

# Antibiotics, Local Anaesthetics & Analgesics In Paediatric Dentistry

DENT 5312  
Paediatric Dentistry Module

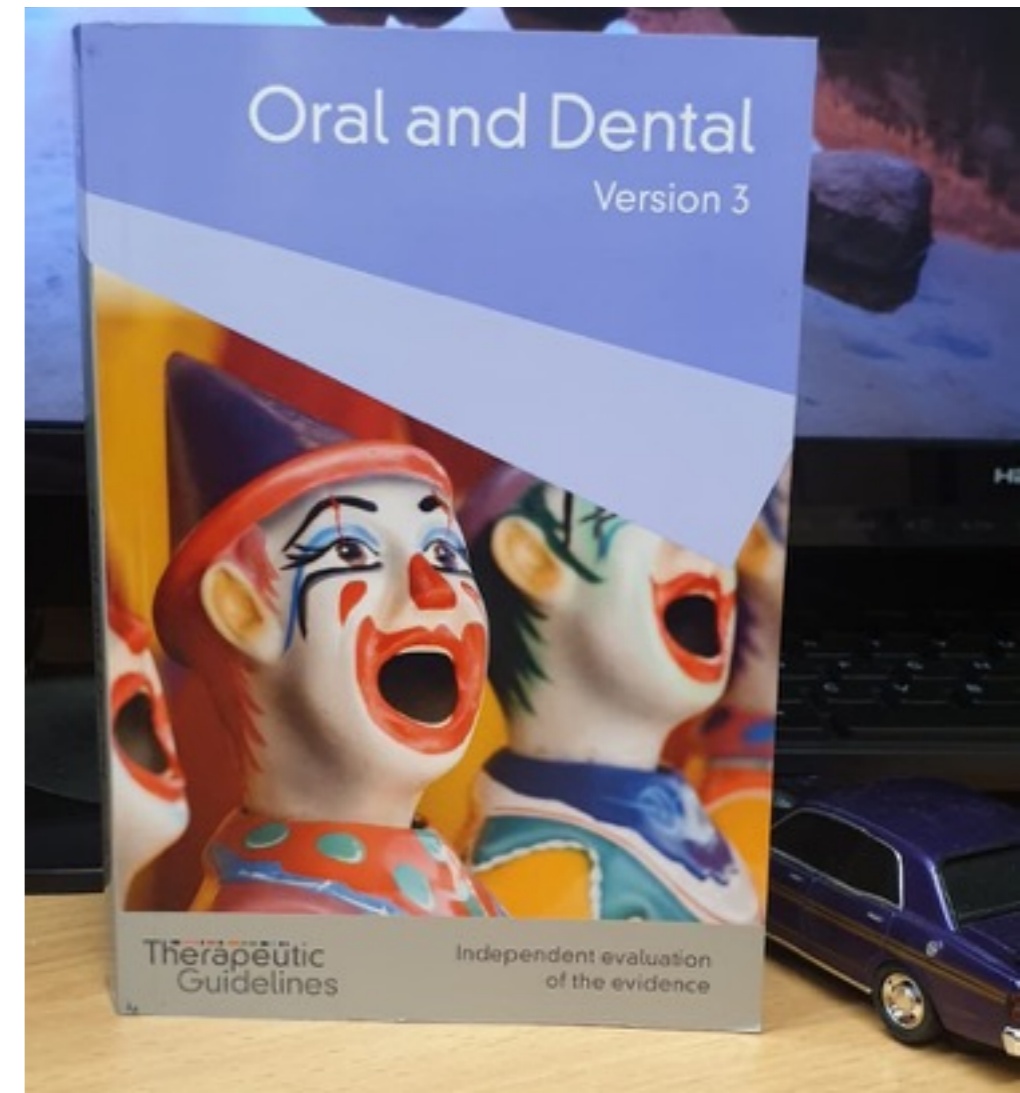
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**Dr Jilen Patel**

*Specialist Paediatric Dentist  
Senior Lecturer, Clinical Dentistry  
UWA Dental School*

# Prescription Writing

- MUST READ
- Oral and Dental Therapeutic Guidelines Version 3
- Chapter: Dental prescriptions and prescription-writing
- Chapter: Practical information on using drugs in dentistry
- Chapter: Acute odontogenic infections



# Prescription Writing

- Must be legible
- Prescriber's name, address, telephone number and qualifications
- Patient's full name, address and date of birth, weight (especially for children)
- Date the prescription is written
- Drug name in full
- Drug strength (250mg, 500mg)
- Drug form (tablet, capsule, suspension)
- Quantity of drug to be administered
- Drug dose, route of administration, frequency and duration of treatment
- Clear instructions for the patient (NOT 'take as directed')
- "for dental treatment only"
- Handwritten signature of prescriber

# Common Antibiotics In Paediatric Dentistry



# Common Antibiotics

- **Phenoxymethylpenicillin (Penicillin V)**
- **Amoxycillin**
- **Cephalexin**
- **Clindamycin**
- **Metronidazole** *(to be used in addition to one of the above antibiotics for spreading odontogenic infections)*

# Common Antibiotics

- **Phenoxymethylpenicillin (Penicillin V)**
- narrow spectrum penicillin: Actinomyces, most Strep spp., Fusobacterium spp.
  - inactivated by strains producing beta-lactamase enzymes
- drug of first choice in odontogenic infections due to its narrow (and appropriate) spectrum of activity
- has fewer gastrointestinal problems than amoxycillin and is less likely to cause a rash

