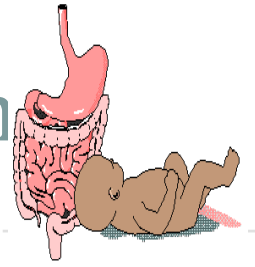
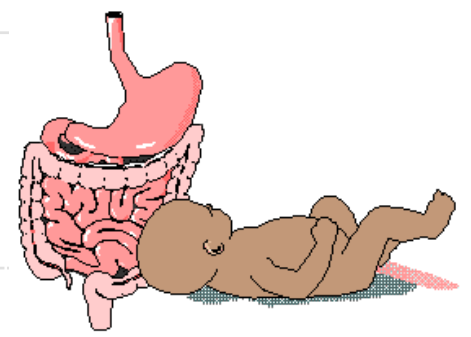


Common GI Problems of Infants and Children

Common GI Problems in children

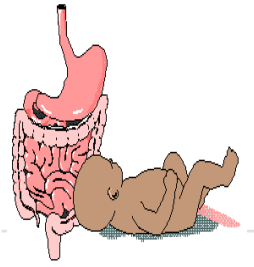


- Diarrhoea
- Vomiting
- Constipation
- Acute abdominal pain
- Pica
- Worm infestation



Diarrhoea

Diarrhoea



- **Definition:**

An increase in the fluidity, volume and frequency of stools.

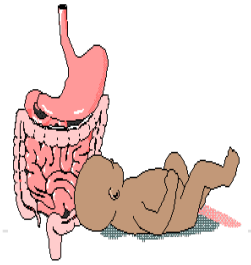
- **Acute diarrhea:**

Short in duration (less than 2 weeks).

- **Chronic diarrhea:**

4 weeks or more

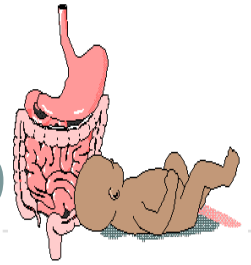
Diarrhoea



Annual incidence of Diarrhoeal episodes in children ≤ 5 year old in developing countries
3.2 episodes per child ,
2 billion episodes globally

Annual mortality from diarrhoea in children ≤ 5 Years in developing countries
1.8 million deaths
Decreased from 4.5 million deaths in last 20 years

Etiology of Diarrhea(infant)



Acute Diarrhea

Gastroenteritis

Systemic infection

Antibiotic association

Overfeeding

Chronic Diarrhea

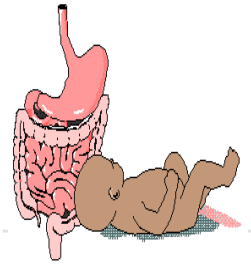
Post infections

Secondary disaccharidase deficiency

Irritable colon syndrome

Milk protein intolerance

Types of Diarrhoea



- **Acute watery diarrhea: (80% of cases)**

- Dehydration

- Malnutrition

- **Dysentery: (10% of cases)**

- Anorexia/weight loss

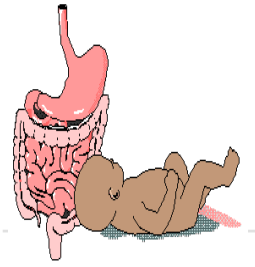
- Damage to the mucosa

- **Persistent diarrhea: (10% of cases)**

- Dehydration

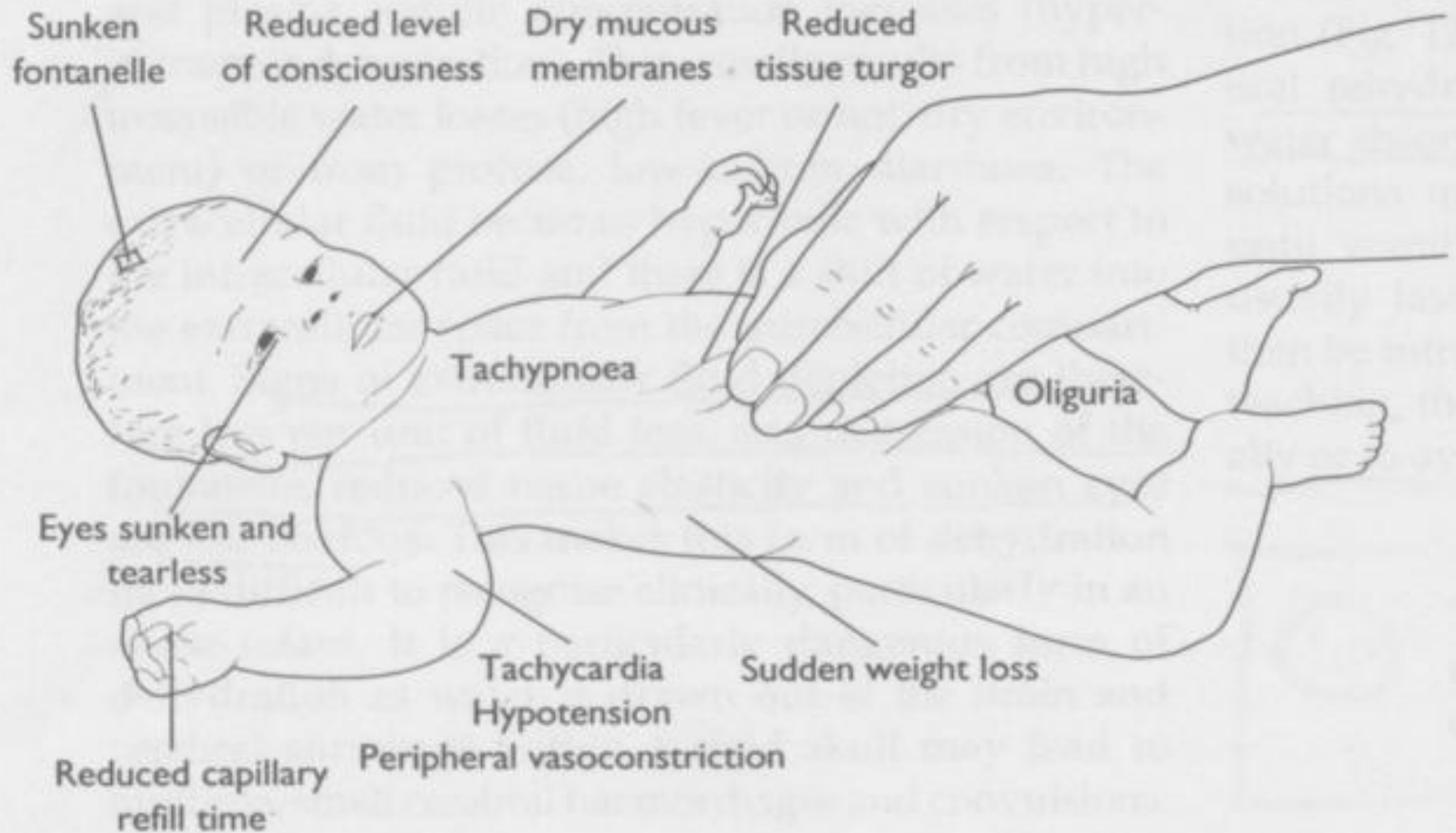
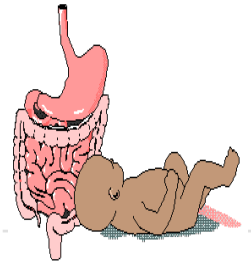
- Malnutrition

