Paediatric Pain Management

Brisbane South PHN
General Practitioner Pain Management Seminar
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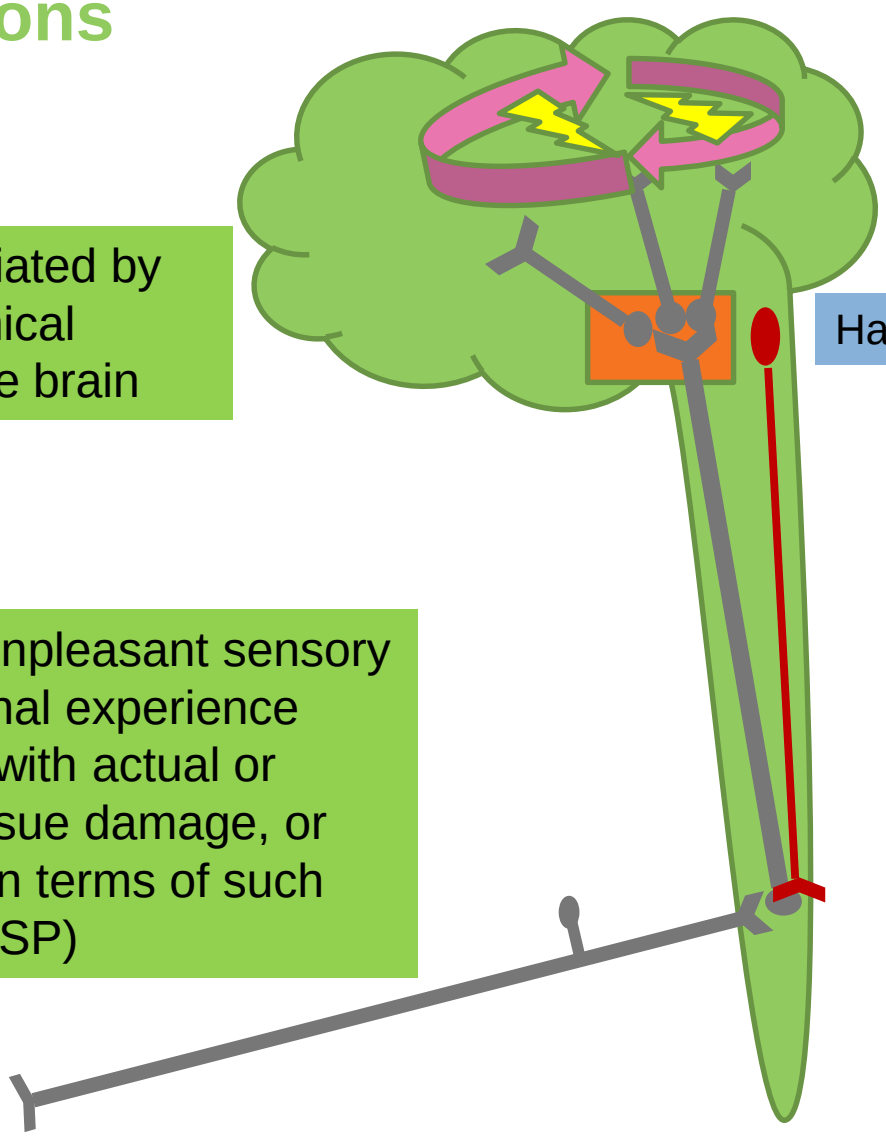
Queensland Government

Outline

- Definitions & descriptions:
  - Pain
  - Acute pain and persistent pain
  - Nociceptive, neuropathic, and nociplastic pain
- Acute pain management
  - Evidence for the use of analgesics in paediatric acute pain management
  - Case studies
- Persistent Pain Management
  - Persistent pain and the sociopsychobiomedical approach
  - Analgesics for persistent pain
  - Case studies

