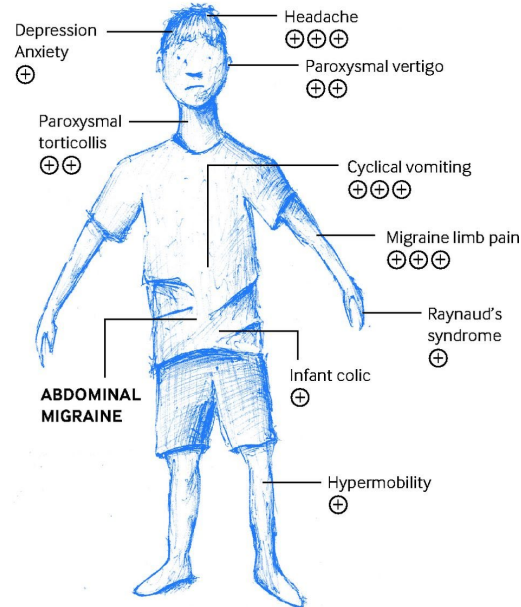




# Migraine in Children and Young People



Strength of evidence for associations: + uncertain,  
++ moderate, +++ strong association'

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**Why talk about migraine in children?**

**Prevalence & Family History**

**Symptoms & signs in children**

**Diagnosing & Managing Migraine in children**

**Abdominal Migraine**

**Other considerations**

# Why worry about migraine?

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Lifelong genetic, neurological brain disorder

- 42 or more genes identified to date
- epigenetics influence gene expression

In top 10 disabling conditions in the world (GBD2016 survey)

- second highest cause of disability worldwide

15% of the population in the UK affected i.e. 1:7

- 3:1 female : male

## Why worry about migraine in children?

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60 per cent of kids prone to headache at some stage

About 10% of school age have migraine

Impact of frequent migraine on the child's life can be huge

- education & school attendance
- family life
- social life
- sports & leisure hobbies
- psychological impact

## Why is diagnosis of migraine in children an issue?

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Nearly half of children who experience headache never get a diagnosis  
Why?

- presenting symptoms may be different from those in adults
- headache may be absent
- patterns of symptoms differ
- attacks tend to be shorter in duration and less frequent
- 'just the normal headaches'
- nobody thinks of migraine – parents, caregivers, HCPs, pharmacists, school

- (Lipton et al 2007)

# Why is diagnosis of migraine in children an issue?

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## Linked conditions give clues

- 🤢 cyclical vomiting
- 🤢 abdominal pain
- 🤢 travel sickness
- 🤢 benign positional paroxysmal vertigo (BPPV)
- 🤢 paroxysmal torticollis

## What age do migraines in children start?

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- 🧒 youngest at NMC aged 4 with migraine with aura
- 🧒 GOSH - patients with premonitory symptoms as young as 18m
- 🧒 peak age is 14
  - 🧒 boys = girls before 14
  - 🧒 girls more after 14
- 🧑 8% boys & 23% girls have experienced migraine by age 17
- 🧑 boys tend to develop migraine at a younger age than girls

# Diagnosing Migraine in children

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## History

- describe a typical attack, symptoms, pattern of attacks, triggers
- ask about impact
- **headache diary**
- family history

## Examination

- full neurological examination & fundoscopy

## Tests

- to exclude other causes not to diagnose migraine

## Brain tumours

- ☹ 41% of kids with brain tumours had headache as the presenting symptom
- ☹ Neurological signs present in 88% at the time of diagnosis (Wilne 2006)