Mechanism of Diarrhoea



- Osmotic
- Secretory
- Exudative
- Motility disorders

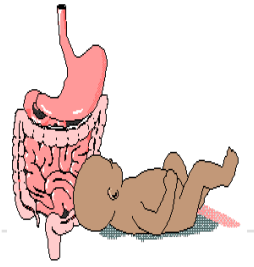
Assessment of Dehydration



Degree of Dehydration

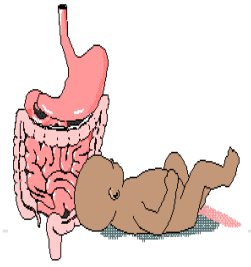
<i>Factors</i>	<i>Mild < 5%</i>	<i>Moderate 5-10%</i>	<i>Severe >10%</i>
<i>General Condition</i>	Well, alert	Restless, thirsty, irritable	Drowsy, cold extremities, lethargic
<i>Eyes</i>	Normal	Sunken	Very sunken, dry
<i>Anterior fontanelle</i>	Normal	depressed	Very depressed
<i>Tears</i>	Present	Absent	Absent
<i>Mouth + tongue</i>	Moist	Sticky	Dry
<i>Skin turgor</i>	Slightly decrease	Decreased	Very decreased
<i>Pulse (N=110-120 beat/min)</i>	Slightly increase	Rapid, weak	Rapid, sometime impalpable
<i>BP (N=90/60 mm Hg)</i>	Normal	Deceased	Deceased, may be unrecordable
<i>Respiratory rate</i>	Slightly increased	Increased	Deep, rapid
<i>Urine output</i>	Normal	Reduced	Markedly reduced

Complications of diarrhoea



- Dehydration
- Metabolic Acidosis
- Gastrointestinal complications
- Nutritional complications

Treatment of Diarrhoea



- Plenty of fluids

oral rehydration solution using ingredients found in household can be given.

Ideally these drinks should contain:

- starches and/or sugars as a source of glucose and energy,
- some sodium and
- preferably some potassium.

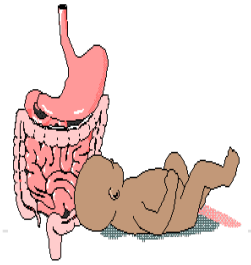
Breastmilk

Gruels (diluted mixtures of cooked cereals and water)

Carrot Soup

Rice water - congee

Treatment of Diarrhoea



- **Home made ORS recipe**

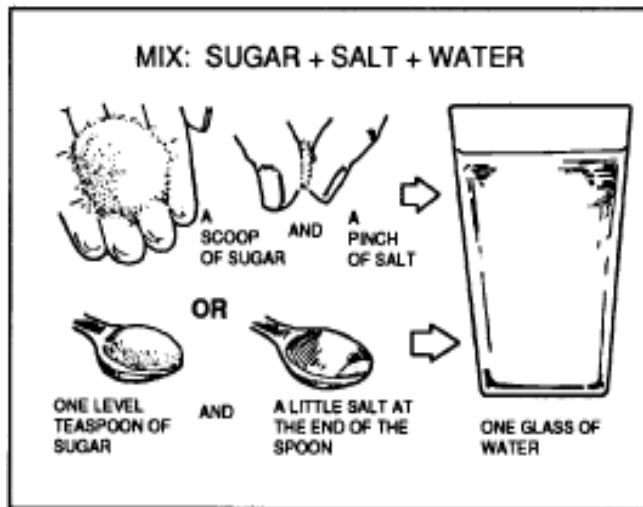
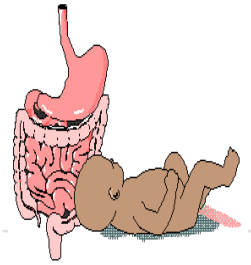
Preparing a 1 (one) litre oral rehydration solution [ORS] using Salt, Sugar and Water at Home

Mix an oral rehydration solution using one of the following recipes; depending on **ingredients and container availability**:

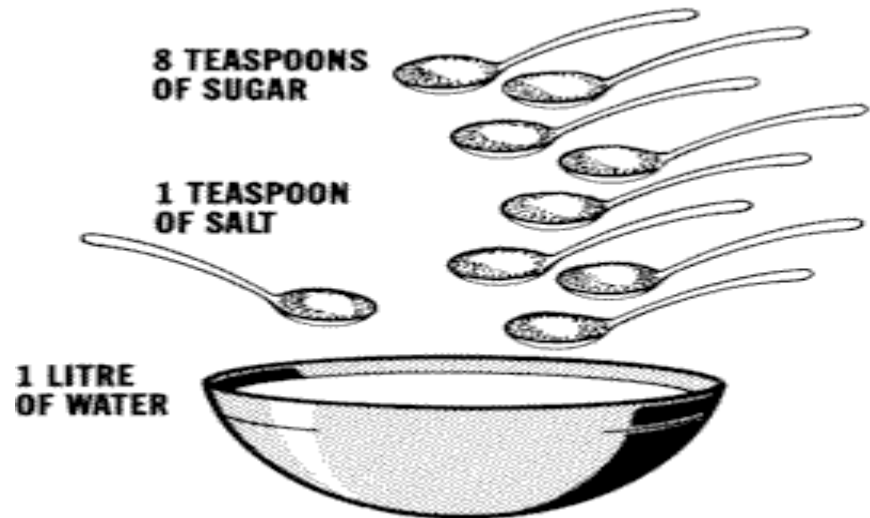
Ingredients:

- **one level teaspoon of salt**
- **eight level teaspoons of sugar**
- **one litre of clean drinking or boiled water and then cooled**
5 cupfuls (each cup about 200 ml.)
- **Preparation Method:**
- Stir the mixture till the salt and sugar dissolve.

Preparation of ORS



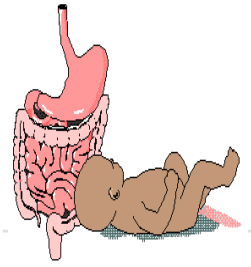
Preparation of glassful of ORS



Preparation of 1 Litre ORS

Taste the drink before giving! It should be no more salty than tears.

ORS

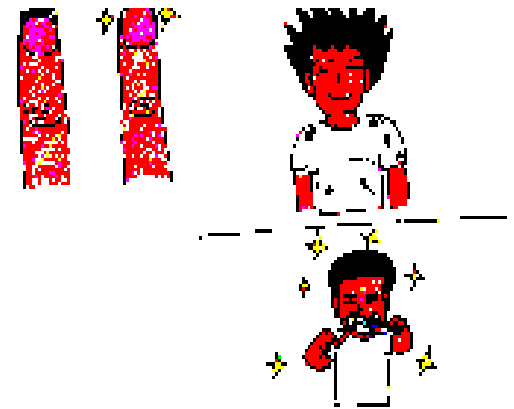


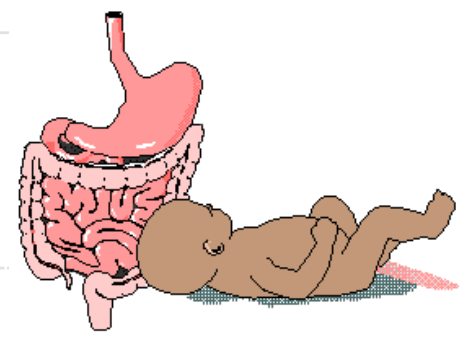
The formula for ORS recommended by WHO/ UNICEF contains