# Common Antibiotics

- **Phenoxymethylpenicillin (Penicillin V)**
- Dose:
  - 12.5mg/kg up to 500mg orally
  - taken 1 hour before meals or 2 hours after 6 hourly for 5 days
  - compliance??
  - 125mg/5ml; 150mg/5mL; 250mg/5ml



# Common Antibiotics

- **Amoxicillin**
- moderate spectrum penicillin
- not affected by food and requires fewer oral doses per day
- Dose
  - 12.5mg/kg up to 500mg orally
  - taken 8 hourly for 5 days
  - 100mg/ml; 125mg/5mL; 250mg/5mL; 500mg/5mL
  - Nb: amoxicillin + clavulanate has a limited role in treating odontogenic infections

# Common Antibiotics

- Cephalexin
- moderate spectrum cephalosporins
- maybe an alternative to patients who are sensitive to penicillin (excluding immediate hypersensitivity)
- not appropriate for those on long-term penicillin or have taken a related penicillin more than once in the previous month
- Dose
  - 12.5mg/kg up to 500mg orally, taken 8 hourly for 5 days
  - 125mg/5mL; 250mg/5mL

# Common Antibiotics

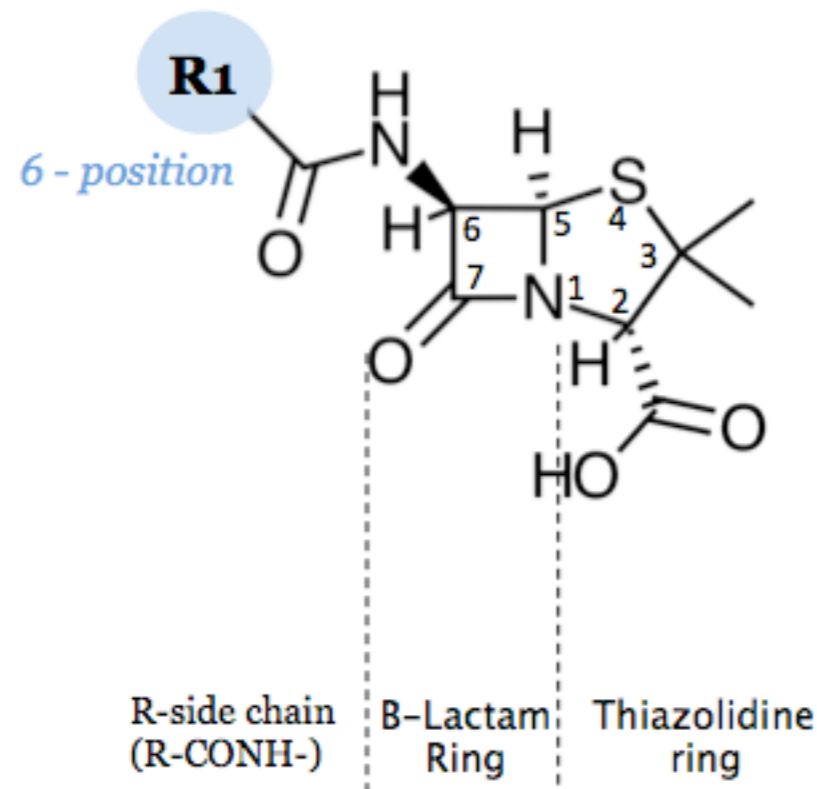
- **Clindamycin**
- first choice in penicillin allergic patients
- Dose:
  - 7.5mg/kg up to 300mg orally taken 8 hourly for 5 days
  - 150mg capsules

# Common Antibiotics

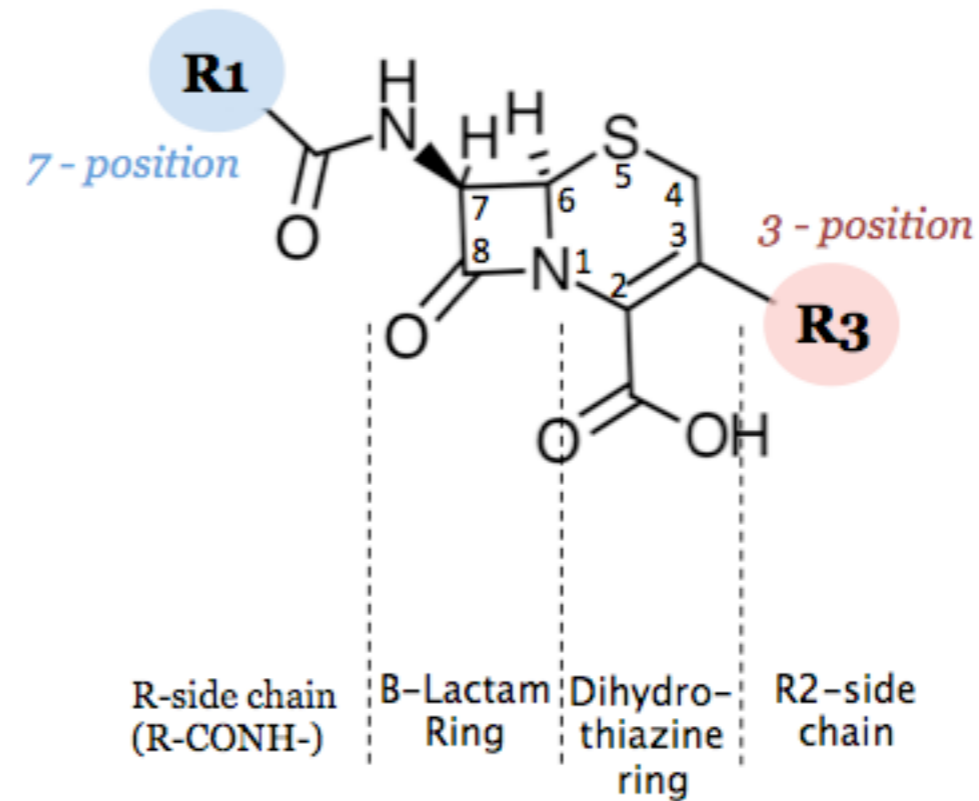
- Penicillin Allergy
- Clinical history: nature and severity of the reaction
- Childhood rash?
  - most often caused by viral infections or drug-virus interaction rather than a true allergy
  - patients can be rechallenged under specialist guidance for definitive assessment
- Can be immediate (IgE-mediated) or delayed (T-Cell mediated)

