

The gastrointestinal tract clinical study

- **For digestive system clinical study the complaints, additional questioning and objective investigation of abdomen are usually performed. After that the study of oral cavity, rectum, stool and laboratory-instrumental methods are recommended.**

The main complaint showing the gastrointestinal tracts` disturbances.

- **They are:**
- **1. Abdominal pain**
- **2. Lack of appetite and/or impossibility to ingest the food (dysphagia)**
- **3. Regurgitation and vomiting**
- **4. Diarrhea**
- **5. Constipation**

Questions to the mother

- **1. How long do the symptoms last?**
- **2. Are there any relationships between the meals` intake and symptoms?**
- **3. What are the predisposed diseases?**
- **4. In small children it is necessary to define the type of feeding (breast feeding or milk formulas?).**

Abdominal examination

- **Abdominal examination is made in 4 steps :**

1. Inspection:

- **It is important to detect :**
- **1. Abdominal enlargement:**
- **Large abdomen may be due to:**
- **a) Abdominal distension where the enlargement is due to distension of intestinal loops or colon by gases. Intestinal obstruction and malabsorption are the main causes.**
- **b) Abdominal masses where the enlargement is due to enlarged organs or other masses.**



Abdominal distention secondary to an abdominal mass in a boy with an omental cyst.

Abdominal enlargement

- **c) Abdominal distention secondary to ascites in a young girl with neonatal liver disease.**



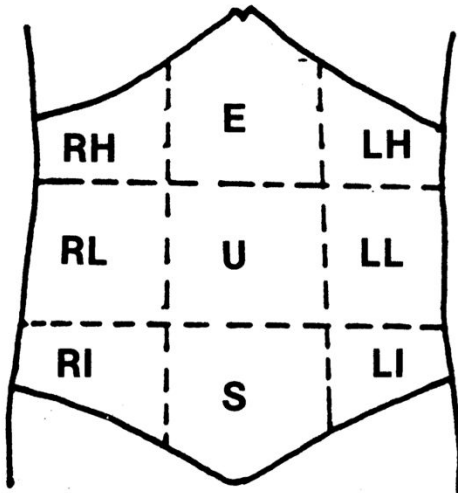
Abdominal inspection:

- **2. Dilated abdominal wall veins :** It is a sign of collateral circulation and indicates the presence of portal hypertension (see veno-occlusive disease).
- **3. Other findings:** Look for umbilical or inguinal hernia, divarication of recti, scar of previous operation or skin lesions (as purpuric eruption or pigmentation).

2. Palpation:

- It is mainly useful for detection of:
- **1. Tenderness or rigidity:** Location of the area of maximal tenderness is diagnostically important :
 - — Right hypochondrium : hepatitis or congestive heart failure.
 - — Right iliac fossa : appendicitis.
 - — Epigastric area : Gastritis.
 - — Left hypochondrium : Splenic congestion.
 - — Left lumbar and left iliac fossa : Colitis.
 - — Tender loin : Perinephric abscess.
 - — Diffuse or generalized tenderness : peritonitis.
- **2. Enlarged organs or abdominal masses:** Hepatic and/or splenic enlargement is common. Comment should include size (in centimeters below the costal margin in midclavicular line), consistency (soft, firm or hard), surface (smooth or irregular) and lower border (sharp or rounded). Palpation of the spleen should include the splenic notch.
- Other abdominal masses may be accidentally discovered

Abdominal Examination

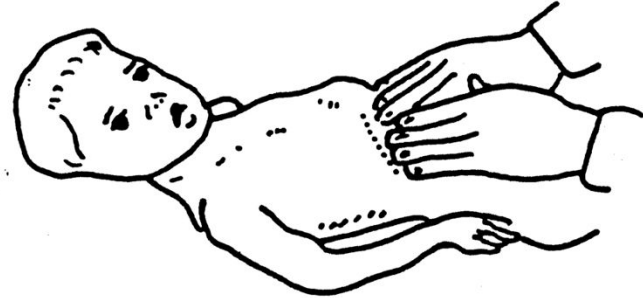


(abdominal areas)

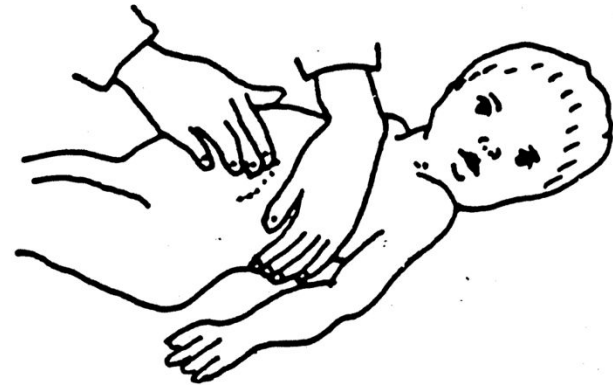
E: epigastric
U: umbilical
S: suprapubic
H: hypochondrium
L: lumbar
I: iliac

R: right
L: left

- palpation of liver



- palpation of spleen



- palpation of kidney



3. Percussion:

- Normally a tympanic resonance is heard on percussion. Percussion is mainly useful for:
- **1. Differentiation between abdominal distension and ascites** : With abdominal distension, there is hyperresonance on percussion. With ascites, shifting dullness can be elicited (dullness in the flank while the patient is in supine position and resonance in the same area when the patient lies on his side). With a small ascites, shifting dullness can be elicited in knee chest position. With massive ascites, transmitted fluid wave can be palpated with one hand placed on one side while the other is tapping on the opposite flank.
- **2. Confirmation of enlarged organ:** This is particularly useful when the abdomen is tense or rigid and palpation is difficult. Dullness can be elicited over the enlarged organ.