Reduced osmolarity ORS	Grams / litre	Reduced Osmolarity ORS	mmols/litre
Sodium chloride	2.6	Sodium	75
Glucose, anhydrous	13.5	Chloride	65
Potassium chloride	1.5	Glucose, anhydrous	75
Trisodium citrate, dihydrate	1.9	Potassium	20
		Citrate	10

Prevention

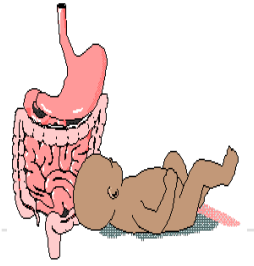
- Wash your hands frequently, especially after using the toilet, changing diapers.
- Wash your hands before and after preparing food.
- Wash diarrhea-soiled clothing in detergent and chlorine bleach.
- Never drink unpasteurized milk or untreated water.
- Drink only boiled/filtered water.
- Proper hygiene.





Vomiting

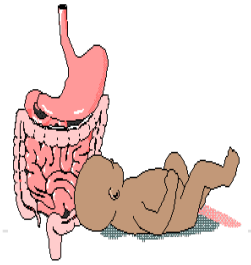
Vomiting in children



- **Definition:**

The forceful expulsion of contents of the stomach and often, the proximal small intestine.

Causes of vomiting



• Neonate/ Infant

– With fever

- Sepsis, meningitis, UTI
- Tonsillitis, otitis media, gastroenteritis

– If no signs sepsis

- Pyloric stenosis/ outlet obstruction
- Metabolic
- Neurologic
- Endocrine

• Child/ adolescents

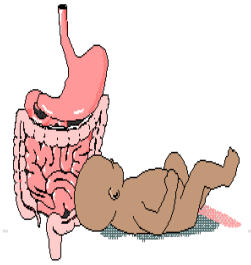
– With fever (but otherwise well)

- Gastroenteritis, esp if also have diarrhoea

– With lethargy/ altered mental status

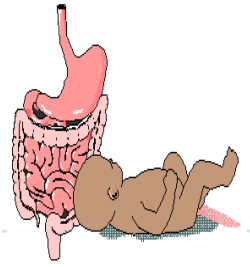
- Neurologic
- Metabolic
- Endocrine
- Drugs, toxins, alcohol

Physiology of vomiting



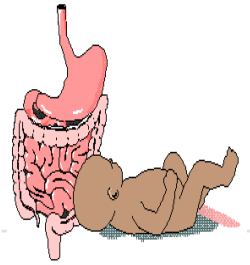
- ✓ Nausea - Feeling of aversion for food and an imminent desire to vomit.
- ✓ Retching - Spasmodic respiratory movements conducted with a closed glottis.
- ✓ Emesis or vomition - Deep inspiration, the glottis is closed and the is raised to open the UES
 - The diaphragm contracts to increase negative intrathoracic pressure.
 - Abdominal muscles contract.

Investigations for Acute Vomiting

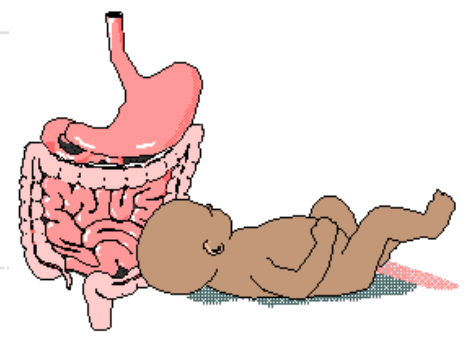


- Thorough examination
- “Septic workup” – blood cultures, urine, FBC, CRP, LP
- Upper GI radiology – Barium swallow/ meal, AXR, ultrasound abdomen, endoscopy
- Metabolic investigations – blood gas, ammonia, blood and urine organic acids

Management

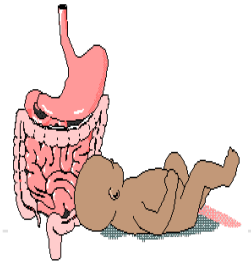


- Depends on specific cause
- While investigating/ treating underlying pathology – replace lost fluids, maintain hydration
- If mild and child able to drink, can try oral rehydration. Intravenous may also be required
- Pharmacologic agents *not* usually recommended
 - May mask signs of serious disease
 - Undesirable side-effects in children



Constipation

Constipation in Children

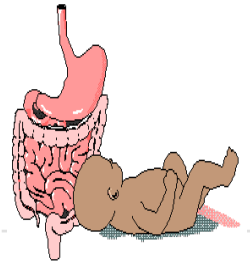


- Defined as a delay or difficulty in defecation, present for two or more weeks and sufficient to cause significant distress to the patient.

NASPGAN 2006

- Stool frequency of < 3 per week is also defined as constipation
- **Prevalence:** 3% of visits to Pediatricians
- 25% of Pediatric Gastroenterology consultations(Molnar D, Arch Dis Child 1983)

Etiology of Constipation



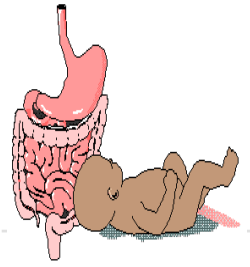
- **Congenital**

1. Anorectal defects
2. Neurogenic
3. Colonic neuropathies
4. Colonic defects

- **Acquired**

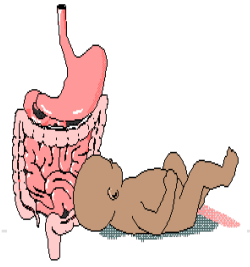
1. Functional
2. Anal lesions
3. Neurologic conditions
4. Metabolic
5. Endocrine
6. Drug induced
7. Low fiber diet
8. Psychiatric problems

Drugs causing constipation



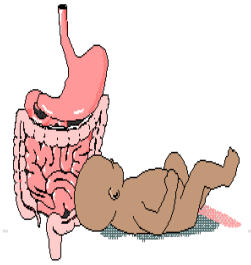
- Antimotility drugs
- Anticholinergics
- Antidepressants
- Opiates
- Antacids
- Phenothiazines
- Methylphenidate

History



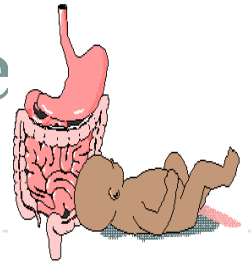
- Constipation history: Frequency, consistency of stools, pain/ bleeding with passing stools, age of onset, fecal soiling, withholding behaviour, nausea/ vomiting, weight loss.
- Family H/o:
- Other important points; Time of passage of meconium, allergies, surgeries, sensitivity to cold, dry skin, Medications.