Definitions

Pain is mediated by electrochemical activity in the brain



Has sensory and emotional components

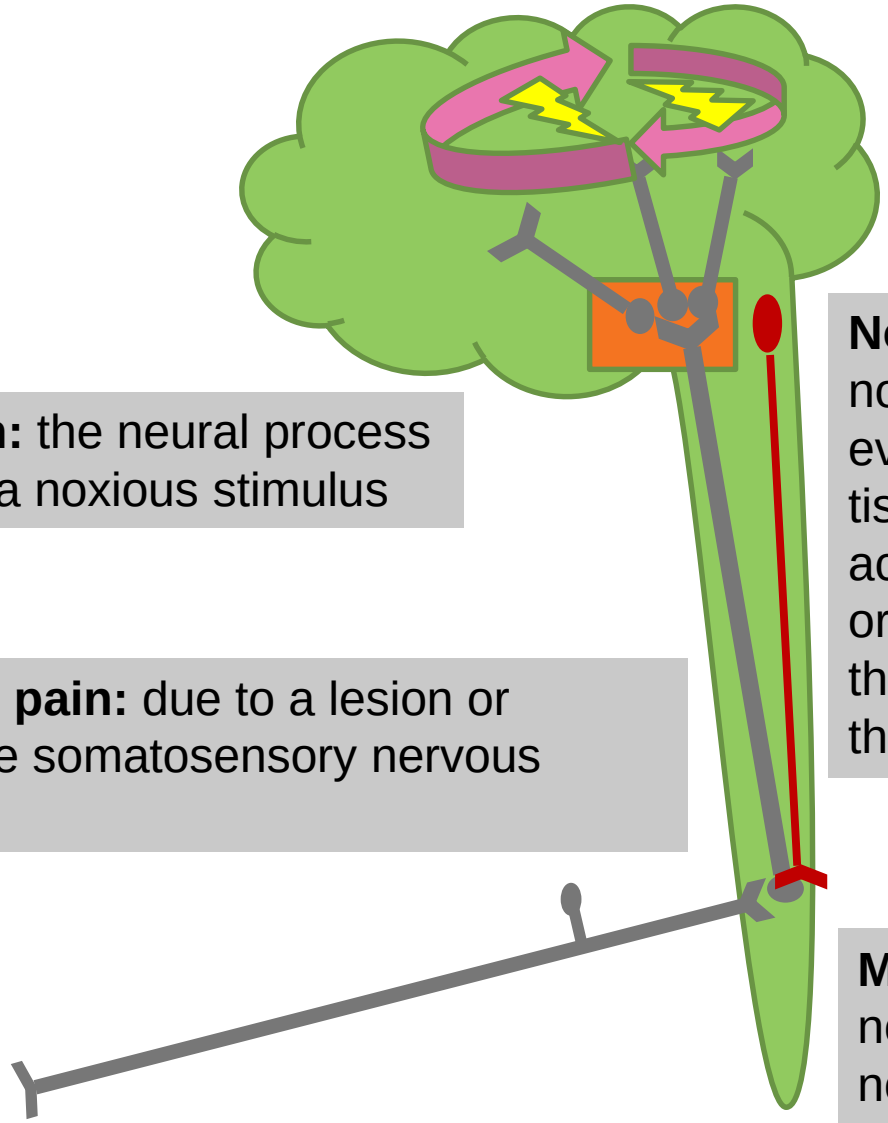
Experience = consciousness

Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or expressed in terms of such damage (IASP)

Is our body's alarm system

The alarm system can be faulty

Definitions



Nociception: the neural process of encoding a noxious stimulus

Neuropathic pain: due to a lesion or disease of the somatosensory nervous system

Nociplastic pain: altered nociception despite no clear evidence of actual or threatened tissue damage causing the activation of peripheral nociceptors or evidence for disease or lesion of the somatosensory system causing the pain.