# Common Antibiotics

- Penicillin Allergy: cross-reactivity between beta lactams



Penicillins



Cephalosporins

# Common Antibiotics

- Penicillin Allergy



ascia  
australasian society of clinical immunology and allergy  
www.allergy.org.au



**Penicillin Allergy**  
GUIDE FOR HEALTH PROFESSIONALS

- In **severe** penicillin allergy (e.g. anaphylaxis, bronchospasm, urticaria, angioedema), **avoid ALL penicillins, cephalosporins and other beta-lactam antibiotics**
- In **non-severe** penicillin allergy (e.g. mild rash) use cephalosporins and carbapenems **with caution**
- Some reactions (e.g. nausea) are not considered allergies and do not warrant prohibiting penicillin use



- Record allergy alert in the patient health record allergy section
- Record details of allergy incident including drug name, description of reaction, severity, date, and name of the person making the report
- In hospitals contact ward pharmacist, infectious diseases or immunology consultant for any concerns/queries
- Immunology consultation for formal testing and/or desensitisation may be indicated

# Common Antibiotics

- **Metronidazole**
- used as a supplement to penicillin or clindamycin in the case of an unresponsive or severe infection
- active against most anaerobic bacteria: Peptoniphilus spp, P. gingivalis, P. oralis
- Dose:
  - 10mg/kg up to 400mg orally taken 12 hourly for 5 days
  - 200mg/5mL



# Common Antibiotics

- **Metronidazole**
- side effects: nausea, vomiting, flushing, headache (Adults should avoid alcohol for at least 24hrs after completing the course of metronidazole)
- interactions with several drugs e.g. Warfarin

# Common Analgesics In Paediatric Dentistry



# Common Analgesics

- Paracetamol (panadol)
- Ibuprofen (nurofen)
- Painstop?
- Aspirin?

# Common Analgesics

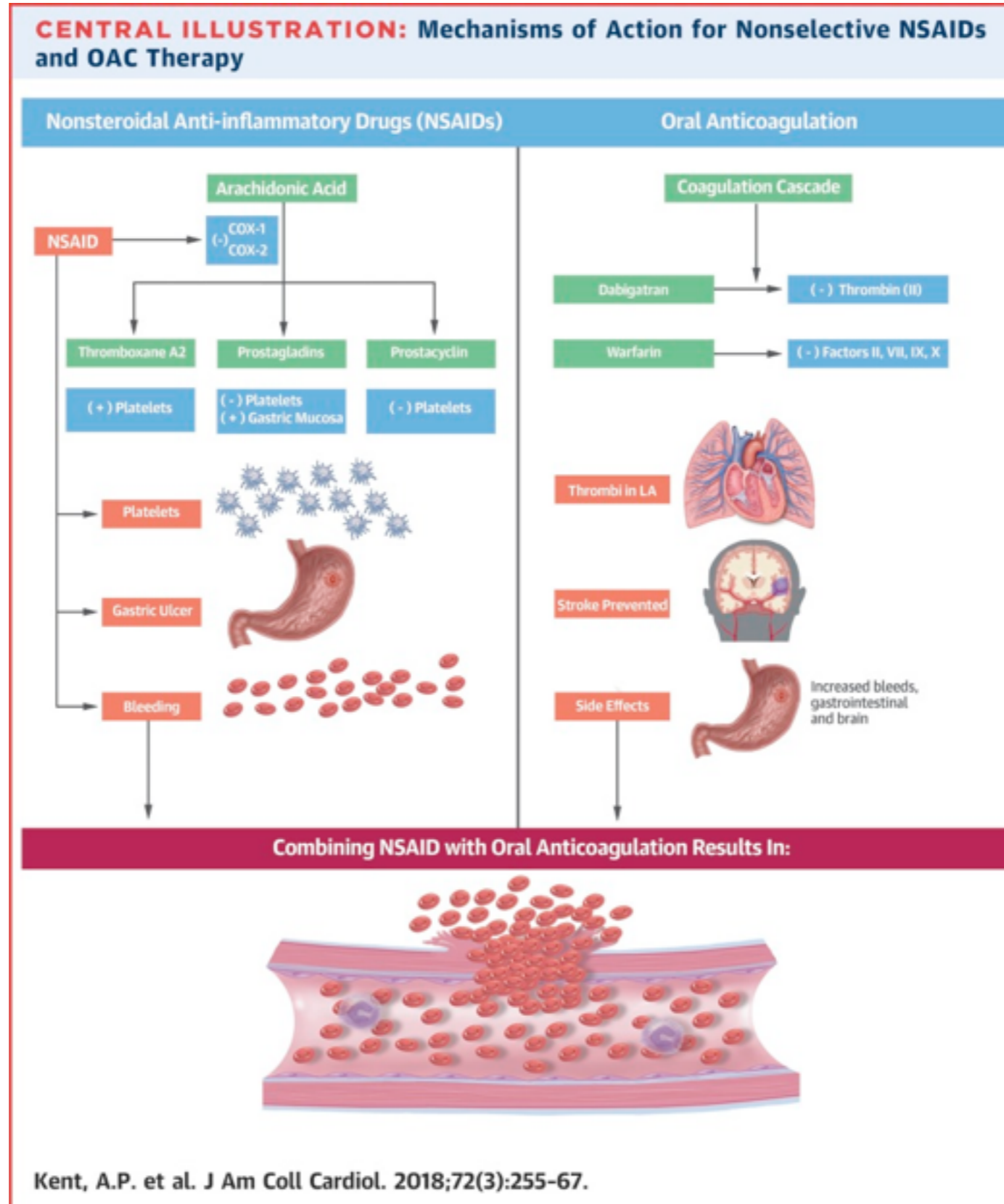
- **Paracetamol**
- Dose:
  - 15mg/kg orally
  - 4 to 6 hourly (to a maximum daily dose of 4g/day)
  - 120 mg /5 ml
- contra-indications: impaired renal or hepatic function