Physical Findings

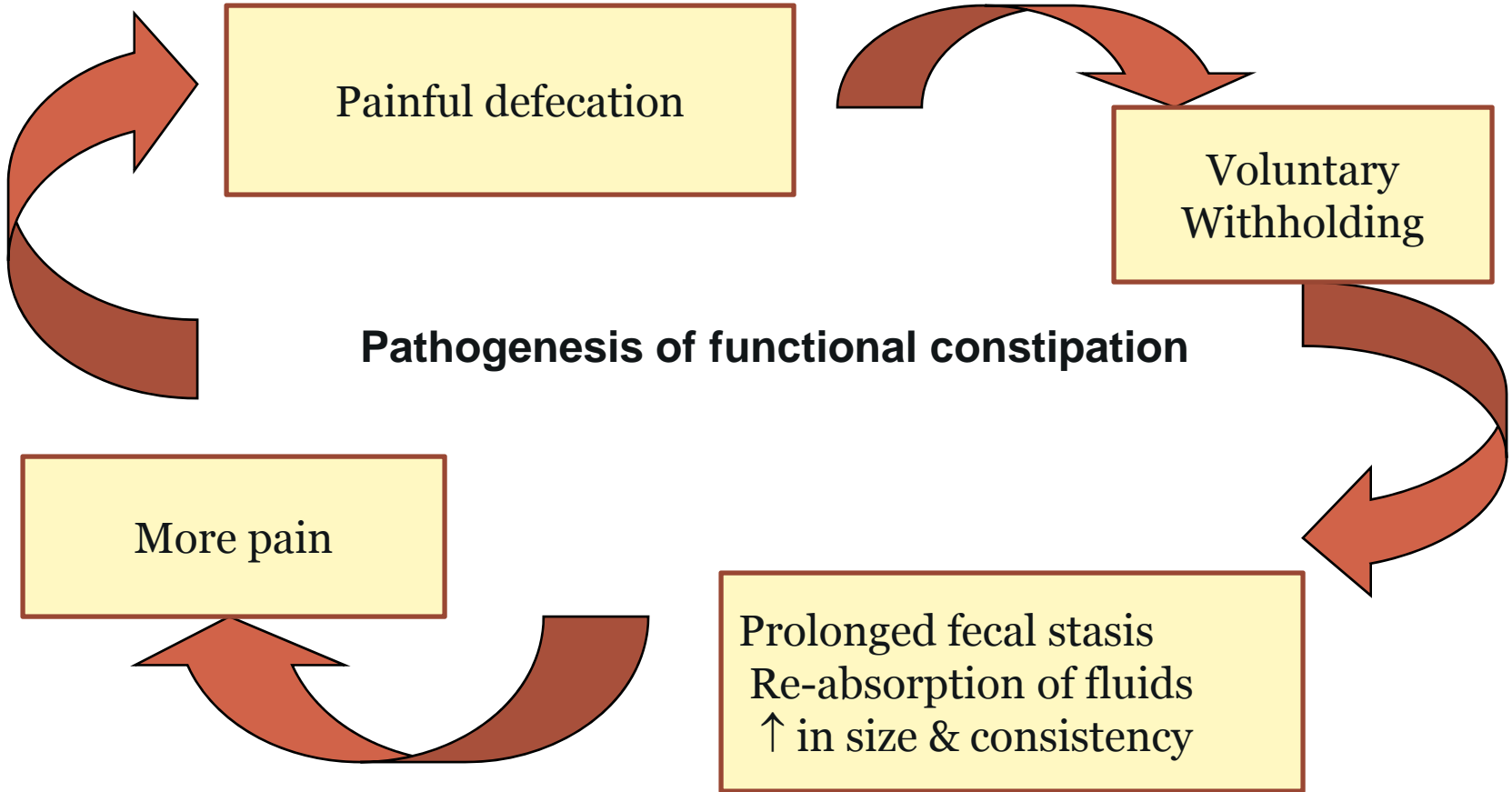


- GPE:
- Abdomen: Distension, fecal mass
- Anal Inspection: Position, stool present around anus or on clothes, anal fissures.
- Rectal Examination: Anal tone, Fecal mass, presence of stool, consistency of stool, other masses, Explosive stool on withdrawal of finger
- Back and Spine:
- Neurological Examination.

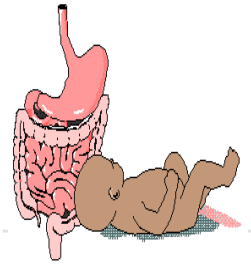
Physical findings to distinguish between functional and organic constipation



- Failure to thrive
- Abdominal distension
- Lack of lumbosacral curve, pilonidal dimple
- Sacral agenesis
- Anteriorly displaced anus
- Gush of liquid stool and air from rectum on withdrawal of finger
- Decreased lower extremity tone and strength.

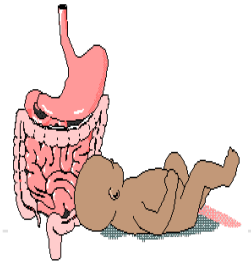


Treatment



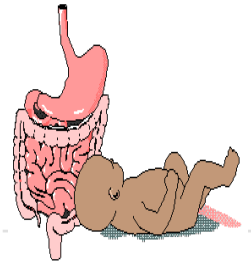
- **Precise, well-organized plan: to clear fecal retention, prevent future retention & promote regular bowel habits.**
- 1. Disimpaction: enema or lavage solutions
- 2. Maintenance: prevention of re-accumulation
- I. Diet
- II. Toilet training
- III. Laxative

Management in Children



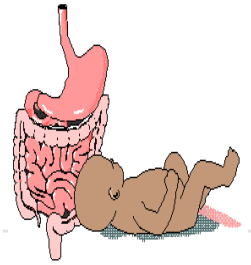
- **Disimpaction:** Either by oral or rectal medication, including enemas
- **Maintenance:**
- **Diet:** a balanced diet, containing whole grains, fruits, vegetables
- **Laxative:** lactulose, sorbitol, magnesium hydroxide, mineral oil are safe & effective
- **Behavioral therapy:** toilet training (5-10min after meal)
- **Rescue therapy:** short course of stimulant laxative
- **Intractable constipation:** Bio-feedback therapy (after 6mo to 1 yr. of intensive medical therapy)

Disimpaction



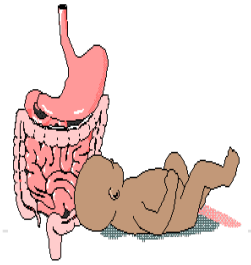
- Fecal impaction: a hard mass in the lower abdomen on physical exam.(seen in 50%),P/R, AXR
- Necessary step before initiating maintenance therapy.
- **Oral route:** non-invasive,gives a sense of power to the child but compliance is a problem.
- **Rectal approach:** faster but invasive (likely to add fear & discomfort that the child already has,may intensify stool withholding)
- **Choice:** should be discussed with parents & child

Maintenance



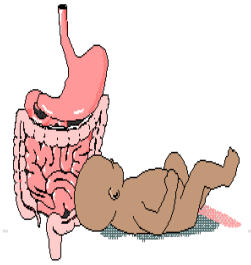
- After removing impaction: prevention of recurrence
- **Dietary intervention:** increased intake of fluids & absorbable and non-absorbable carbohydrate.
- **Behavioral modification:**
- Toilet training (unhurried time in the toilet for 5-10 min after each meal) for initial months (2-3 yrs of age)
- Keep diary of stool frequency, consistency, pain, soiling, laxative dose
- Reward system (positive re-inforcement)

