

Paediatric procedural analgesia in Emergency Care

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No conflicts of interest (I am a parent as well as a doctor)

Views expressed are my own

Any equipment photographs are purely for illustration and are not endorsed

Topic

Procedural analgesia in Paediatric Emergency Care

Infant and child pain perception

Physiological, biochemical & behavioural effects of pain

Practical approach

Non-Pharmacological & Pharmacological methods

Intranasal Opiates

I will not discuss Ketamine Sedation protocols

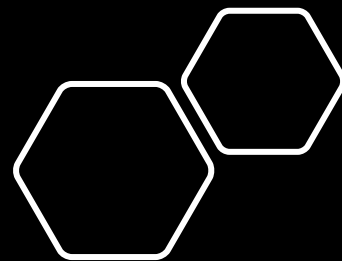
Outcomes

Advocate for child health and wellbeing in your hospital by championing prevention of paediatric procedural pain

Motivate for your wards and emergency department to

- 1) Develop protocols to assist with prevention of paediatric procedural pain
- 2) Train medical students and doctors accordingly
- 3) Purchase 2 things → can you guess ???







15 minutes
challenge



Pain perception

Pain perception recorded from 20 weeks gestation. By 30 weeks CNS pain nerve tracts are completely myelinated.

Neonates have the same number or greater pain nerve endings per mm of skin as adults

Descending inhibitory pain pathways are immature in neonates and develop during infancy / preschool years

Neonates and Infants may be MORE sensitive to pain than older children and adults

Pain heightens anxiety and fear, which in turn increases perception of pain

Physiological, biochemical, behavioural affect of Pain

Increased HR, RR, BP, ICP, Muscle contraction & rigidity, Nausea, Vomiting, Emotional distress

Scientific indicators of pain in research studies: Catecholamines, Cortisol (salivary), EEG, MRI

Studies of long-term neuro-developmental impact, specific pain related behaviour carried to adult life, PTSD reported (Children with long term health problems undergo repeated trauma related to their hospital visits)

Long term impact on caregivers effects how they respond to their childs pain and when they seek medical help

Procedural pain is preventable

Easy to prevent so why don't we try? (talking about this since 2014)

1st ask yourself

“Is the procedure really necessary?”

ThenIt takes 2 of us!

- Assistance with the procedure greatly increases chance of 1st time success!
- A quick successful procedure is better than many unsuccessful attempts

Combination of non-pharmacological & pharmacological pain prevention methods work best

Parent Involvement

Parents want to be involved in alleviating their child's pain and distress.

Parents can help:

- Explain the procedure to the child.
- Employ some of the non-pharmacological techniques such as touching, talking, blowing bubbles, distracting conversation, singing.

Parents should not be asked to restrain their child.

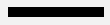


Environment

Make the most of what you have available

- Dedicated procedure room away from cot space
- Privacy
- Child “friendly” e.g. wall art, mobile
- Monitor available