Type	Score	Description	Distraction
Bad days	10	Curled up, <b>worst pain in life</b> , not responding to name, whimper when touched by adult to gain a response	None – stopped by falling asleep
	9	<b>Curled up, huge pain</b> , can say a couple of words if touched by adult to gain a response	Music, being hugged by mum
	8	<b>Lying still</b> , not watching anything, can respond to questions	
Manageable days	7	Lying or sitting still, watching tablet and can answer questions but struggle to hold a conversation will say ' <b>I don't know I can't think</b> '; more <b>sensitive to the light</b>	Audiobook or watching my brothers or watching tablet
	6	Sitting still but <b>able to draw and watch tv</b> ; can push through to play as helps distract from pain	Drawing, watching tv, playing with brothers or friends. Throwing and rolling balls for younger brother.
	5	Some play but <b>limited by pain</b> , rests after. <b>No big movements</b> or tipping head upside down. Can't do reading or writing needed for school – <b>need pain relief or to go home if at school</b>	
Good days	4	Concentration is broken and occasionally <b>trying to push through</b>	I push myself through
	3	<b>Bothered by the pain</b> , starts to affect concentration but still active and chatting	
	2	<b>Noticeable ache</b> not stopping me	
	1	Occasional ache <b>not stopping me</b>	

# Colour coded headache diary for a month

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Week 1							
Week 2							
Week 3							
Week 4							

# Downloadable headache diary for a month



Date	Day of the week	Time attack starts	Pain Score 1-10/10 If zero, leave blank	Medication Taken Initials will do E.g. A = Aspirin	Time medication taken	Other Comments
1						
2						
3						
4						
5						
6						
7						
8						
9						
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31						

## Triggers : things that change

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- skipping meals
- long gaps between meals e.g overnight
- exercise and sports
- weather changes
- stress & excitement
- growth spurts
- hormonal fluctuations oestrogen levels dropping pre-menstrually
- insufficient sleep, prolonged sleep

## Family History

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**Positive FH** higher risk of child developing migraine at a young age

**1<sup>st</sup> degree relatives have migraine without aura (MO)**

1.9 x risk of developing MO in child

1.4 x risk of developing MA in child

**1<sup>st</sup> degree relatives have migraine with aura (MA)**

4 x risk of developing MA in child

**If both parents have migraine**

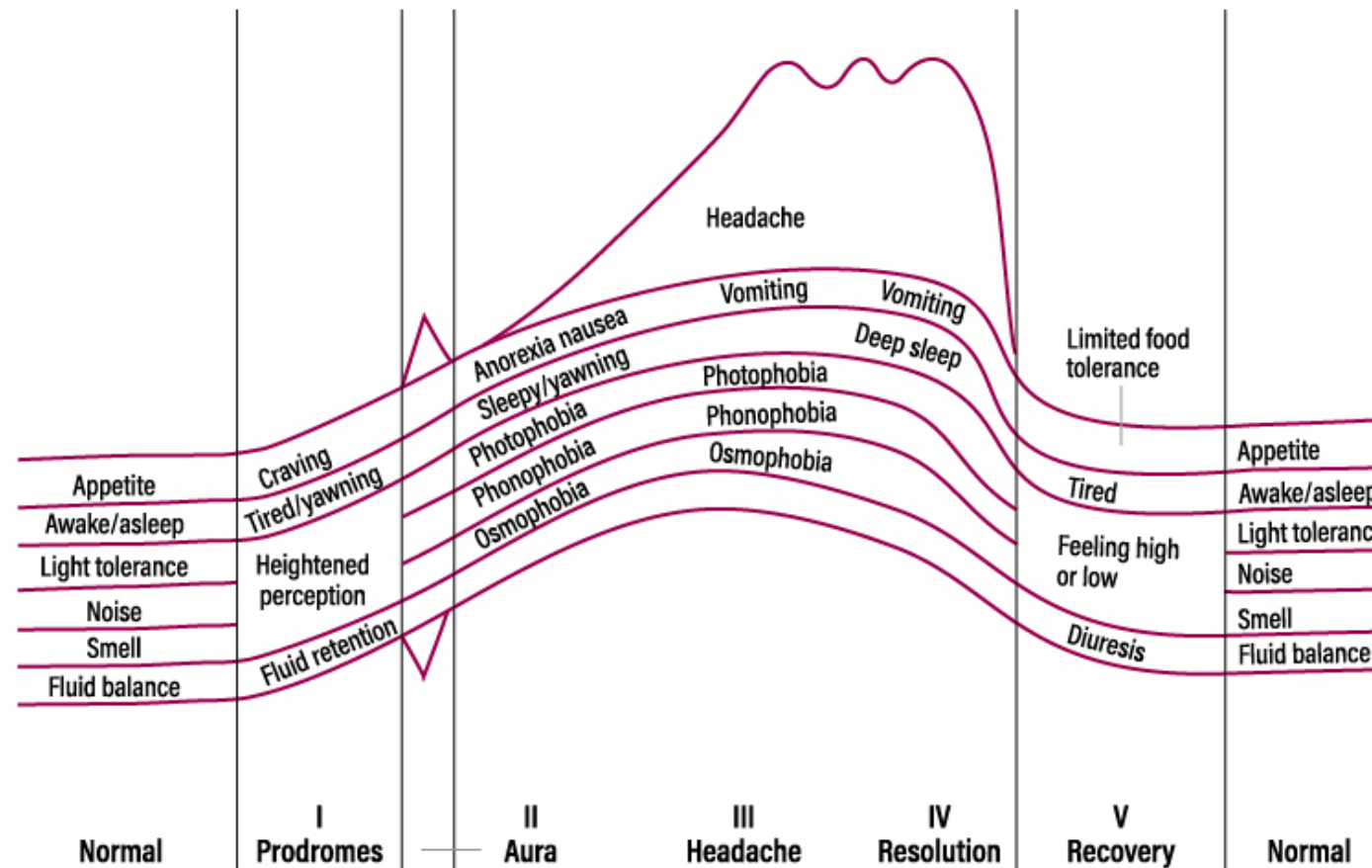
risk of their child having migraine is increased by **75%**