Maintenance



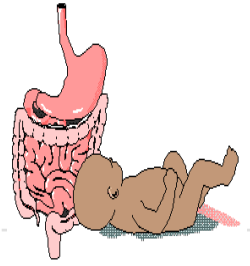
- **Osmotic laxatives**
- Lactulose/sorbitol/magnesium hydroxide:
 - 1-3 ml/kg/day, 1-2 dose/s (increment: 5ml every 3 d)
- **Osmotic enema:**
- Phosphate enema: <2 yrs to be avoided
- >2 yrs: 6ml/kg (upto 135ml)
- **Lavage:**
- PEG solution: disimpaction: 25ml/kg/hr by NG tube until clear output or 20ml/kg/hr for 4 hr/day
- Maintenance: 5-10 ml/kg/day (non-electrolyte PEG)

Maintenance

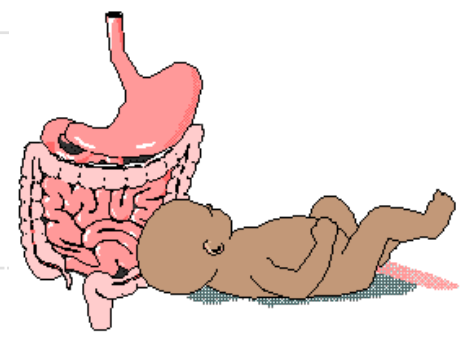


- **PEG without electrolytes as maintenance therapy**
- PEG as lavage solution: due to large volumes, no absorption or secretion of electrolytes.
- PEG in low volume: near complete absorption of electrolytes.
- Advantages of PEG over other laxatives:
- Inert substance, no enzymatic or bacterial degradation
- No flatulence and no loss of activity
- Tasteless or odorless, colorless, mix well in fluid

Maintenance

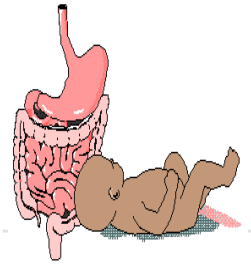


- **Lubricant:**
- Mineral oil: <1 yr: not recommended
- Disimpaction: 15-30 ml/yr of age (240ml daily)
- Maintenance: 1-3 ml/kg/day
- **Stimulants:**
- Senna:
 - 2-6 yrs: 2.5-7.5 ml/day (8.8mg/5ml of Sennosides)
 - 6-12 yrs: 5-15 ml/day
- Bisacodyl:
 - >2 yrs: 0.5-1 suppository (10mg)
 - 1-3 tabs/dose (5mg)



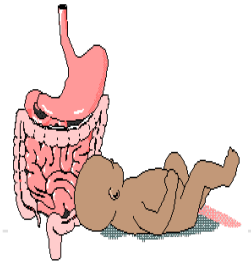
Pica

Pica

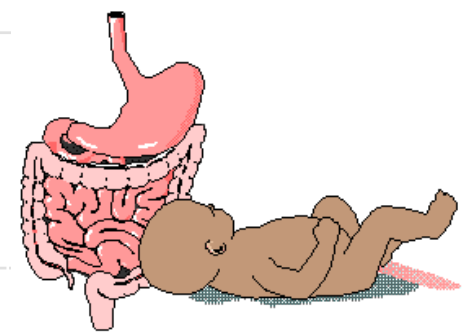


- **Definition** - Persistent ingestion of nonnutritive, unedible substances for a period of at least 1 month at an age at which this behavior is developmentally inappropriate.
- Common in children between 18 mths – 2 Yrs , after 2nd year needs investigation
- Children usually slow in motor and mental development

Pica

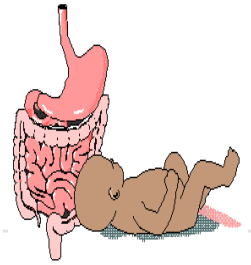


- Mental retardation, lack of parental nurturing predisposing factors
- Increased risk of Lead poisoning, Iron Deficiency anemia, parasitic infection.
- Screening lead poisoning, parasitic infection required



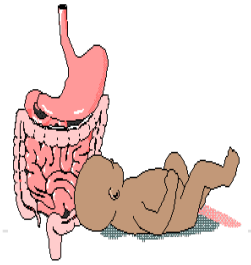
Abdominal Pain

Abdominal pain in Children



- **Acute abdomen:** Severe acute onset of pain which results in urgent need for diagnosis and treatment. May indicate a medical or surgical emergency
- **Less acute pain :** common symptom, may be difficult to elicit and interpret objectively

Approach to Abdominal Pain



- **Detailed history**

- Relationship to feeding, vomiting and diarrhoea, fever, micturition

- Onset, duration, aggravating and relieving factors, prior treatment

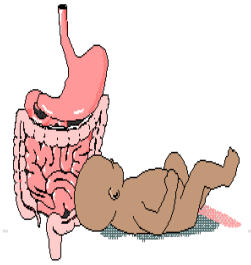
- **Decide on the type of pain**

- Visceral pain: dull, aching, midline, not necessarily over site of disease

- Somatic : localized, sharp, from parietal pleura, abdominal wall, retroperitoneal muscles

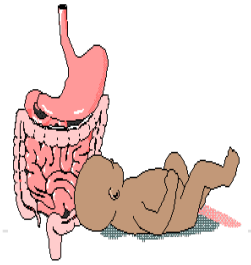
- Referred pain : from parietal pleura to abdominal

Visceral Pain



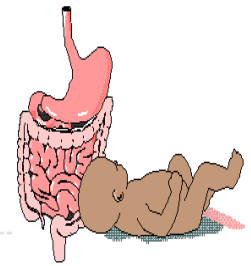
- Typically felt in the midline according to level of dermatome innervation
 - Epigastric
 - Peri-umbilical
 - Suprapubic
- Small intestinal pain felt peri-umbilical and mid-epigastric
- Colon felt over the site because of short mesentery
- Visceral pain becomes somatic if the affected viscus involves a somatic organ eg peritoneum or abdominal wall

Approach to Abdominal Pain



- Restlessness versus immobility
 - Colic (visceral) vs peritonitis (somatic)
- Assess degree of pain
 - Even babies feel pain
 - Assessment has 3 components
 - what the child says* (self report),
 - how the child behaves* (behavioural)
 - how the child is reacting* (physiological)
 - “Faces Pain Scale” used from age 4 onwards

Faces Pain Scale



Faces Pain Scale – Revised (FPS-R)

In the following instructions, say "hurt" or "pain," whichever seems right for a particular child.

"These faces show how much something can hurt. This face [point to left-most face] shows no pain. The faces show more and more pain [point to each from left to right] up to this one [point to right-most face] – it shows very much pain. Point to the face that shows how much you hurt [right now]."

Score the chosen face 0, 2, 4, 6, 8, or 10, counting left to right, so '0' = 'no pain' and '10' = 'very much pain.'

Do not use words like 'happy' and 'sad'. This scale is intended to measure how children feel inside, not how their face looks.

Hicks CL, von Baeyer CL, Spafford P, van Kortlaar I, Goodenough B. The Faces Pain Scale – Revised: Toward a common metric in pediatric pain measurement. *Pain* 2001;93:173-183. Scale adapted from: Bleil D, Reeve R, Champion GD, Addicoat L, Ziegler J. The Faces Pain Scale for the self-assessment of the severity of pain experienced by children: Development, initial validation and preliminary investigation for ratio scale properties. *Pain* 1990;41:139-150.

