

Analgesia for Children

The need for effective and appropriate analgesia must be assessed for all children in pain.

Analgesia should be given as an early priority, along with splintage prior to x-ray where appropriate.

Principles

Use a combination of the techniques discussed below:

1. Talk to the child, explain things in a simple manner, enrol the support of parents and nursing staff and try to **gain the child's confidence**. Also consider distraction with toys, blowing bubbles, reading and story-telling. Utilise the ED Paediatric play specialist (bleep 2017)
2. Use [physical measures](#) such as splinting #'s and cooling minor burns.
3. Analgesics/ local anaesthetics/ sedatives should be calculated on **dose per kg body weight**.
4. Become familiar with the use of Paracetamol, Ibuprofen, [intranasal Diamorphine](#), and [intravenous morphine](#).
5. **Intravenous opiates** must be diluted up to 5 - 10 mls, and then given slowly titrating the dose to the response.
6. Consider [adjunctive measures](#) such as topical LA (Adrenaline/Cocaine gel, LMX4), Entonox, oral Midazolam, oral Glucose Solution prior to minor painful procedures in neonates, Femoral nerve block

1. Mild to moderate pain (e.g. undisplaced greenstick fracture)

Paracetamol

- Suspension 120mg/5ml or 250mg/5ml
- Tablets: 500mg soluble tablets

Age	Dose
< 3 months	<ul style="list-style-type: none">• Oral 20 mg/kg loading dose then 15mg/kg thereafter• Rectal 30 mg/kg Maximum recommended dose 60 mg/kg/day
> 3 months	<ul style="list-style-type: none">• Oral 20 mg/kg loading dose then 15mg/kg thereafter• Rectal 40 mg/kg Maximum recommended dose 90mg/kg/day not

	exceeding 4g/day
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Suppositories: 60, 120, 250 and 500mg 20mg/kg 6 - 8 hrly

NSAIDs **Not applicable for neonates;** **Caution with asthma, renal impairment and low platelet count**

Ibuprofen

- Suspension 100mg/5ml
- (max 30mg/kg/day not exceeding 2400mg) PO 6-hrly

Age	Dose
< 12 months	Not recommended
> 1 year	• 5-10 mg/kg

Diclofenac

- Suppositories: 12.5, 25, 50, and 100mg

Age	Dose
Over 1 year old	• 1-1.5 mg/kg Maximum recommended dose: 3mg/kg/day by any route up to 150 mg/day

Oral Glucose Solution in neonates

To be considered prior:

- Venepuncture
- Heel prick
- Cannulation
- i.m injections

Age	Dose
Preterm neonates	0.5 ml of Glucose 30% oral solution
Term neonates	1 ml of Glucose 30% oral solution

The dose is to be administered onto baby's tongue 2 minutes prior to procedure using oral syringe. After administration of the dose the baby should be given a dummy or a comforter to suck on- this will enhance the analgesic effect of the glucose. The effect will last for approximately 10-15 minutes

2 Moderate and severe pain (e.g. displaced fractures, burns)

Intranasal diamorphine (dose: 0.1mg/kg)

ALL patients receive 0.2ml. The concentration of that 0.2mls changes. The smaller the child the greater the amount of diluent used to achieve the required concentration

Weight (kg)	Approx. age (years)	Volume of saline (ml)	Resultant dose of Diamorphine in 0.2mls
10	1	1.0	1000
11		0.9	1110
12	2	0.85	1180
14		0.7	1430
16		0.6	1670
18	5	0.55	1820
20		0.5	2000
25	8	0.4	2500
30	10	0.35	2860
35		0.3	3330

Protocol

- Obtain weight of child and **round it off to nearest 5 kg**
- Add a volume of 0.9% sodium chloride (according to the chart above) to a 5mg ampoule of diamorphine
- Draw up 0.3ml of solution for intranasal use. Expel 0.1ml through the atomiser
- Administer by placing a 1ml syringe with attached atomiser device in the nostril and inject 0.2ml solution.

Note: Due to the minimum volume of 0.3ml being required for drawing up. Intranasal diamorphine is only to be given to children weighing 35kg or less. For those over 35kg consider other analgesics such as fentanyl, ketamine or morphine.

Intravenous Morphine Not applicable to neonates

Age	Dose
< 6 months	0.025 - 0.05 mg/kg
6–12 months	0.1 mg/kg
1 –12 years	0.1 - 0.2 mg/kg

- If analgesia is inadequate and there are no signs of respiratory depression, a further dose of intranasal or iv opiate may be given after 5 - 10 minutes
- Use 0.05/kg iv boluses to minimise nausea and vomiting
- An antiemetic is not usually required with an opiate.
- Naloxone 10mcg/kg (iv or s/c) is an opiate antagonist. (ampoules 0.4mg/ml). Use if child becomes drowsy. Dosage:
 - Age 1-12 - 10µg/kg, then 100µg/kg if no response
 - Age 12+ - 0.4-2mg repeated every 3 min (max 10mg)

Oramorph Not applicable in neonates

Age	Dose
1-12 months	Oral 80-200 micrograms/kg 4 hourly
Over 1 year old	Oral 100-400 micrograms/kg 4 hourly

Other analgesics to consider include:

- Paracetamol/Codeine combinations – codeine should only be considered for those >12 years old
- Intravenous Ketorolac
- Tramadol (1 mg/kg 4-6 hourly; max 100mg/dose and 400mg/day)

Analgesic Adjuncts

1. Physical measures:

- Limb splints, POP, and Thomas' splint
- Cold compress if < 10% BSA, for 10 minutes maximum

- Cling film or dressings over burns.