Combination of methods



- Pharmacological & non-pharmacological work best

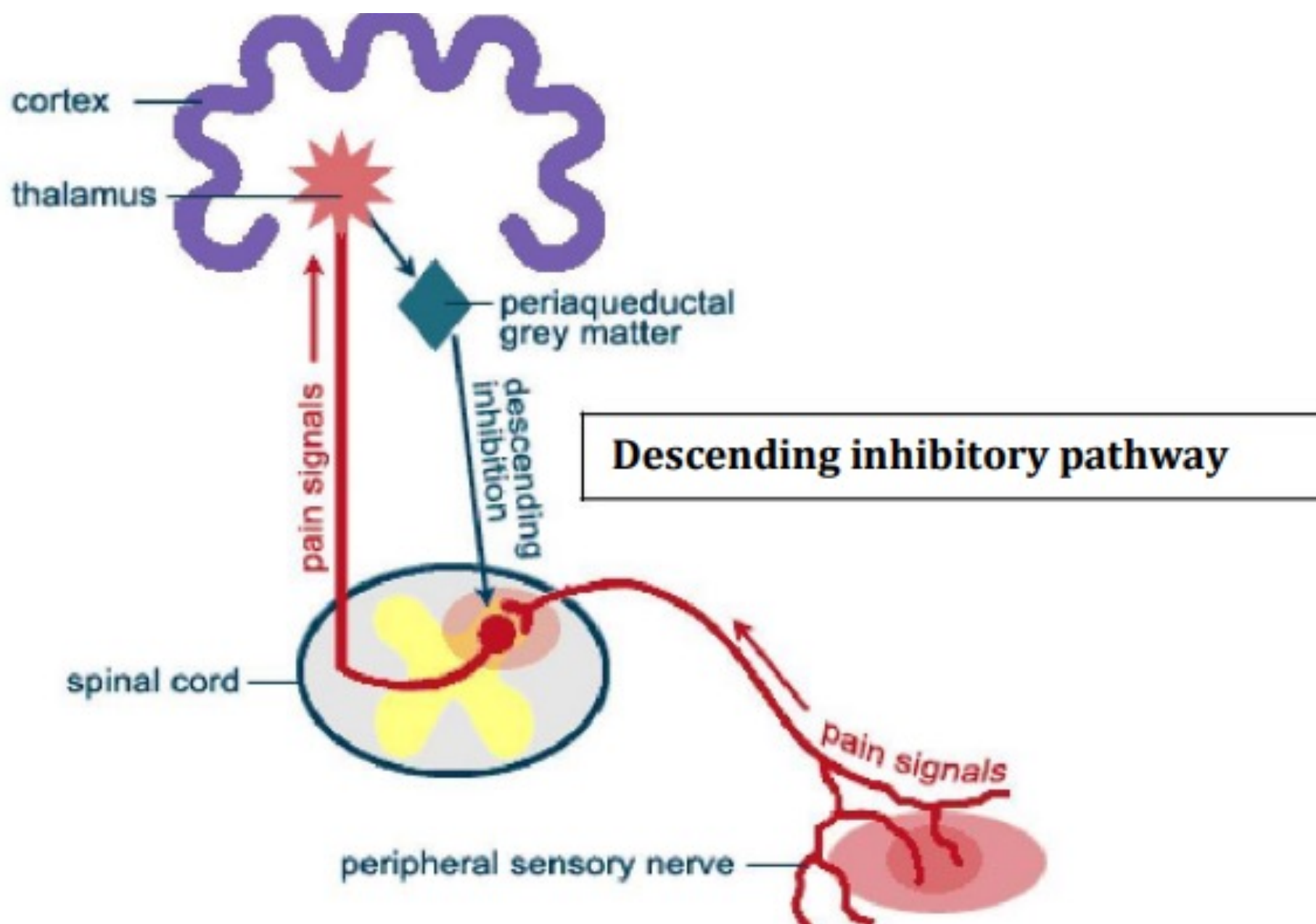


Diagram from: Management of common symptoms and problems in paediatric palliative care. Clinical Guidelines. HPCSA 2012 Dr Michelle Meiring et al.

Non-Pharmacological

Age	Action
Neonate/Infant	In mothers arms Breastfeeding Mothers voice Touch, massage
Pre-School	Blowing bubbles Music, singing Toys, books Cartoons
School age	Involved in decision making Set task e.g. counting backwards, biggest bubble, reading out loud Video games, cartoons
Adolescents	Need to be in control May wish to watch or talk through procedure as it happens Want privacy



A few simple tools

Sanitizer wipe clean

Pharmacological methods for minor procedures

For siting IV lines and Venepuncture

<12months: Sucrose 25% and Sucking

>1month: + Local anaesthetic creams = Ametop or EMLA (60 minutes prior)

>6yr: Consider Ethyl Chloride “cold spray” (immediately effective)

For NGT or Urinary catheter placement

- Remicaine local anaesthetic gel (5minutes prior)

Radial artery stabs....