Mixed pain: Two or all of nociceptive, neuropathic and nocipalstic pain

Simple analgesia for acute pain – the evidence

Paracetamol and NSAID's are effective in acute post-operative pain (Wong et al 2013)

Paracetamol can be used from birth onwards, with dose adjusting in the neonatal period

- 32 – 44/40, 3 – 5kg: 15 mg/kg PO q8h max daily dose 45 mg/kg
- >44/40, 15 mg/kg PO q6h, max daily dose 60 mg/kg

Ibuprofen (10 mg/kg PO) and ketorolac (0.2 mg/kg IV or IM) are used down to 3 months old (PCA 52/40) if fit and well

COX-II inhibitors are increasingly being used in children

- Paediatric data very limited
- Celecoxib 2 mg/kg PO BD, Parecoxib 1 mg/kg IV/IM daily
- Avoid use in under 2 y.o. (reduced & unpredictable clearance)

Opioids

Opioids are the most powerful analgesics that we have and are integral to multimodal analgesia for moderate to severe acute pain

Opioids carry heavy baggage, which accumulates with time. Use must be judicious

- Respiratory depression
- Nausea, vomiting, pruritus, urinary retention
- Cognitive impairment and sedation
- Tolerance, hyperalgesia, withdrawal
- Immune modulation
- Dental hygiene
- Osteoporosis

Codeine

FDA Drug Safety Communication: FDA restricts use of prescription codeine pain and cough medicines and tramadol pain medicines in children; recommends against use in breastfeeding women

- FDA contraindications & warnings on codeine use: Increased risk of respiratory depression in at risk populations (ultra-rapid metabolizers)
    - 64 cases (24 deaths) of serious breathing problems reported to FDA from 1969 – 2015)
    - Numerous cases of excess sleepiness and serious breathing problems (1 death) in breastfed infants
- Variability in efficacy (poor, intermediate, rapid & ultrarapid metabolizers)
- Pharmacogenetics testing (Over 100 allelic variants of CYP2D6)
- 8 mg of codeine = 1 mg morphine for extensive (or normal) metabolisers

What about tramadol?

Society for Paediatric Anaesthesia in New Zealand and Australia

SPANZA Advisory on Tramadol - May 2017

- FDA contraindications and warning's on tramadol: Increased risk of respiratory depression in at risk populations (ultra-rapid metabolisers)
  - 9 cases (3 deaths) of serious breathing problems identified from 1969 – 2016. All 3 deaths had taken oral drops preparation
  - No adverse reports in literature with tramadol in breastfeeding mothers
- SPANZA statements
  - Continue to use in breastfeeding mothers
  - Continue to use in paediatrics, judiciously in OSA and obesity patients, and adenotonsilectomy patients.
- Dose **1 – 2 mg q6h PRN (Max 400 mg per day),** or **0.5 – 1 mg/kg q6h PRN** in higher risk populations

Specific opioids cont

Strong opioids – immediate release

- Oxycodone 0.1 – 0.2 mg/kg q4h PRN, max dose 10 mg
- Morphine 0.15 – 0.3 mg/kg q4h PRN, max dose 15 mg
- Avoid or dose reduce if risk factors

Strong opioids – sustained release

- Avoid initiating in primary care
- May encounter post-discharge from hospital, should have weaning plan in place
- There is no reason for these to be continued longer than 2 weeks

Case study – Analgesia post adenotonsilectomy

- 3 y.o. 16 kg male clinically diagnosed with severe OSAS for adenotonsilectomy
  - Otherwise fit and healthy, first GA
  - Ex-term baby, uncomplicated pregnancy and development
  - Moderately difficult to maintain patent airway with two handed jaw thrust on gas induction of anaesthesia
- Intra-operative medications:
  - IV paracetamol 15 mg/kg (240 mg)
  - IV parecoxib 1 mg/kg (16 mg)
  - IV fentanyl, total 1.5 mcg/kg in divided doses (25 mcg)
  - IV dexamethasone 0.15 mg/kg (2.4 mg)
  - IV ondansetron 0.15 mg/kg (2.4 mg)
- Recovery analgesia
  - IV oxycodone 0.5 mg q 10 mg PRN maximum 3 doses
- Post-operative analgesic regimen
  - PO Paracetamol 15 mg/kg (240 mg) qid for 1 week then PRN
  - PO Ibuprofen 10 mg/kg (160 mg) tds for 1 week, then PRN
  - PO Oxycodone 0.05 – 0.1 mg/kg (0.8 – 1.6 mg) q 4h PRN
  - Ice cold slushy drinks/icy poles PRN