**No FH?**

- may not be clear, missed or mild attacks, “sick headaches”
- unrecognised, unlabelled

# Four Phases of Migraine

Figure I. Four phases of migraine



## Phase One: Prodromal or Premonitory

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In the 24 hours before headache appears

- ☹️ Reported less frequently by children
- ☹️ Commonest – fatigue, mood changes, neck stiffness
- ☹️ Also yawning, light-headedness, polyuria, visual blurring, cravings, light sensitivity.
- ☹️ Poor concentration also common\*\*

## Phase Two: Aura

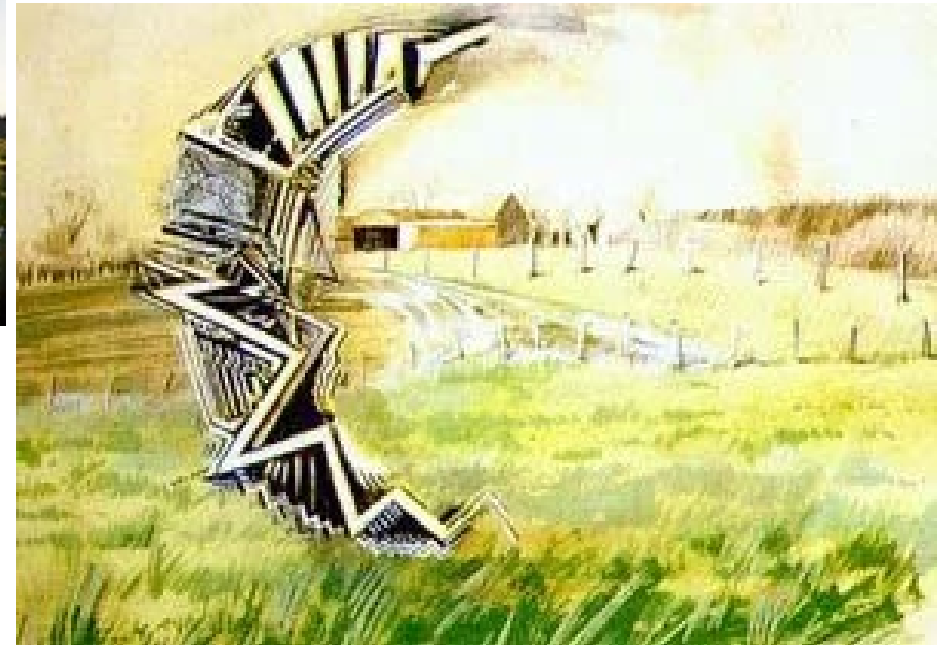
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### Definition :