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0

2

4

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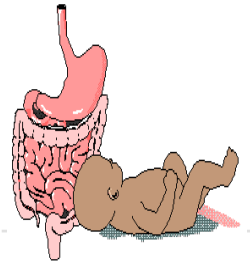
6

8

10

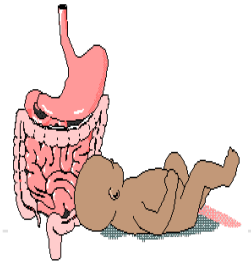


Some Medical Disorders with Abdominal Pain



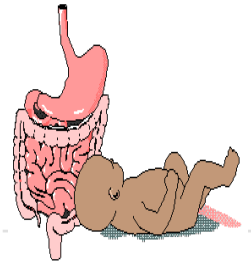
- Mesenteric adenitis : associated with ARI
- Enterocolitis and food poisoning : often diffuse pain before diarrhoea
- Pneumonia: referred from pleura, associated respiratory symptoms and signs
- Inflammatory bowel disorders
- Biliary tract, liver disease and congestion
- Dyspepsia : ulcer and non-ulcer
- Systemic diseases: HSP, DKA, Sickle cell disease
- Peritonitis

Recurrent Abdominal Pain



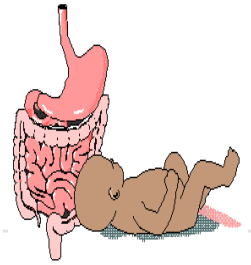
- Very common 10 – 15% of children
- Duration longer than 3 months, affecting normal activity
- Organic cause found in <10% of these
- RAP is defined by four basic criteria:
 - ✦ **History of at least 3 episodes of pain**
 - ✦ **Pain sufficient to affect activity**
 - ✦ **Episodes over a period of 3 months**
 - ✦ **No known organic cause**
- Family history often positive for GI complaints.
- Growth and development normal

Causes of Recurrent Abdominal Pain



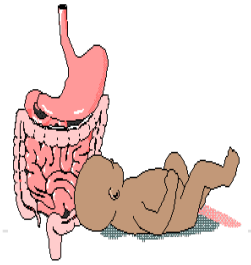
- Common:
 - Parasites
 - Faecal loading
 - Functional abdominal pain
- Less common:
 - Infections
 - Inflammatory disorders
 - Renal cause

Functional Abdominal Pain



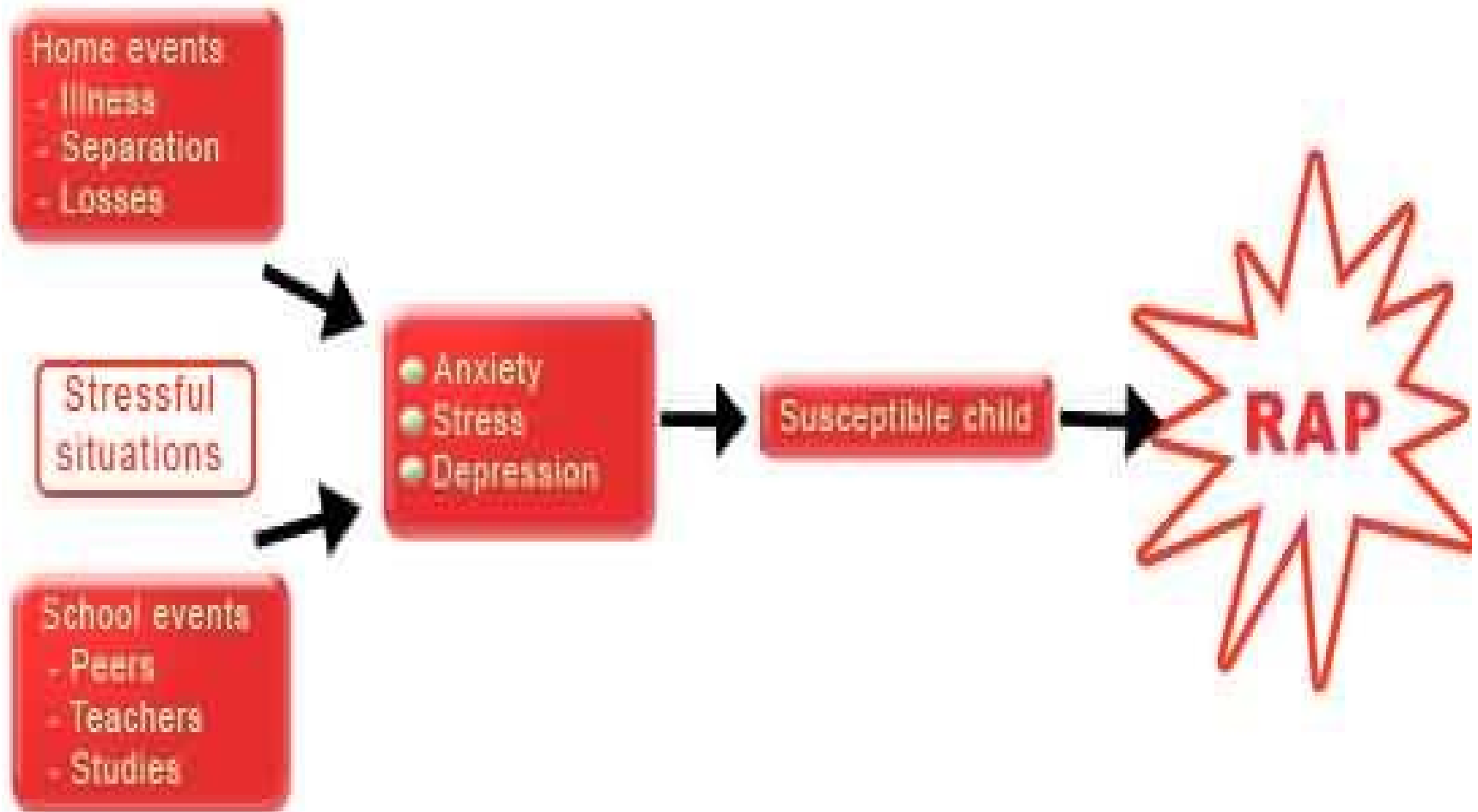
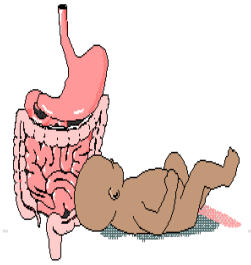
- Typically 5 – 14 years old
- Unrelated to meals or activity
- Clustering of pain episodes: several times per day to once a week, recurring at days to weeks intervals
- Physical or psychological stressful stimuli
- Personality type obsessive, compulsive, achiever
- Family history of functional disorders : reinforcement of pain behaviour

Functional Abdominal Pain

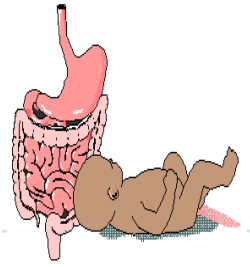


- Vague, constant, peri-umbilical or epigastric pain more often than colic
- Duration <3 hours in 90%, variable intensity
- Associated symptoms: headache, pallor, dizziness, low-grade fever, fatiguability
- May delay sleep, but does not wake the child
- Well-grown and healthy
- Normal FBC, ESR, Urinalysis, Stool microscopy for blood, ova, parasites