Case study – Analgesia post adenotonsilectomy

- Discharged home D1 post-op after uneventful night
- D3 post-op – present to ED because of pain.
  - ENT review – uncomplicated surgical recovery, maintaining adequate hydration with oral intake.
  - ED review of analgesia
    - Paracetamol 1 – 2 times per day
    - Ibuprofen 1 – 2 times per day
    - Oxycodone 1.6 mg – 5 doses in the last 24 hours
    - No documentation of non-pharmacological strategies e.g. icy poles
  - ED plan: Increase oxycodone to 1.5 – 3 mg q4h PRN
- D5 post-op – present to GP because of pain
  - No surgical complications evident, adequately hydrated
  - Analgesic review – still not taking simple analgesia regularly, oxycodone 3 mg – 6 doses in last 24 hours
  - Analgesic plan – increase oxycodone to 1.5 – 3 mg q3h PRN

Case study – scoliosis surgery

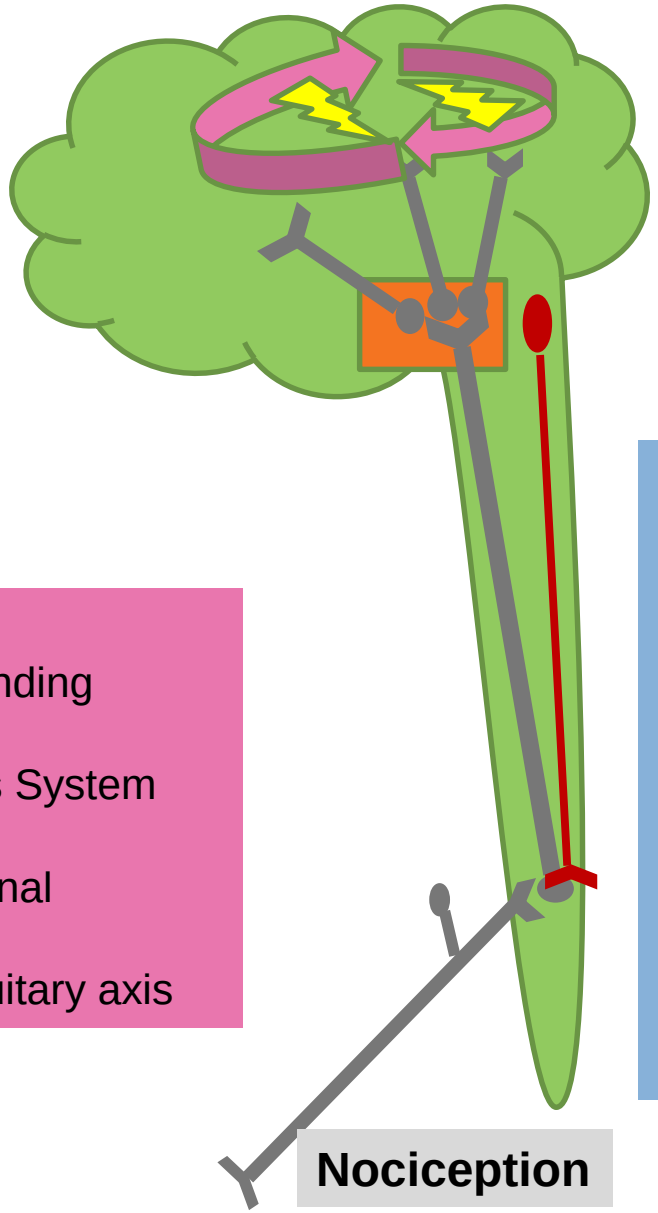
- 15 y.o. 60 kg female with idiopathic scoliosis, had a posterior fusion from T3 – L2
- Post-op analgesia
  - Surgically placed epidurals, 0.125% levobupivacaine continuous infusions, run for 72 hours post-op
  - Regular paracetamol and ibuprofen for 7 days
  - Oral oxycodone IR 5 – 10 mg q4h PRN
  - Targin 20/10 BD started D2 post-op, (60 mg oxycodone in 24 hours, increasing mobilization)
  - Gabapentin 200 mg tds started D3 post-op with removal of epidurals, for “burning type pains” in back
- Discharged from hospital D5 post-op on:
  - Regular paracetamol and ibuprofen
  - Targin 20/10 BD
  - Oxycodone 5 – 10 mg q4h PRN (2 doses in last 24 hours)
  - Gabapentin 200 mg tds