2. Entonox:

- Useful adjunct in children old enough to self-administer.
- Helpful with IV cannulation, application of POP, fracture manipulation, burns, removal of foreign body and performing a nerve block.
- Avoid in a decreased level of consciousness, head injury, suspected pneumothorax, children with chronic lung disease or G-I perforation
- Full analgesic effect occurs after 2 minutes of administration
- Child will be fully recovered within 10-15 minutes after stopping the use of Entonox and ready to go home if alert, orientated, able to mobilise and communicate
- Short-term side effects include dizziness, tingling sensation in hands and legs, a funny feeling in the lip and euphoria. They may lose track of time, get a dry mouth, become sedated, aggressive or have uncontrolled giggles. Occasionally nausea, vomiting and distorted hearing

2. Local anaesthetics:

- LMX4 cream (takes 20-30 min to work)
- Lidocaine and bupivacaine (see above for adults- same dose per kg)
- LAT gel (Lidocaine 4%, Adrenaline 0.1%, Tetracaine 0.5%)- **available at CGH**
- Cocaine and adrenaline gel **available at CGH and GRH**

Both gels suitable for simple lacerations of the head, neck, limbs, or trunk; wounds less than 5 cm in length

Contraindicated in grossly contaminated wounds or ones involving **mucous membranes, digits, genitalia, or nose**

Dosage is 0.5ml to 1.0ml per cm of wound length up to a maximum of:

- ✓ **2 ml for those aged 1-3 years**
- ✓ **3 ml for those over 3 years**

Place half dose of gel onto open wound and cover with occlusive dressing (e.g. sterile gauze) onto which the remaining half has been applied

Press firmly over the dressing for **30 minutes** either with the tape or the parent's gloved hand

Wound cleaning and suturing should be completed within **15 minutes** of removal of the gel.

Each bottle is for use on one patient only and discarded within 24 hours of opening

ANALGESIA quick reference

PARACETAMOL

AGE	ORAL PARACETAMOL	
	(15mg/kg)	
Neonate 28-32 weeks	20mg/kg single dose then 10-15ml/kg every 8-12 hours. Max 30mg/kg in divided doses	
Neonate over 32 weeks	20mg/kg single dose then 10-15ml/kg every 6-8 hours. Max 60mg/kg in divided doses	
1-3 months	30-60mg every 8 hrs	
3-6 months	60mg every 4-6hrs	max 4 doses in 24hrs
6months- 2 years	120mg every 4-6hrs	max 4 doses in 24hrs
2-4 years	180mg every 4-6hrs	max 4 doses in 24hrs
4-6 years	240mg every 4-6hrs	max 4 doses in 24hrs
6-8 years	240-250mg every 4-6hrs	max 4 doses in 24hrs
8-10 years	360-375mg every 4-6hrs	max 4 doses in 24hrs
10-12 years	480-500mg every 4-6hrs	max 4 doses in 24hrs
12-16 years	480-750mg every 4-6hrs	max 4 doses in 24hrs
16-18 years	500mg-1g every 4-6hrs	max 4 doses in 24hrs
WEIGHT	IV PARACETAMOL	
Neonate	10mg/kg every 4-6hrs	max 30mg/kg in 24hrs
Child up to 10kg	10mg/kg every 4-6hrs	max 30mg/kg in 24hrs
Child 10-50kg	15mg/kg every 4-6hrs	max 60mg/kg in 24hrs
Child >50kg	1g/kg every 4-6hrs	max 4g in 24hrs

	PER RECTUM PARACETAMOL
Neonate 28-32 weeks	20 mg/kg single dose, then 10–15 mg/kg every 12 hours. Max 30 mg/kg per day in divided doses
Neonate over 32 weeks	30 mg/kg single dose, then 15–20 mg/kg every 8 hours. Max 60mg/kg per day in in divided doses
1-2 months	30–60 mg every 8 hours. Max 60mg/kg per day in in divided doses
3-11 months	60–125 mg every 4–6 hours as required; maximum 4 doses per day
1-4 years	125–250 mg every 4–6 hours as required; maximum 4 doses per day
5-11 years	250–500 mg every 4–6 hours as required; maximum 4 doses per day
12-17 years	500 mg every 4–6 hours

IBUPROFEN

AGE	IBUPROFEN
Child 1 – 3 months	5mg / kg every 4 – 6 hours daily
Child 3 – 6 months	50mg 3 times daily; max 30mg/kg in 3 – 4 divided doses
Child 6 months – 1 year	50mg 3 – 4 times daily; max dose 30mg / kg daily in 3 – 4 divided dose
Child 1 – 4 years	100mg 3 times daily; max 30mg /kg daily in 3 – 4 divided doses.
Child 4 – 7 years	150mg 3 times daily; max 30mg / kg daily in 3 – 4 divided doses.
Child 7 – 10 years	200mg 3 times daily; max 30mg / kg (max 2.4g) daily in 3 – 4 divided doses.
Child 10 – 12 years	300mg 3 times daily; max 30mg/kg (max 2.4g) daily in 3 – 4 divided doses.
Child 12 - 18 years	Initially 300 – 400 mg 3 – 4 times daily; increased if necessary to max. 600mg 4 times daily; maintenance dose of 200 – 400 mg 3 times daily may be adequate.