Functional Abdominal Pain - Pathogenesis

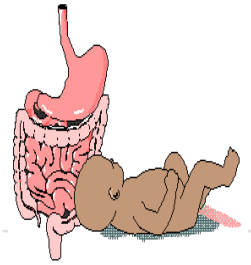


Management of Functional Abdominal Pain

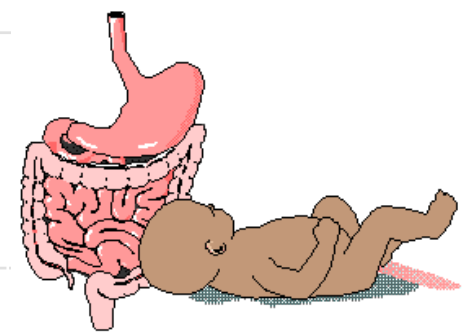


- Positive clinical diagnosis: careful history
- Do not over-investigate: more anxiety
- FBC, ESR, Urinalysis and culture, Stool for occult blood, ova and parasites
- Positive reassurance that no organic pathology is present
- Little place for drugs
- Dietary modification
- Reassuring follow-up

Pointers to Organic Pain in Children

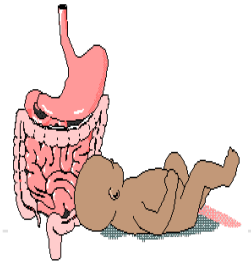


- Age of onset <5 or >14 years
- Localized pain away from umbilicus
- Nocturnal pain waking the patient
- Aggravated or relieved by meals (dyspepsia)
- Loss of appetite and weight
- Alteration in bowel habit
- Associated findings: fever, rash, joint pain
- Abdominal distension, mass, visceromegaly
- Occult blood in stools, anaemia, high ESR



Worm Infestation

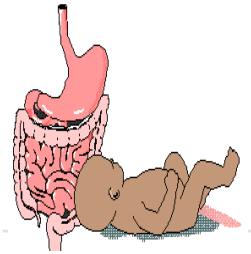
Worm Infestation in Children



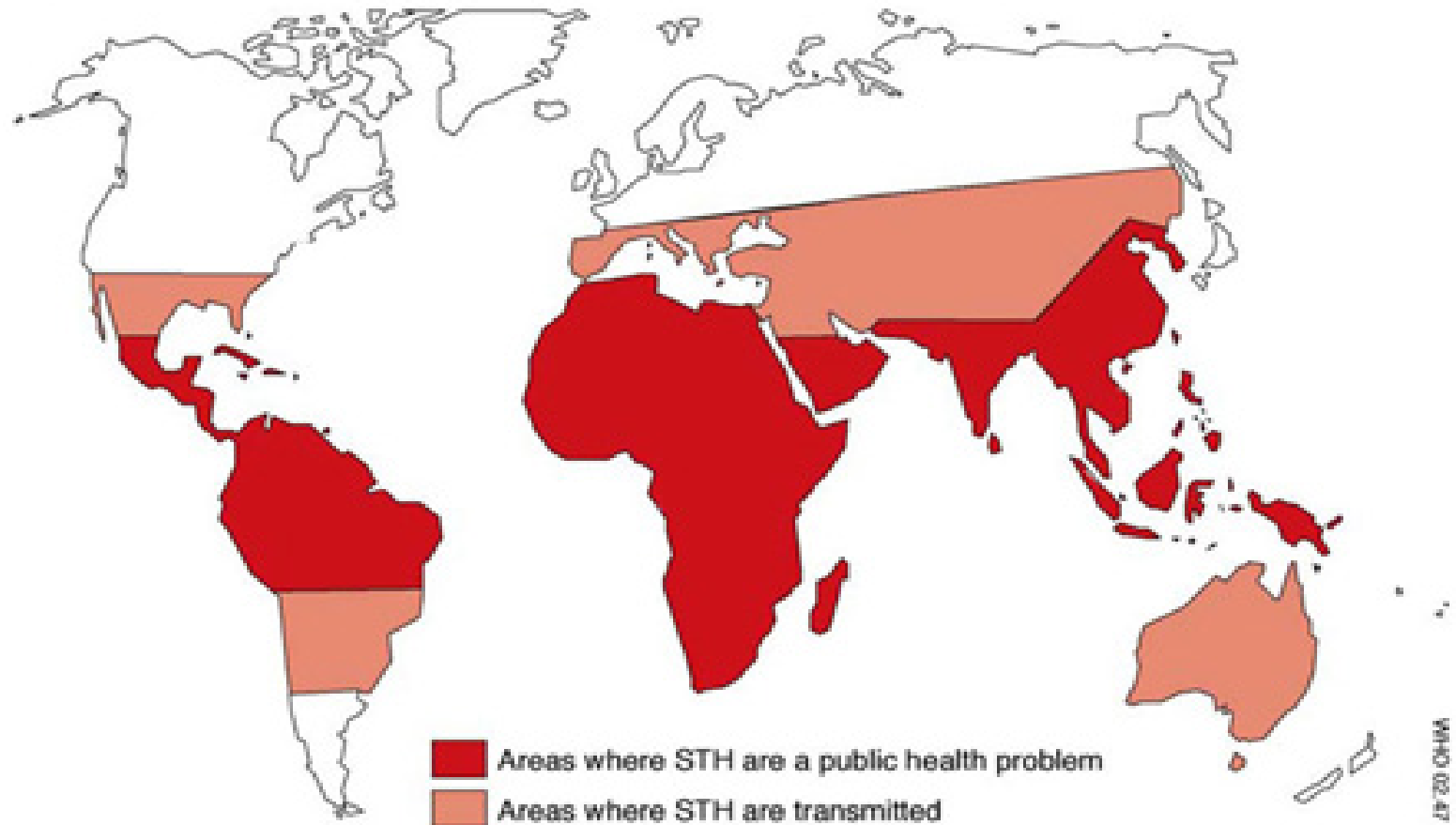
- Medical term- “Helminthiasis”
- Most common infection worldwide
- >2000 million people affected worldwide*
- Includes different worms like
 - Hookworm (*Ancylostoma duodenale*)
 - Roundworm (*Ascaris lumbricoides*)
 - Pin worms (*Enterobium vermicularis*)