Persistent Pain

Persistent Pain – Sociopsychobiomedical model

Thoughts

Feelings



Behaviors

Mechanisms
- Brainstem & descending pathways
- Autonomic Nervous System activation
- Shared brain neuronal networks
- Hypothalamic – pituitary axis

Thought's, feelings, behaviors shaped by:
- Belief system's & expectations
- Past experiences
- Personality traits
- Cognitive biases e.g. catastrophization
- Mental health
- Living conditions
- Relationships
- Pain

Nociception

Different presentations of persistent pain

Pain related fear driving avoidance behaviors

Boom Busting patterns of activity (often as a coping strategy for something)

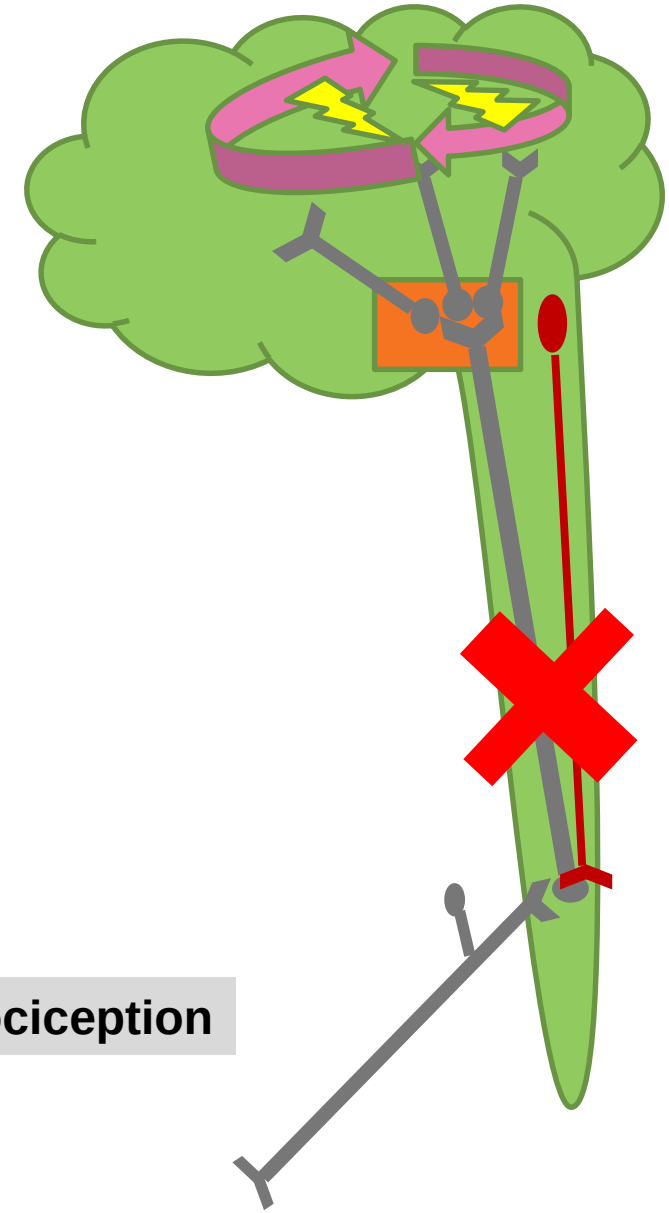
Other sources of fear, examples include:

- Social anxiety
- Performance anxiety
- Generalized anxiety
- Health related anxiety
- Parental/care giver anxiety, and over solicitousness
- Conflict in relationships

Pain is serving a purpose, examples include:

- Expression & communication of emotion
- Attention, access to care giver, emotional support
- Control within a family system
- Avoidance of an unpreferred activity
- Materialistic gains
- Tertiary gains

Persistent Pain – medications



Thoughts

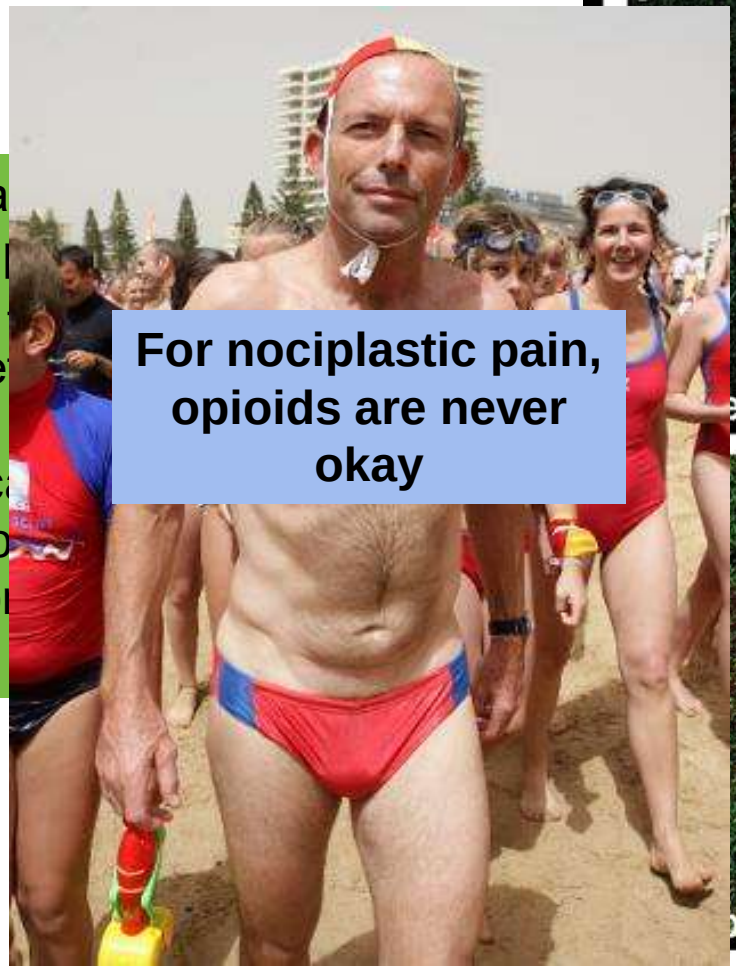
Feelings

Behaviors

Nociception

Opioids

- No RCT's in pa
  non-malignant
- Adult literature
  analgesic bene
  months.
- Long-term effic
  function) unkno
- Dose & duratio
  serious harm.