# Common Analgesics

- **Ibuprofen**
- Dose:
  - 5-10mg/kg orally
  - 6 to 8 hourly (to a maximum daily dose of 2400mg/day)
  - 100 mg / 5 ml
- contra-indications: hypersensitivity (asthma, rhinitis, urticaria) renal or cardiac impairment, gastroenterological pathology, anticoagulants/corticosteroids
- \*use the lowest effective dose, no more than 3 days without review

# Common Analgesics

- Ibuprofen



# Common Analgesics

- **Painstop?** *Paracetamol + codeine*
- Paracetamol 120mg per 5mL + Codeine Phosphate 5mg per 5mL (dosage on the bottle)
- for acute pain, 0.8 ml / kg 6h Painstop Night
- Paracetamol 120mg/5mL + Codeine Phosphate 5mg/5mL + Promethazine Hydrochloride 6.5mg/5mL + Ethanol 0.5mL/ 5mL (dosage on the bottle)
- acute pain + sedation, 0.5 ml /kg 6h

*FOR HISTORICAL REFERENCE ONLY!*

# Common Analgesics

- *Painstop? Paracetamol + codeine*



EMNote

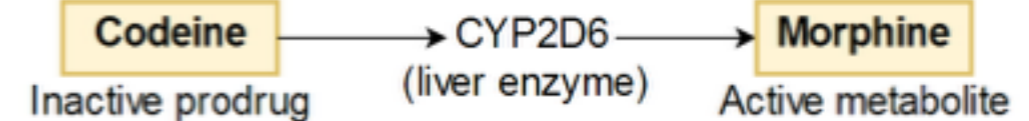
American Academy  
of Pediatrics



DEDICATED TO THE HEALTH OF ALL CHILDREN™

## Codeine: Time To Say “No”


Joseph D. Tobias, MD, Thomas P. Green, MD, Charles J. Coté, MD, SECTION ON ANESTHESIOLOGY AND PAIN MEDICINE, COMMITTEE ON DRUGS



1. Codeine **should not be prescribed** to children
2. Codeine may cause unanticipated respiratory depressions and deaths in children who are **ultrarapid metabolizers**

# Common Analgesics

- **Painstop?** *Paracetamol + codeine*



**Australian Government**  
Department of Health  
Therapeutic Goods Administration



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## Safety review: Codeine use in children and ultra-rapid metabolisers

22 November 2017

### Update - recommendations implemented

Consumers and health professionals are advised that the recommendations of the safety review of codeine use in children and rapid metabolisers have now been implemented.

The Product Information (PI) documents for all prescription codeine products have been updated to reflect the findings of the TGA's safety review.

Specifically, codeine products should no longer be used in children under 12 years of age, or in children aged 12-18 years who have recently undergone surgery to remove their tonsils or adenoids.

Codeine should also not be used by breastfeeding mothers or in patients known to be ultra-rapid metabolisers.

Most PIs for over-the-counter codeine products now have warnings to not use these products in children aged under 12 years.

From 1 February 2018, all Schedule 2 (Pharmacy Medicine) and Schedule 3 (Pharmacist Only Medicine) codeine-containing products will be rescheduled to Schedule 4 (Prescription Only Medicine).

In the meantime, the TGA has identified a small number of over-the-counter codeine products, all of which are tablets, that are currently being marketed and still have dosage instructions for children aged 6-12 years. The sponsors of these products have written to pharmacists to inform them of the relevant safety information including that these products should not be used in children under 12 years of age.

### Related information

- [Update of codeine safety and efficacy review](#)
- [Scheduling delegate's final decision: codeine, December 2016](#)
- [Update on the proposal for the rescheduling of codeine products](#)

# Common Analgesics

- **Aspirin?**

**[Severe Reye syndrome: report of 14 cases managed in a pediatric intensive care unit over 11 years].**

[Article in French]

Thabet F<sup>1</sup>, [D](#) [Drug Saf.](#) 2006;29(12):1111-21.

⊕ **Author information** **Reye's syndrome: the case for a causal link with aspirin.**

**Abstract** [Glasgow JF](#)<sup>1</sup>.

Idiopathic F **⊕ Author information**

epidemiology [Drug Saf.](#) 2002;25(4):225-31.

inherited metabolic **Abstract** **Is aspirin a cause of Reye's syndrome? A case against.**

syndrome a Reye's s years of [Orłowski JP](#)<sup>1</sup>, [Hanhan UA](#), [Fiallos MR](#).

**METHODS:** that their **⊕ Author information** [Paediatr Drugs.](#) 2007;9(3):195-204.

center with drug app **Abstract** **Aspirin and Reye syndrome: a review of the evidence.**

the ultimate two, the [Schrör K](#)<sup>1</sup>.