- ☹️ visual & non-visual neurological symptoms
  - ☹️ developing over 5-20 mins
  - ☹️ resolving within an hour
  - ☹️ before the onset of headache
- 
- only 25% of people with migraine get aura
  - more common in older children & if FH of aura
  - more common in boys
  - higher risk of stroke with COCP -oestrogen



# Aura



# Aura

93% of affected children get visual symptoms

- ☹️ children may struggle to describe aura
- ☹️ head banging
- ☹️ flashing lights
- ☹️ zigzags

Non- visual symptoms include

- ☹️ tingling, numbness of face, hands or other areas
- ☹️ word-finding difficulties, slurring of speech
- ☹️ clumsiness
- ☹️ dizziness/vertigo
- ☹️ attention loss, confusion, agitation
- ☹️ rarely hemiparesis

## Phase Three: Pain

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### Headache Pain

- 🤢 may be one-sided, bilateral or all over
- 🤢 commonly fronto-temporal or not localized
- 🤢 may be felt orbitally
- 🤢 severity may be variable
- 🤢 often described as throbbing or constrictive pressure
- 🤢 neck and shoulder pain

### Nausea & vomiting

- 🤢 gastric stasis common
- 🤢 some present with only abdominal pains or cyclical vomiting

## Phase Three

### Heightened Sensory symptoms

- ✧ increased sensitivity to light, sound, smells & movement
- ✧ light glare, flashing lights, flicker, computer screens, spots & stripes
- ✧ allodynia, touch which is normally not painful is felt as pain
- ✧ central sensitization of the brain in action –wind up

# Managing Migraine in children & YP

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Education about the condition reduces fear & restores hope

Lifestyle factors

Routine is important!

- ▣ What is migraine? Four phases
- ▣ Lifestyle and trigger management
- ▣ Give age-appropriate information for the child, care givers and school

## Migraine brains prefer routine

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### Mealtimes and diet

- have something to eat every 3-4 hours and a bedtime snack
  - never skip meals
  - snacks of slow-release energy foods e.g. more protein & fat than carbs, low GI
  - eat and drink suitable snacks before and after exercise
  - stay hydrated
  - maintain an optimal body weight
- 
- Consider food triggers but don't be too obsessed
  - The paradox of cravings

## Migraine brains prefer routine

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### Sleep

- anchor the day
- sleep and wake cycle important
- sleep hygiene
- beware the lie-in

### Exercise

- can help, can trigger

### Caffeine

- best avoided in children

### Alcohol

- may need advice if teenage patients

# Managing Migraine in children

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## Self Management strategies

- behavioural techniques – planning, pacing
- relaxation
- giving written instructions about treatment plans
- counselling or CBT
- mindfulness techniques
- yoga



# Managing Migraine in children: Supplements

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## Magnesium

- no strong study evidence but safe to try
- may cause diarrhoea

## Riboflavin (Vitamin B 2)

- dose of 400mg daily for three months has been studied
- no strong evidence of benefit
- turns the urine yellow/orange

## Coenzyme Q10

- some study evidence of deficiency in children with migraine (Hershey 2007)
- supplementation seemed to help

(Feverfew and Butterbur not recommended in children)

# Managing Migraine in children: Non-medication interventions

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## Acupuncture

some evidence in adults

## Posture & exercise

- no conclusive studies but one showed reduction of headache in adults taking regular exercise
- neck and migraine – bidirectional relationship

## Massage, Biofeedback

- lack of good evidence

# Managing Acute attacks

**Goal:** effective control as quickly as possible to return to normal activities

Simple measures may work well in children

- 🌀rest
- 🌀dark room
- 🌀eat something
- 🌀simple analgesics – Paracetamol, Ibuprofen. (Use on **maximum 14 days per month**)