Pharmacological methods for major procedures

For fracture manipulation, burns scrub, wound suturing, ICD insertion

- <3months Consider GA
 - >3m Ketamine or Opiate analgesia
- + Local anaesthetic 1% Lignocaine (LAT Gel if available)

For Lumbar puncture, Pleural tap

<3m: Sucrose and sucking

>3m: Consider Ketamine

>12m: Consider Opiate analgesia or Anxiolysis with local anaesthetic

Simple analgesia for post procedure pain

Anticipate & Prescribe in advance

Paracetamol 15-20mg/kg QDS

- IV Time to peak effect 45minutes (cost)
- PR Time to peak effect 60minutes
- PO Time to peak effect 120 minutes

Ibuprofen 10mg/kg TDS

- PO Time to peak effect 90 minutes



Local Anaesthetic Wound management

Topic Gel LAC/LAT (chat to your pharmacy) *

OR

Lignocaine 1% Infiltration

- 1ml contains 10mg of lignocaine
- Maximum dose: 2-3mg/kg
- Time to onset: 2 minutes, Peak effects: 20-30 minutes, Duration of action: 2 hours
- Side effects: peripheral nerve complications depending on site. Systemic toxicity is rare.
- Aspirate prior to infiltrating to ensure no inadvertent intravenous injection occurs.



OPIATES

Bye-Bye Valoron



DOH Circular Nov 2021

“The sole supplier in South Africa is discontinuing the production of Tilidine drops”

“There is often irrational fear of prescribing opiate analgesia, however it is important that this be addressed with clinicians, as children are vulnerable to inadequate pain management.”

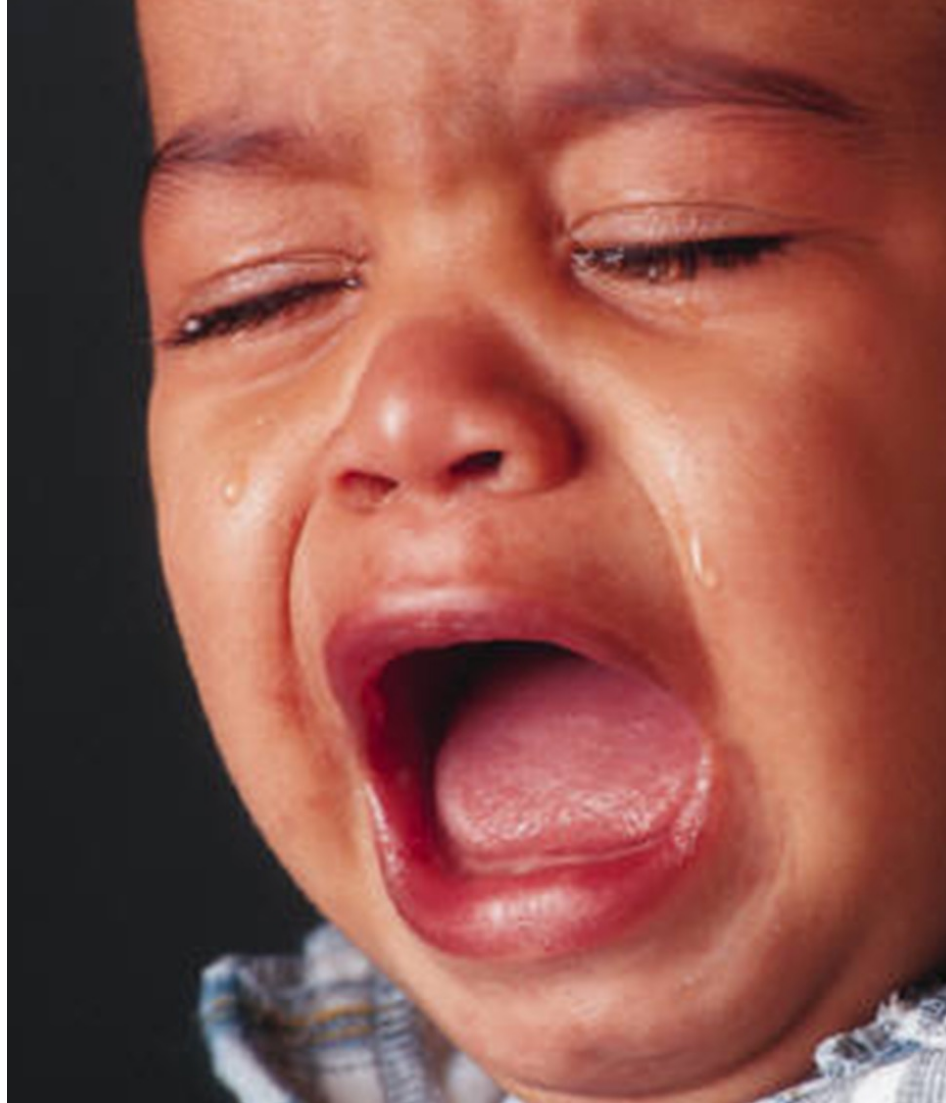
For procedures associated with moderate pain