**RESULT:** For evidence Reye's s consider associat

acetaminophen and they establish

alanine-aminotransferase case nu of Reye's

continuous the drug syndrom

neurological therape aspirin v **⊕ Author information** **Aspirin use to be banned in under 16 year olds.**

**CONCLUSI** country. Re unlike th viral mut [Macdonald S](#).

syndrome a providec that time [Macdonald S](#).

notifications and self [Macdonald S](#).  
preceding \ PMID: 12411346 PMCID: [PMC1169585](#) DOI: [10.1136/bmj.325.7371.988/c](#)

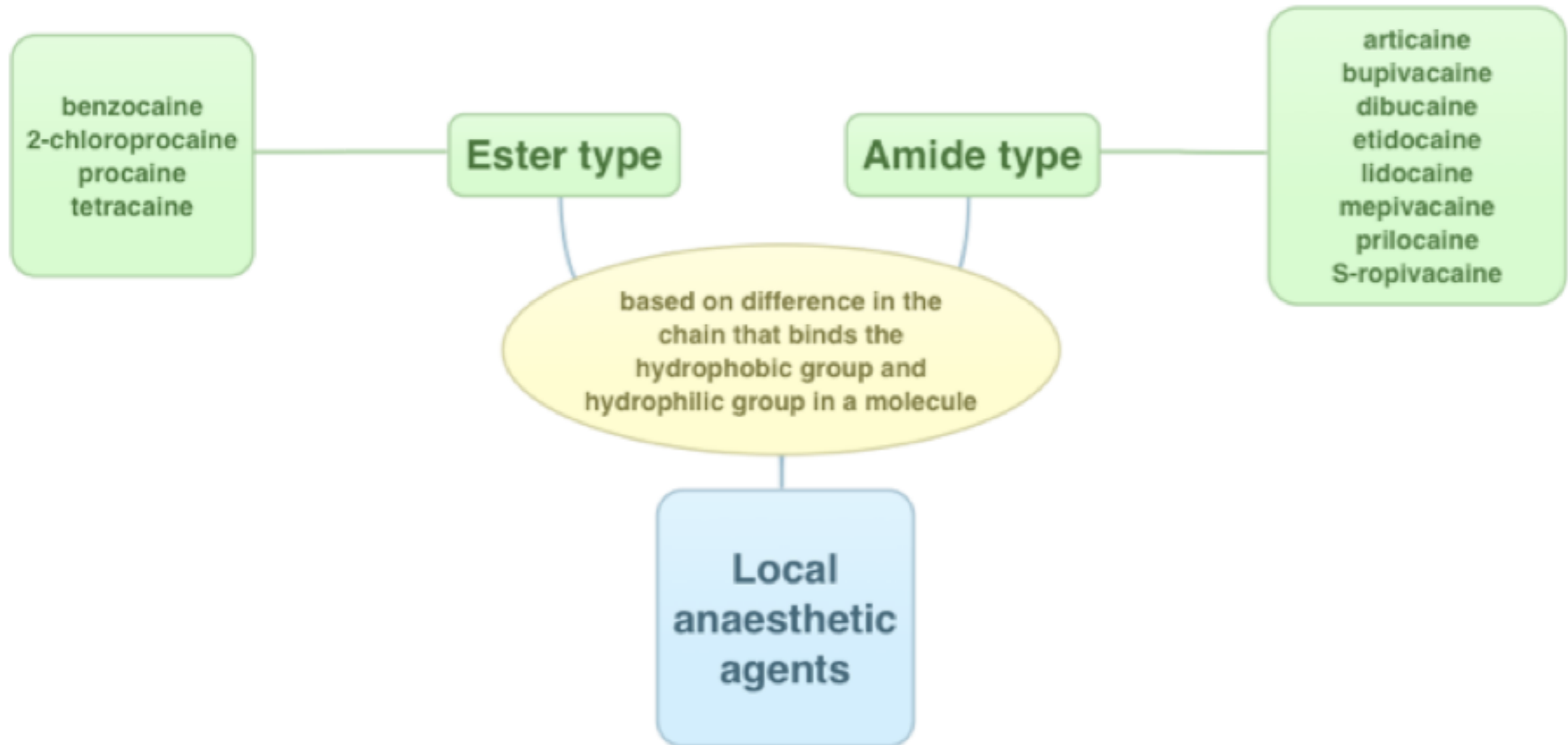
infections and diseases might present clinically with Reye-like symptoms. Exogenous agents involve a number of toxins, drugs (including aspirin [acetylsalicylic acid]), and other chemicals. The 'rise and fall' in the incidence of Reye syndrome is still poorly understood and unexplained. With a few exceptions, there were probably no new Reye-like diseases reported during the last 10 years that could not be explained by an inherited disorder of metabolism or a misdiagnosis. This may reflect scientific progress in the better understanding of cellular and molecular dysfunctions as disease-determining factors. Alternatively, the immune response to and the virulence of a virus might have changed by alteration of its genetic code. The suggestion of a defined cause-effect relationship between aspirin intake and Reye syndrome in