Consider **pro-kinetic** anti-emetic

- Cyclizine, Domperidone, Ondansetron if severe vomiting
- reduce gastric stasis
- reduce nausea & vomiting
- facilitate absorption of medication for rapid onset of action

# Managing Acute attacks

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- **NEVER use Codeine or other opiates for migraine in children or adults**
- Avoid Aspirin in under 16s because of risk of Reye's syndrome

## Triptans can be useful

- none are licensed, many have been widely used off-label in children
- seven different triptans, different formulations available
- tablets, melts, nasal sprays, injections
- nasal sprays can be rapidly effective but taste bad
- side effects - drowsiness, tightness in the chest, spaced out feeling, heaviness
- use on **maximum 8 days per month** to avoid Medication Overuse Headache

# Migraine Prevention

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Realistic Goal: reduce impact by 50% - frequency, severity and duration

Unrealistic goal: cure

Think about starting a preventer if

- 🕒 attacks are occurring more than 5 times per month
- 🕒 acute medications are ineffective
- 🕒 acute medication is being overused
- 🕒 aura is troublesome

\*Kacperski et al Opt management of headaches in children & adolescents Ther Adv Neurol Disord 2016 9(1) 53-68

## General principles for starting preventives

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- 🕒 share the decision making with the patient & their care givers
- 🕒 tailor the choice of drug to the patients life & other relevant medical conditions
- 🕒 warn about common side effects & likely delay in onset of benefit
- 🕒 trial of maximum tolerated dose for 3 months is necessary before assessing efficacy
- 🕒 start low & increase dose slowly
- 🕒 no evidence support using two preventative medications at the same time

Type	Start dose	Usual &/or Maximum dose
<b>Beta- blockers:</b> Propranolol : Age 2-11 years  Age 12-17 years	200-500mcg/kg bd  20-40mg bd	Usual dose 10-20mg bd Max per dose 2mg/kg bd  Usual dose 40-80mg bd Max 4mg/kg per day (max 120mg per dose)
<b>Tricyclic Antidepressants:</b> Amitriptyline, Nortriptyline	10mg on	Incr by 0.25mg/kg/day every 2 weeks
<b>Serotonin antagonists:</b> Pizotifen 5-17 years	0.5mg od	1.5mg daily in divided doses. Max single dose 1mg (at night)
<b>Anticonvulsants :</b> Topiramate 12 years up  Age 16-17 years	2-4mg/kg/day  25mg on for a week, incr in steps of 25mg every week	Usual dose 50-100mg daily in 2 divided doses Max 200mg per day

## Preventive Medications

Type	Examples	Common side effects
Beta- blockers	Propranolol	fatigue, wheezing, poor exercise tolerance, cold extremities
Anti-depressants TCAs	Amitriptyline, Nortriptyline	dry mouth, daytime somnolence, weight gain
Serotonin antagonists	Pizotifen	weight gain, sleepiness, dizziness, dry mouth, nausea, incr appetite
Anticonvulsants	Topiramate	cognitive dysfunction, glaucoma, depression, paraesthesia, teratogenic



## General Principles for stopping preventives

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Medication should not be given without being reviewed with a view to planning when and how to stop it

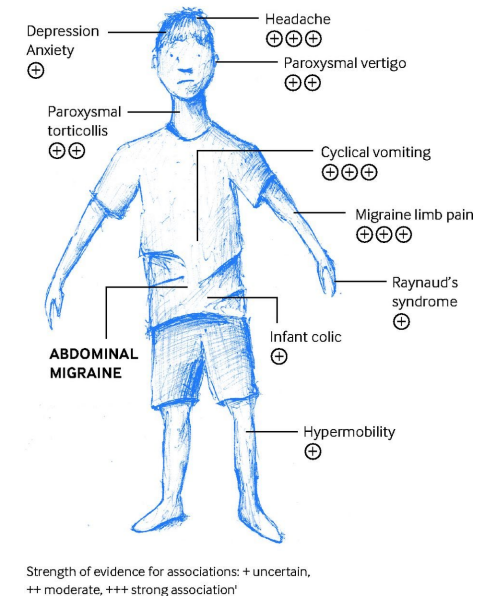
- Once the effective dose has been reached & migraines reduced, maintain the dose for a further 6-12 months & then wean off
- Stop if improvement is less than 30-50% after three months on maximum tolerated dose
- Stop if side effects are intolerable

