for the calming response induced by the sweet taste and its analgesic effects for invasive procedures in both full term and preterm neonates.³² The key mechanism is believed to be the release of β -endorphins, and central pathways that mediate the effects of sucrose have been elucidated although further research has been encouraged to address areas of uncertainties.³³ Recommendations for practice include using 24% sucrose or 25 to 30% glucose at small volumes of 0.2 to 0.5 mL/kg given in aliquots over the duration of the procedure and not to exceed 10 doses per 24 hours for infants up to 12 months of age.^{34,35}

Psychological strategies

Psychological interventions comprise cognitive and behavioural techniques to reduce child anxiety and fear. These include simple combined distraction and suggestion techniques, child-directed training and coping skills, and parent and child training combined with nurse coaching.³⁶ The presence of parents or another trusted adult can

reassure children and provide advocates for the child to ensure pain-reducing interventions are used. Parents and other adults around the child should be calm because fear and anxiety can be transmitted to the child during the procedure.

Child preparation is also helpful and includes explanation of the procedure, sensory information as to what will happen and how it will feel and what can be done to decrease discomfort. This can also include demonstration and rehearsal sessions.

Distraction techniques are useful. These include breathing exercises, bubble blowing, playing with toys and games, watching movies, bringing their favourite stuffed toy with accompanying bandaged arm, jokes and funny activities. The Children's Hospital at Westmead has produced a useful guide to facilitating painful procedures in children.³⁷

Physical intervention

Physical intervention techniques that can help children deal with pain include the following.

- **Breastfeeding for infants up to 1 year of age.** This is a cost free, natural and convenient option and is believed to work by multiple mechanisms that include soothing touch, maternal presence, soothing sucking, sweet taste and smell. Breastfeeding is started before needle puncture and continued throughout the procedure. An adequate breast/infant latch must be established before injecting and this may take a few minutes.
- **Non-nutritive sucking of a dummy.** Sucking releases neurotransmitters that modify pain perception.³⁸
- **Swaddling.** Wrapping helps the child feel safe, secure and relaxed.
- **Upright positioning and holding.** Seat the child upright on the parent's lap with the child facing the parent.
- **Tactile stimulation.** This includes touching the skin near the procedure site, using techniques such as rhythmic

rubbing and manual pressure. The proposed mechanism is that nociceptive signal transmission to the brain is reduced by simultaneous competitive transmission of touch sensation. The end result is fewer pain signals reaching the brain.

- **Cooling such as through the application of ice.** Cooling reduces pain sensation in the cutaneous sensory neurons. Other agents that use topical anaesthetics and cooling to numb the skin are available.
- **Buzzy Bee®.** This is a palm-sized device combining cold and vibration to decrease the sensation of sharp pain through distraction.³⁹

Minimising pain from needle procedures supports children's health because it reduces acute suffering. This improves the experience of children undergoing needle procedures and reduces long-term harm, including noncompliance with future healthcare interventions.

PHARMACOLOGICAL TREATMENT OF PAIN IN CHILDREN: WHO GUIDELINES

Optimal pain management can be achieved using a comprehensive approach combining both pharmacological and nonpharmacological strategies. Analgesic prescription is based on the following key concepts:

- a two-step strategy (as recommended by the WHO) – see below¹¹
- dosing at regular intervals (by the clock)
- using the appropriate route of administration (by the mouth)
- tailoring treatment to the individual.

It is important to select pain measurement tools for the specific paediatric population. The most common pain intensity scales, such as the Faces Pain Scale-Revised, visual analogue scale and numerical rating scale, rely on the capacity to quantify pain. The new WHO guidelines provide comprehensive information about these tools, including the applicable age range.¹¹

A two-step strategy

A comprehensive approach comprising various treatment modalities, such as a combination of nonopioid and opioid analgesics, adjuvants and nonpharmacological strategies, may be required. The two-step strategy considers the use of low doses of strong opioids for treatment of children with moderate pain. Codeine has been excluded because of the variability in metabolism that can alter the actual dose received in children.^{11,40}

Mild pain should be treated with simple analgesia such as paracetamol and ibuprofen and moderate-to-severe pain with low doses of strong opioid analgesics. The treatment strategies are as follows.

The first step: mild pain

Paracetamol and ibuprofen are the medicines of choice in children above 3 months of age. The only option for children below 3 months of age is paracetamol; however, careful medical review and specialist management is recommended.^{11,41} There is evidence that ibuprofen has superior analgesic properties compared with paracetamol in the management of children with acute pain. However, grading of evidence performed in acute pain settings has not established the long-term safety evidence for its continuous use.¹¹

Paracetamol and ibuprofen should be used with caution because of the risk of toxicity and adverse effects. Ibuprofen and other NSAIDs have the potential to cause renal and gastrointestinal toxicity and bleeding. Prolonged paracetamol use or overdose increases the risk of hepatotoxicity.¹¹ If pain persists despite a properly administered single agent, alternating simple analgesics at recommended dose intervals is a reasonable approach.⁴² Alternatively analgesia may be enhanced by using both paracetamol and ibuprofen.⁴³

The second step: moderate-to-severe pain

Opioids should be considered for children with moderate-to-severe pain. Morphine

is recommended as a first-line medicine for the management of severe pain in children.⁴⁴ Other alternatives include oxycodone, fentanyl, hydromorphone and methadone. Liquid formulations are often needed for children unable to swallow tablets. Constipation, pruritus, hallucinations and somnolence are potential side effects of opioid use. These are encountered infrequently in patients receiving appropriate doses and short courses.

The paediatric complex pain clinic

Referral to a paediatric pain specialist should be considered when a child has chronic pain and:

- all reasonable investigations relevant to the situation have been performed and the appropriate specialist's opinion sought if required
- reasonable and accessible management in the primary care sector has been tried with insufficient success
- pain has a significant impact on some aspects of both the child's and parents' lives such as sleep, self-care, mobility, work or school attendance, recreation, relationships or emotion.

Chronic pain is defined as pain that is constant and daily for a period of at least three months, or where the natural history of the painful condition predicts that this is likely to be the case.⁴⁵

Referrals to a paediatric pain specialist are particularly recommended when the patient has:

- exacerbations of chronic pain that result in an emergency department presentation or hospital admission
- complex psychosocial influences on pain behaviour requiring specialised assessment and care
- current or past history of addiction or prescribed medication use that seem to be complicating current management (e.g. difficult to control neuropathic pain)
- complex regional pain syndrome (early referral is recommended)
- difficult to control cancer pain.

Links to chronic pain service referrals can be accessed through state government agencies such as the NSW Agency for Clinical Innovation (ACI).^{46,47}

CONCLUSION

Long-term effects of untreated pain are complex. Anticipation of pain and the use of presently available modalities can significantly reduce the pain associated with medical encounters. Optimal pain management may require a comprehensive approach using both pharmacological and nonpharmacological strategies. It is recommended that analgesic treatment be used in two steps according to the severity of the child's pain. Referral to a paediatric complex pain clinic is recommended for children with chronic pain. **MT**

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A list of references is included in the website version (www.medicinetoday.com.au) and the iPad app version of this article.

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