# Local Anaesthesia In Paediatric Dentistry



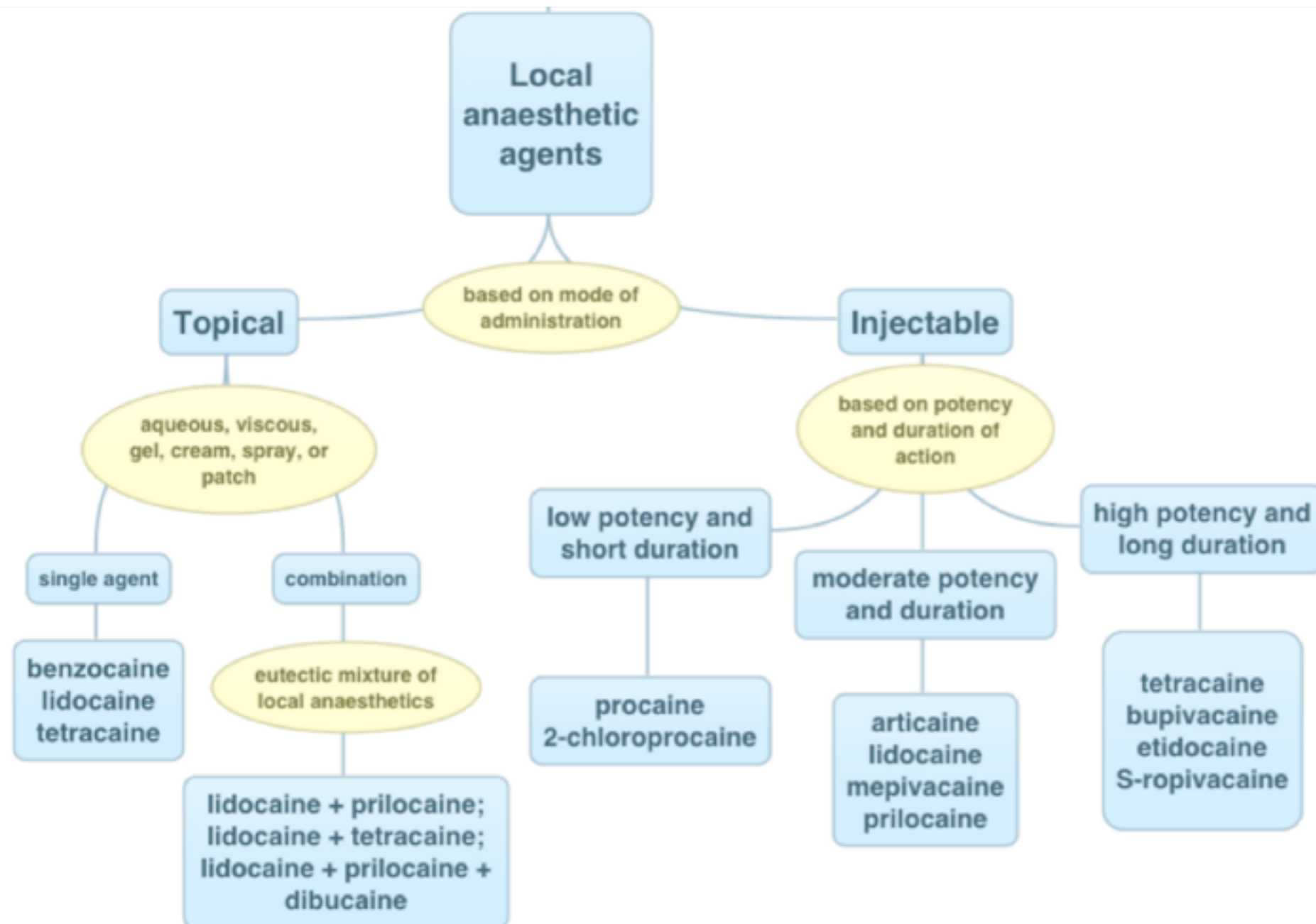
# Local Anaesthetics

- Assumed knowledge: mechanisms of action of LA, types of LA, indications/contraindications, duration on onset etc



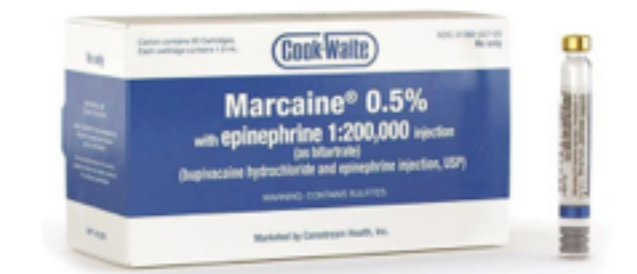
# Local Anaesthetics

- Assumed knowledge: mechanisms of action of LA, types of LA, indications/contraindications, duration on onset etc



# Local Anaesthetics

- 2% Lignocaine with 1:80,000 Adrenaline
  - Max dose: 7mg/kg
- 4% Articaine with Adrenaline 1:100,000
  - Max dose: 7mg/kg
- 0.5% Bupivacaine with 1:200,000 Adrenaline
  - Max dose: 2mg/kg



# Local Anaesthetics

- Variations among countries/regions



# Local Anaesthetics

- Variations among countries/regions

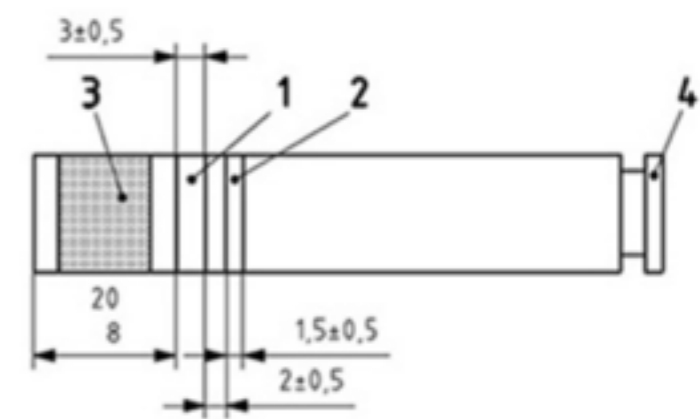
Table 1. Local anaesthetic agent and concentration colors (Band 1)