# Abdominal Migraine \*

Episodic central abdo pain usually lasting >1 hour  
occurs with other features of migraine

- sensory disturbance, anorexia, nausea, vomiting, pallor
- associated with other episodic syndromes
- cyclical vomiting
- migraine limb pain

well between attacks – normal physical & neuro exam



Don't assume abdo pain with no demonstrable pathology is psychogenic in origin!  
Missing the diagnosis led to 4-5% having inappropriate surgery

\*Abdominal Migraine BMJ 2018;360:k179 Heather Angus-Leppan et al

# Abdominal Migraine

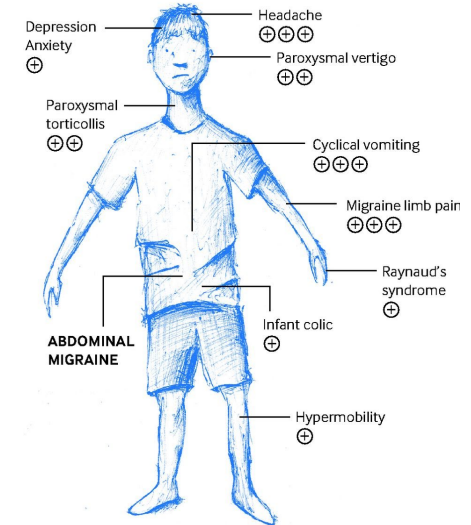
## Diagnosis:

- history & examination, urinalysis (DKA,UTI?)
- exclude red flags
- no other investigation required

## Prevalence :

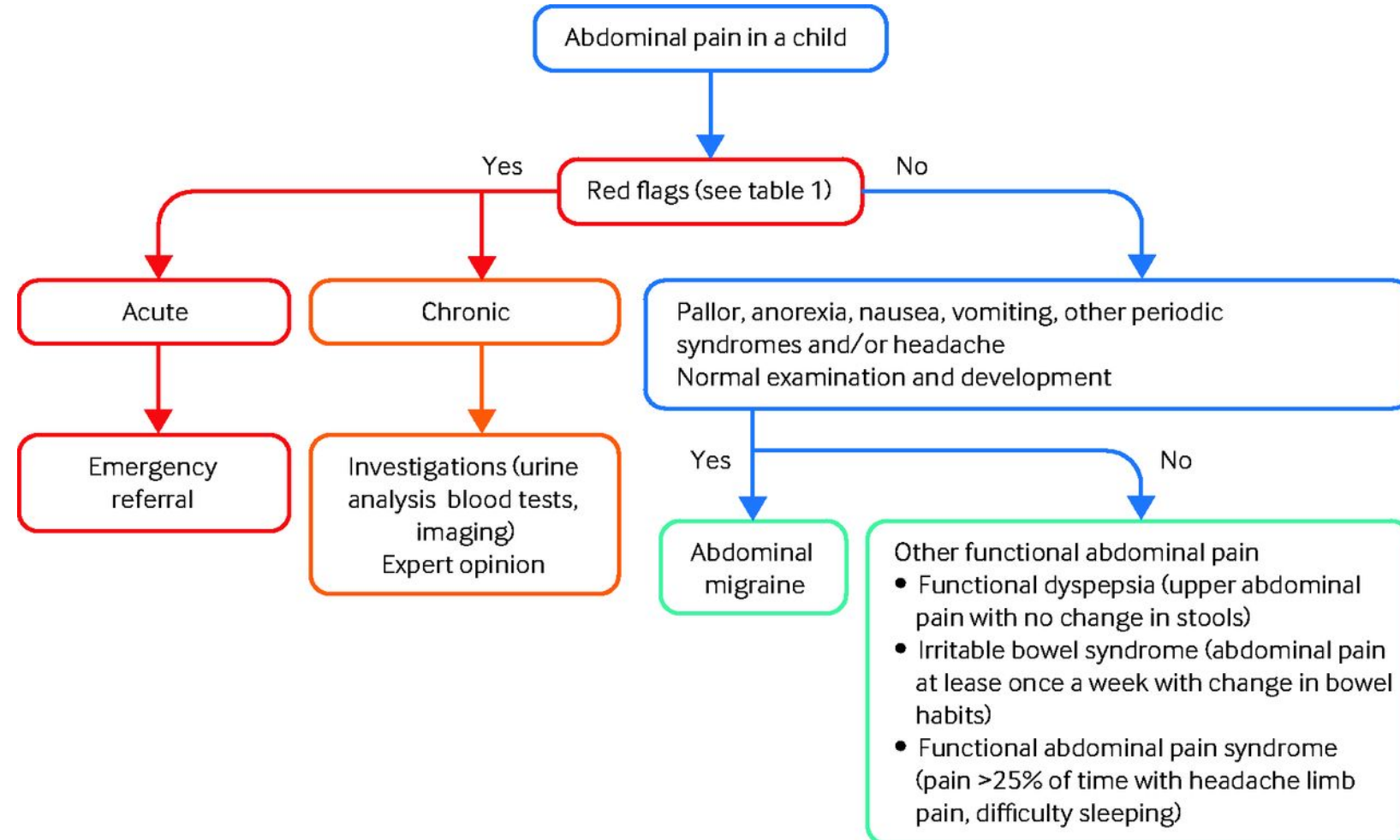
2.4 - 4.1% in two British studies, 9.2% in US study