STG alternative recommendation:

Ketamine, oral 4-6 mg/kg in a sweet drink **30 min before procedure**

OR

Morphine, oral 0.1-0.3 mg/kg **30–60 minutes before procedure**



In an Emergency Centre

Waiting 30-60minutes for procedural analgesia for major procedure is often not practical

- What if the child is in pain now, needs immediate procedure
 - Wounds / Burns / Fractures
- PO Ketamine
- PO Morphine also requires patience, usually ordered case by case => delays
- Trying for an IV line is painful procedure and traumatic.

Mucosal Atomisation Device

+ Luer-lock syringe

In addition to procedural pain

May also help you with

- Fentanyl in TET spell crises (analgesia dose)
- Midazolam in Seizure management (0.25mg/kg Nasal)
- Ketamine for Anxiolysis/Analgesia/Sedation (3-6mg/kg Nasal)



Fentanyl

Always available emergency drug

>12months can be safely given Intranasal with Mucosal Atomizer Device

Contraindicated if nose blocked or bleeding or reduced GCS

Dose 1.5micrograms/kg/dose

100micrograms/2ml intravenous solution: 10micrograms = 0.2ml.

Side effects: As for opiates. Opiate toxicity is rarely reported with correct dose and application

If respiratory depression occurs Naloxone: 0.1mg/kg IV/IM OR can also be given IN

Intranasal Fentanyl Administration

STEP 1: Calculate and Draw up correct volume of Drug to 2.5ml Leur-lock syringe

STEP 2: Attach mucosal atomiser device (MAD) onto syringe

STEP 3: Position child at 45 degrees with head turned to one side

STEP 4: Insert MAD loosely to nostril and press plunger firmly

If dose exceeds 0.3ml divide and use both nostrils to maximise absorption

If not effective, may repeat dose after 15 minutes (Max 2 doses)

Onset: 5minutes, Peak effect: 10-30minutes, Duration: 1hour

Calculating dose of Intranasal Fentanyl

Child weighs 14kg

- Dose is 1.5micrograms/Kg
 - $1.5 \times 14 = 21$ micrograms
- 100micrograms in 2ml solution
 - 21micrograms in $2/100 \times 21 = 0.42$ ml
- $0.42\text{ml} > 0.3\text{ml}$
 - 0.21ml per nostril



Still need
the bubbles!



Summary

- Procedural pain is a common negative experience for children (and their caregivers) when accessing emergency child health services
- Preventable
- Non-Pharmacological and Pharmacological methods combined
- Minor procedures hurt too! Repeated episodes -> long term effects
- Ketamine is great but other options are available for analgesia
- Intranasal route for opiate administration is pain free, safe, easy and quickly effective

Thank you listening

Further Reading

- SASA Paediatric guidelines for the safe use of procedural sedation and analgesia for diagnostic and therapeutic procedures in children:2021-2026. Southern African Journal of Anaesthesia and Analgesia 2021;27(4 Supplement 2):S1-83 <https://doi.org/10.36303/SAJAA.2021.27.4.S2.2635>
- Dunn et al. Paediatric Procedural sedation and analgesia in a South African emergency centre; a single-centre descriptive study. IJEM online May 2023 <https://doi.org/10.1186/s12245-023-00508>
- Burger et al. Emergency Centre-based paediatric procedural sedation: current practice and challenges in Cape Town. Southern African Journal of Anaesthesia and Analgesia 2019; 25(1):23–28 <https://doi.org/10.1080/22201181.2018.1541561>
- RCEM Ketamine procedural sedation of children in emergency departments. Updated 2020
- [Emergencymedicines.com Episode 76 Paediatric Procedural sedation Michael Killian 2016](https://www.emergencymedicines.com/episode-76-paediatric-procedural-sedation-michael-killian-2016)
- ACEP Clinical practice guideline for emergency department Ketamine dissociative sedation: 2011 update
- ACEP Policy statement: Unscheduled procedural sedation: a multidisciplinary consensus Practice guideline 2018

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