Product	Band color (PMS)				
Articaine - 4%	Gold 871	Gold 872	Gold 873	Gold 874	Gold 875
Bupivacaine - 0.5%	Blue 300	Blue 301			
Lidocaine - 2%	Red 185	Red 186	Red 199	Red 200	
Lidocaine - 3%	Purple 266	Purple 267			
Mepivacaine - 2%	Brown 477	Brown 478	Brown 498	Brown 499	
Mepivacaine - 3%	Tan 406	Tan 407	Tan 408		
Prilocaine - 3%	Orange 136	Orange 137			

Table 2. Vasoconstrictor and concentration colors (Band 2)

Product	Band color (PMS)				
No vasoconstrictor	White	None			
Epinephrine < 1:200 000	Yellow 108	Yellow 109	Yellow 110	Yellow 115	Yellow 116
Epinephrine < 1:100 000 to 1:200 000	Orange 136	Orange 137			
Epinephrine < 1:50 000 to 1:100 000	Brown 477	Brown 478	Brown 498	Brown 499	
Epinephrine 1:50 000	Green 347	Green 348	Green 355	Green 356	
Levonordefrin	Black	None			
Nor-epinephrine 1:100 000	Tan 406	Tan 407	Tan 408		
Nor-epinephrine 1:25 000	Purple 266	Purple 267			
Octapressin (felypressin)	Blue 300	Blue 301			

Figure 1. Placement of colour coding bands on cartridge



Dimensions in millimeters

Key	
1:	Band #1 for coding of concentration of anaesthetic agent
2:	Band #2 for coding of concentration of vasoconstrictor
3:	Cartridge plunger
4:	Disc end



# Local Anaesthetics

- Variations among countries/regions



# Local Anaesthetics

## Option 1

- Calculating dosage
- 1% solution contains 1g in 100mL
  - which is 10mg in 1mL
- 1mL of a 1% solution contains 10mg of LA base
- 2% lignocaine = 20mg/mL
- Each carpule:
  - 2.2mL (x 20mg) = 44mg of lignocaine per carpule
  - 1.8mL (x 20mg) = 36mg of lignocaine per carpule
  - 1.7mL (x 20 mg) = 34mg of lignocaine per carpule

# Local Anaesthetics

- Calculating dosage
- *What is the maximum dose of 2% Lignocaine with adrenaline can you give a 25 kg child?*
- Max dose = 7mg/kg (ie. 7mg/kg x 25kg) = 175mg
- 2% Lignocaine ie 20mg/ml
- ie. 175mg/20mg = 8.75ml (which is 3.9 carpules) [8.75ml/2.2mL carpules]

# Local Anaesthetics

- Calculating dosage

Option 2

- *What is the maximum dose of 2% Lignocaine with adrenaline can you give a 25 kg child?*

$$\text{Maximum dose (mg/kg)} \times \frac{\text{weight (kg)}}{10} \times \frac{1}{\text{concentration of LA}} = \text{Max dose (ml)}$$

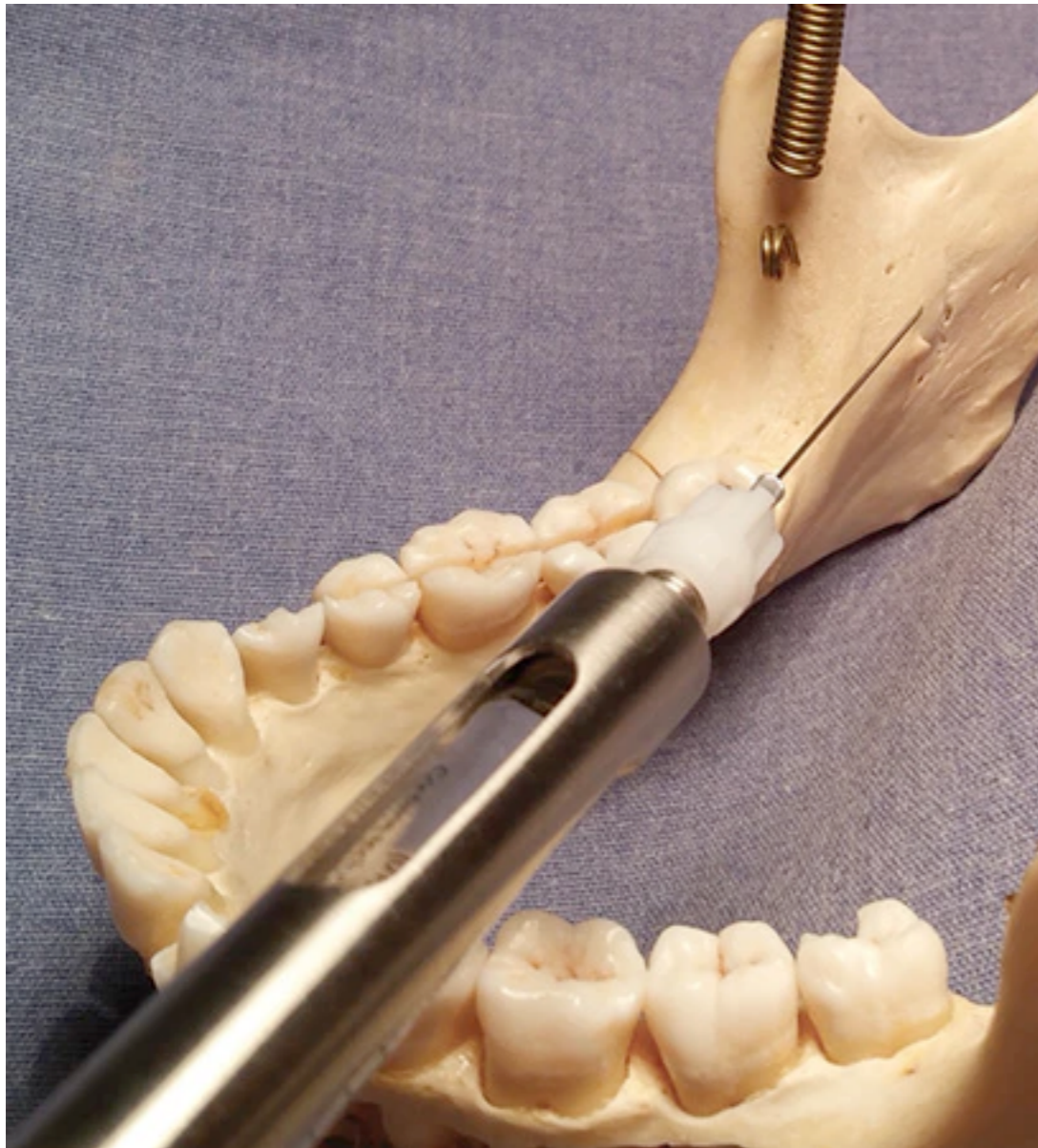
$$7 \text{ (mg/kg)} \times \frac{25 \text{ (kg)}}{10} \times \frac{1}{2} = 8.75 \text{ ml}$$