- peaks at age 12
- female : male ratio 1.6 : 1.2
- 70% have current or previous migraine with or without aura
- onset in childhood
- predictive of adult migraine
- can persist to adulthood
- family history of migraine common



Strength of evidence for associations: + uncertain,  
++ moderate, +++ strong association'

# Abdominal pain differential diagnosis in children



# Abdominal Migraine : management of acute attacks

Clear diagnosis & explanation essential

Regular routines, avoid triggers

88% relieved by rest

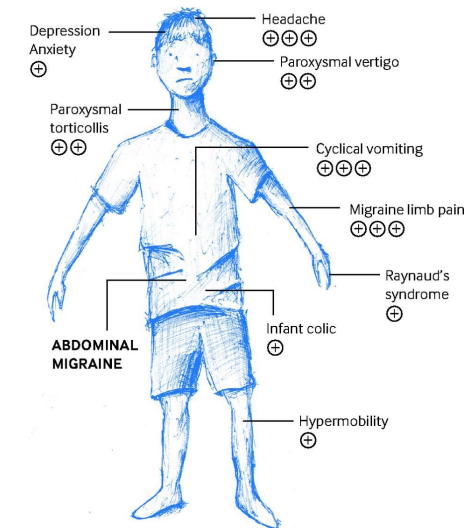
64% by sleep

38% by analgesics

## Acute treatment:

- Rest in dark, quiet room\*
- Simple analgesics such as paracetamol 15 mg/kg, ibuprofen 10 mg/kg\*
- Sumatriptan - 10 mg intranasal or tablet \*

\* Can be given in Primary Care



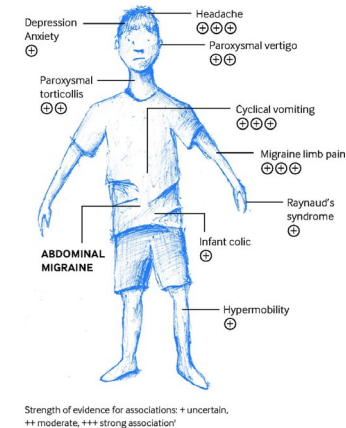
Strength of evidence for associations: + uncertain,  
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# Abdominal Migraine : Prevention

- Pizotifen 0.25 mg bd as syrup\*
- Propranolol 10-20 mg bd or tds daily
- (Cyproheptadine 0.25-0.5 mg/kg daily as syrup)
- (Flunarizine 5-7.5 mg/day)