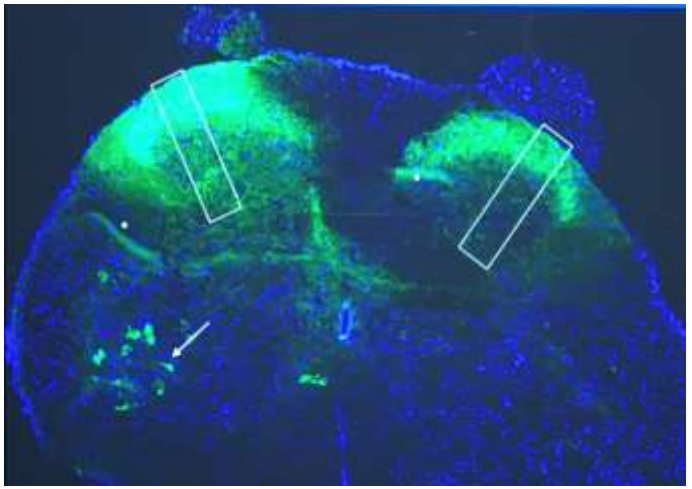


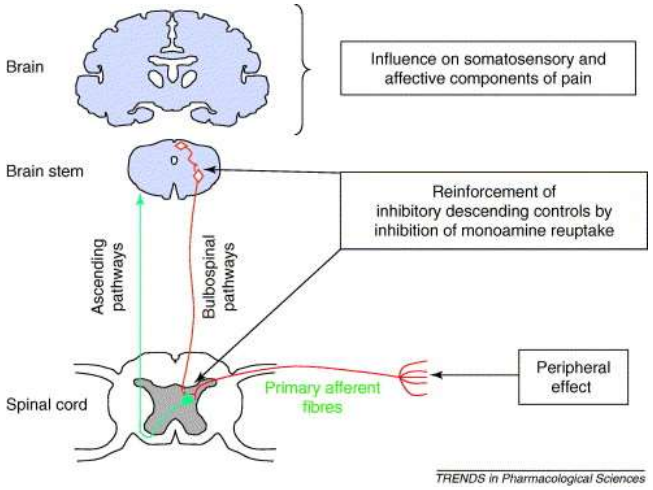
For nociplastic pain, opioids are never okay

Gabapentinoids & Antidepressants

Gabapentinoids:

- Alpha 2 delta agonists
- Gabapentin: Start at 2.5 mg/kg nocte, BD or tds, Maximum dose 10 mg/kg/dose tds
- Pregabalin: Start at 25 mg nocte or BD, Maximum dose ? 4 mg/kg/dose BD
- Very low quality evidence (just two RCT's), efficacy unclear.





Antidepressants with NA activity

- Amitriptyline start at 5 – 10 mg nocte. Maximum dose 1 mg/kg
- Very low quality evidence, efficacy unclear

Simple analgesia

Paracetamol:
•No evidence from RCT's

NSAIDs
- 7 RCT's identified in recent Cochrane review
- Most studies looking at at JIA population
- No Meta-analysis possible
- Adult RCT's – Some NSAIDs helpful for certain chronic pain conditions e.g. osteoarthritis, chronic low back pain

Case study

SE, a 12 y.o. female with pain in her right foot of 3 months duration, triggered by minor incident at dance class

Investigations and orthopaedic review – No cause found

Function
- Reduced school attendance because of pain
- Avoidance of physical activity – had begun using crutches to non-weight bear on left
- Prolonged sleep latency

Pain related fear driving avoidance behaviour
- Rumination about pain
- Belief that pain = damage, and pain is never going to get better
- Worry and belief's shared by mother

Case study 2

LB, a 13 y.o. boy with constant abdominal pain 4 years duration, associated with constipation and an Extensive family history of illness manifesting in the abdominal region

Investigations include OGD, colonoscopy, several abdominal USS, AXR, blood tests, all NAD

Function:

- School – missing 30 days per term for last 4 years
- Physical activity – no organized activity, minimal incidental activity
- Screen time > 8 hours a day
- Sleep – prolonged latency, extended time in bed during day

Case study 2 cont

LB had seen 4 psychologists in 4 years, thought psychology was ”a waste of time”

Social history
- Mother – Anxiety disorder, with some insight
- Father – overwhelmed with work demands, biomedical focus
- Busy household – 2 sisters, both with partners living at home

Outpatient pain management program
- Started with education
- School attendance worsened, end of year fast approaching
- Mother’s anxiety escalated, increasing strain in mother-son dyad
- Plan for SSRI over summer holidays and mental health admission at start of new school year
- Resolution of symptoms over summer holidays
- Psychometric testing revealed learning difficulties, context provided on challenges in school engagement during mental health admission
- Mother receiving own care for anxiety