# Local Anaesthetics

- Documentation!
- must include the type and dosage of local anaesthetic
- Dosage of vasoconstrictors, if any, must be noted
  - e.g. 2% or 44 mg lignocaine with 1:100,000 epinephrine include the type of injection(s) given
  - e.g. infiltration, block, intra-osseous  
needle selection, and patient's reaction to the injection (eg. Beh: +)
- patients for whom the maximum dosage of local anaesthetic may be a concern, the weight should be documented preoperatively

# Local Anaesthetics

- Techniques: Inferior Alveolar Nerve Block



*The IANB has the LOWEST success rate of all major nerve blocks in the human body - Malamed 2015*

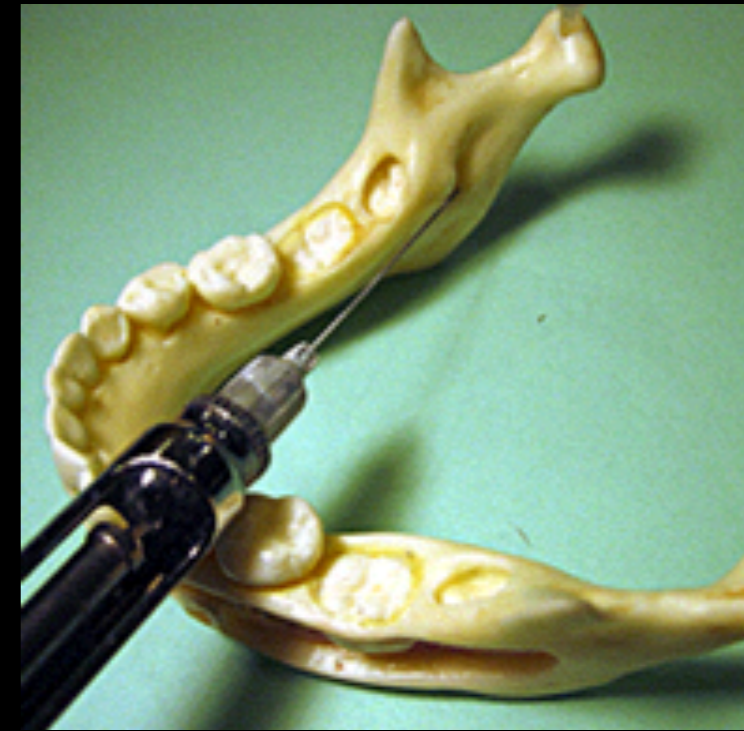
# Local Anaesthetics

- Techniques: Inferior Alveolar Nerve Block



# Local Anaesthetics

- Techniques: Inferior Alveolar Nerve Block
- Differences between adult and children:
  - ramus shorter vertically
  - narrower antero-posteriorly
  - consider using a short needle
  - gauge 27 to 30



# Local Anaesthetics

- Techniques: Inferior Alveolar Nerve Block
  - use precise technique
  - practice aspiration technique
  - use vasoconstrictors
  - adhere to maximum dose
  - use half carpule initially and then re-inject if inadequate or block is missed
  - post-operative care!

# Local Anaesthetics

- Use of Vasoconstrictors in children
  - high cardiac output
  - greater tissue perfusion
  - higher basal metabolic rate
  - liver enzymes less mature than in adults so detoxifying of LA's slower
  - immature CNS and CVS so more susceptible to toxicity at low concentrations

# Local Anaesthetics

- High doses of local anaesthetic
  - CNS: depression, sleepy
  - CVS: decreased contractile force, decreased cardiac output
  - Pulmonary system: respiratory arrest - DEATH
- IV administration: analgesia, anxiety, restlessness, GA

# Local Anaesthetics

- Delivery systems



# Local Anaesthetics

- Delivery systems

## Needle Free Injector

Manufactured by Injex Pharma GmbH, Berlin, GERMANY

# INJEX



Injection *WITHOUT* Needle

SAY GOODBYE TO NEEDLE PAIN!  
**YES, IT'S POSSIBLE WITH...**  
**DENTAL Vibe**



# Local Anaesthetics

- Delivery systems: camouflage



Thank You