- Sodium valproate 500 mg tds intravenous - in hospital
- Dihydroergotamine 0.5 mg intravenous, further doses possible (up to mean total 7-9 mg over several days) - in hospital

\* Can be given in Primary Care



# Managing Migraine in children: Other considerations



## **Onabotulinum toxin (Botox):**

1 study in 2018, only 10 patients, safe & effective, used in post-pubertal kids in USA

**Greater Occipital nerve blocks:** combination of local anaesthetic and steroid

## **Anti-CGRP monoclonal antibodies:**

**Erenumab (Aimovig), Fremanezumab (Ajovy), Galcanezumab (Emgality)**

New CGRP receptor blocker injections, not licensed in children

Monthly self-administered s/c monoclonal antibody injection

## **Neuro-modulation devices**

**Cefaly Dual**

**sTMS (no longer available)**

Safe and well tolerated, small pilot study, 21 pts, 12-17 year olds, 2018.

# Managing Migraine in children: Other considerations

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## **Contraception in girls**

Migraine with aura – avoid oestrogen-containing pills, increased risk of stroke

## **Medication Overuse headache**

- common cause of transformation of episodic migraine to chronic daily headache
- prevent this developing with good initial advice
- detox from acute analgesics essential
- support & warn about withdrawal headaches
- high risk of recurrence

## **Beware over the counter medications**



# Managing Migraine in children: From a mother

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## Ground rules for talking within earshot of my child

- Talk to her first not me
- If she can't answer she'll ask me to
- Growth mindset language – not worked it out yet
- Empathise with her on how rubbish she is feeling before discussing her symptoms and plan
- Explain at her eye level what tests you want to do and why
- Ask her before me if she has any questions
- Don't dismiss her emotions or pain – she is a child not a puzzle to be solved
- Not having found a medical reason does not mean stopping – it means looking harder
- Any disagreements we have are not to be discussed in front of my child

## Key Messages

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- 🧠 Most headaches are migraine
- 🧠 Abdominal pain in children may be migraine
- 🧠 The impact of migraine may be huge
  - make the diagnosis
  - educate & manage appropriately
  - empower young patients to manage migraine properly as they grow into adults
- 🧠 **NEVER use CODEINE or other opiates to manage migraine in children (or adults)**



# Useful resources



## Heads Up podcast

- <https://www.nationalmigrainecentre.org.uk/migraine-and-headaches/heads-up-podcast/#children>

## Factsheet for parents

- <https://www.nationalmigrainecentre.org.uk/migraine-and-headaches/migraine-and-headache-factsheets/migraine-in-children-and-adolescents/>

## Factsheet for Schools

- <https://www.nationalmigrainecentre.org.uk/migraine-and-headaches/migraine-and-headache-factsheets/migraine-advice-to-schools/>

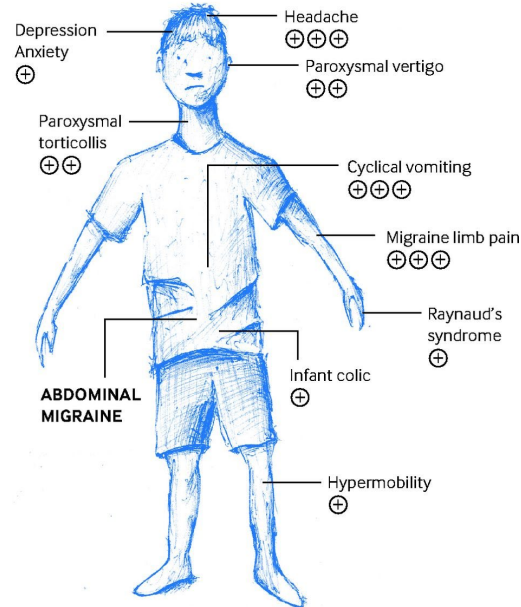
## Migraine Trust

- <https://www.migrainetrust.org/living-with-migraine/asking-for-support/help-in-school/>

**Migraine Buddy diary or downloadable from NMC or MT websites**



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