**Ref: WHO & UNICEF Joint Statement (2004)*

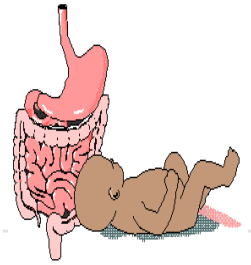
Global Distribution



Global distribution of soil-transmitted helminth infections

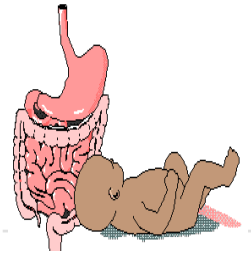


Incidence in India

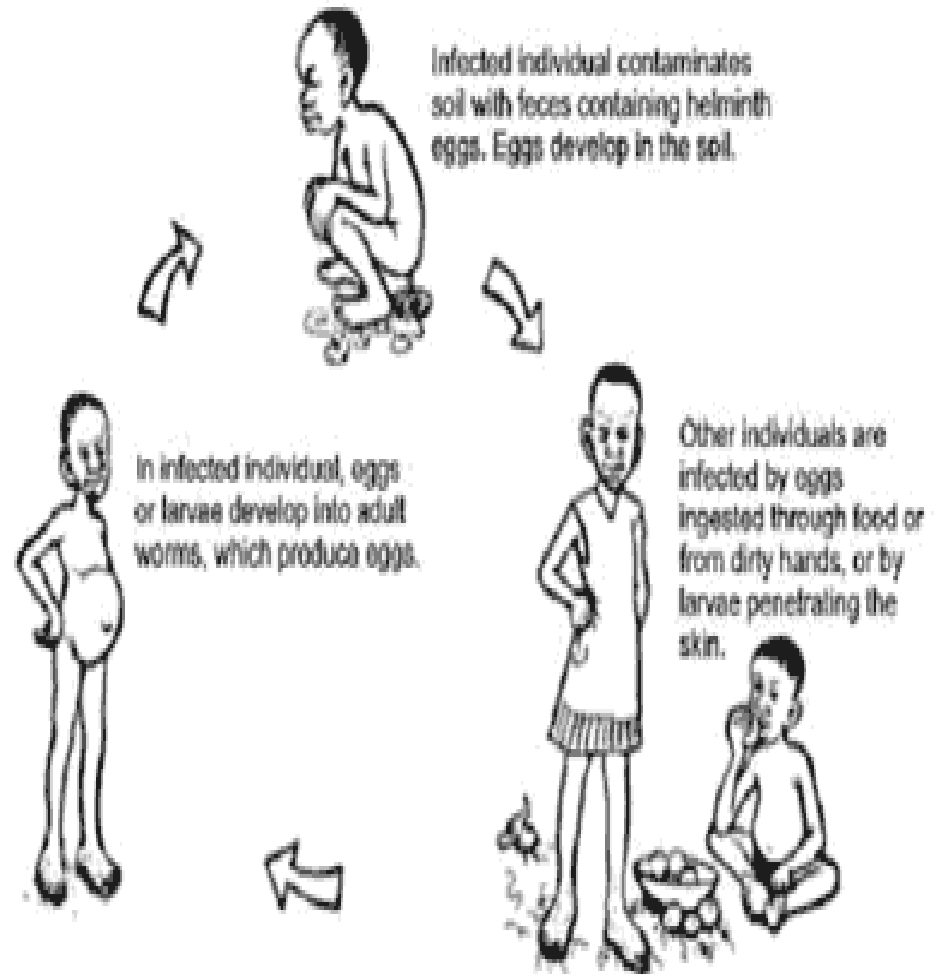


- Round worm- most common
- Widely prevalent
- Heavily infected areas – Assam, W Bengal, Bihar, Orissa, A.P., Tamil Nadu, Kerala, Maharashtra
- 60-80% population of certain areas of W.B., UP, Bihar, Orissa, Punjab, TN & AP affected

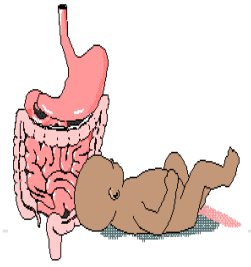
How are Helminths Transmitted



- ❑ Contaminated food
- ❑ Contaminated water
- ❑ Through piercing the skin (Hookworms)
- ❑ Habits like eating mud in children (“Pica”)



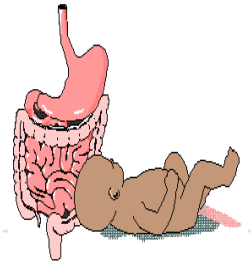
Predisposing Factors



- ❑ Unsanitary conditions
- ❑ Malnutrition
- ❑ Improperly cooked meals
- ❑ Improper hygiene



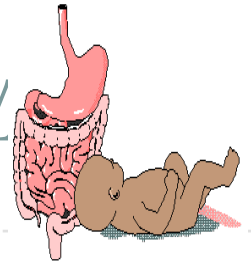
VULNERABLE GROUPS



- ❑ Pre-school
- ❑ School going children
- ❑ Adolescent girls
- ❑ Women of child-bearing age



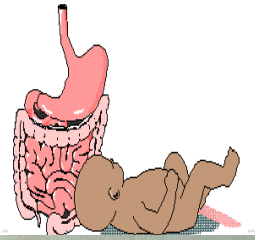
WORM INFESTATION- SYMPTOM



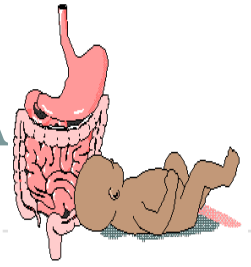
- ❑ Abdominal pain
- ❑ Nausea/vomiting
- ❑ Diarrhea
- ❑ General malaise & weakness
- ❑ Anemia
 - Retarded physical growth & development in children
- ❑ Intestinal obstruction



Complications



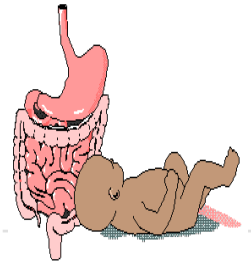
CONTROL & PREVENTION OF WORM INFESTA



- Treat following groups once or twice per year
 - Pre-school & school age children
 - Women of child-bearing age (including 2nd & 3rd trimester of pregnancy)
 - Workers in high risk profession- Miners, tea-pickers, etc

Maximum risk – In children 5 - 14 years of age

BEST STRATEGY



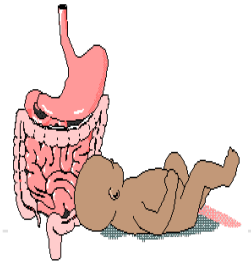
“Deworming school-aged children is probably the most economically efficient public health activity that can be implemented in any low-income country where soil-transmitted helminths are endemic”



**World Health
Organization**



Ideal Time for Deworming



- For children, ideally done every 6 months after 1 year of age
- Dosing intervals of 2-3 months if protein-energy malnutrition is prevalent



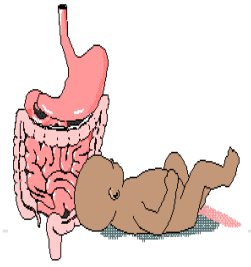
BENEFITS OF DEWORMING



- ❑ Beneficial effects on growth
- ❑ Better nutrition- shown to improve iron & Vitamin A status
- ❑ Improves school performance
- ❑ Reduces morbidity



Drugs used for Deworming



- ❑ Albendazole
- ❑ Mebendazole
- ❑ Levamisole
- ❑ Pyrantel pamoate
- ❑ Ivermectin



ALBENDAZOLE- ADVANTAGES

- Highly effective
- Safe
- Single dose
 - Dose:
 - 400 mg (>10 kg body weight)
 - 200 mg (< 10 kg body weight)
- Relatively inexpensive
- Easy to administer



Drugs for Deworming

70

Drug	Available strengths	Mode of action
Albendazole	200, 400 mg	Absorbed by intestinal cells of the worms; blocks glucose uptake & inhibits formation of ATP
Levamisole	Tablets 40 mg; Syrup 40 mg/5ml	Binds to acetylcholine receptors & inhibits production of succinate dehydrogenase, causing spastic paralysis & passive elimination of worms
Mebendazole	100 & 500 mg tablets Suspension 100 mg/5 ml	Same as albendazole
Pyrantel	Chewable tablets 250 mg Suspension 50 mg/ml	Binds to acetylcholine receptors & paralyses the worms by depolarizing neuromuscular junctions
Ivermectin	Chewable tablets 6 mg	Causes paralysis in many nematodes through influx of chloride ions across cell membranes & disruption of neural transmission mediated by GABA

*Thank You for Being
Patient Till the End*