4. Auscultation:

- **It is only useful in paralytic ileus where the normally heard intestinal sounds are absent.**

**The inspection of oral cavity.
Digital (by finger) examination
of the rectum. The stools`
inspection.**

Oral cavity and pharynx

- **On the known reason to keep the child peaceful the oral cavity and pharynx have to be examined in the end of clinical examination. The attention to odor from mouth, to condition of mucous membranes of the cheeks and gums, to teeth and tongue has to be paid.**

The area of anus

- **The area of anus is examined in young children in position on side and in other children in knee-cubital position. The examination reveals: rifts of the anus, the sphincter tone reduction (for instance, in dysentery), the rectal fall out after stubborn constipation or severe diarrhea. The irritated rectal mucous membranes and skin near the anus reflect the pinworms invasion.**

Rectal examination

- **The digital (by finger) rectal examination allows to find the stool in ampoule of the rectum and blood in it, polyps, tumors, strictures, fecal stones, ulcers etc. Simultaneous rectal digital (by finger) examination and contralateral palpation of abdominal wall allows to define the size, consistency and tenderness of low situated abdominal organs (uterus and its adnexa in girls, urinary bladder, appendix and others. The digital examination is saved in children from 6-month age. For their examination the pinkie finger is used. The index finger is preferred for adult patients.**

Bristol Stools Chart

Type 1



Separate hard lumps, like nuts (hard to pass)

Type 2



Sausage-shaped but lumpy

Type 3



Like a sausage but with cracks on its surface

Type 4



Like a sausage or snake, smooth & soft

Type 5



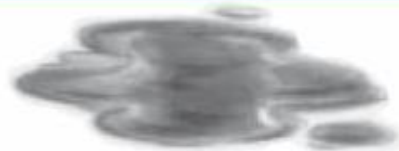
Soft blobs with clear-cut edges (passed easily)

Type 6



Fluffy pieces with ragged edges, a mushy stool

Type 7



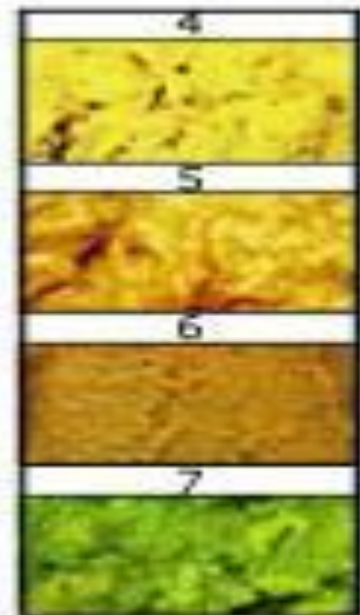
Watery, no solid pieces, ENTIRELY LIQUID

**Colour scale allowing
reveal an acholic stool in
obstructive jaundice (for
instance, in hereditary
biliary atresia)**

Abnormal



Normal



Stool examination

- The visual stool examination in children has a big importance for digestive abnormalities revealing.
- So called dyspeptic stool quite often is characteristic for infants with transitory non-inflammatory disturbance due to mistakes in nursing. The dyspeptic stool has a type of minced eggs. It is soft, watery, greenish, with admixture of white clots and acidity smell.
- A lots of bloody mucus are very characteristic for stool in colitis (dysentery).
- In severely ill children the bloody stool without admixture of fecal masses is strongly characteristic for intussusceptions.
- The discolored (white) stool combined with dark urine indicates the delay of bile pass into a bowel and is a symptom of hepatitis.
- The survey of stool can be complemented by microscopic assays for leucocytes and erythrocytes counts, eggs of parasitic worms, protozoa cysts and bacteriological studies.

**The Semiotics of
gastrointestinal disturbances.
The main syndromes.**

The abdominal pain

The acute abdominal pain

- The **abdominal pain** is common symptom in children. It reflects a lot of conditions. When the **pain appears suddenly** for the first time, this condition requires to rule out a surgical pathology in abdominal cavity like an appendicitis, intussusceptions, peritonitis due to inflammatory irritation of abdominal viscera (peritoneum).
- Also the acute infectious diseases like scarlet fever, influenza, measles may cause the abdominal pain which origin usually is not clear.
- The viral and bacterial diarrheas, urinary tract infections, lobar pneumonia, pericarditis, Henoch – Shounlein purpura can also provoke the abdominal pain due to viscerovisceral reflexes.

Recurrent abdominal pain

- **Recurrent abdominal pain in older children can reflect chronic gastro-intestinal diseases like duodinitis, cholecystitis, pancreatitis, peptic ulcer of stomach or duodenum and ulcerous colitis. The helminthes` invasion also can be accompanied by recurrent abdominal pain.**

Recurrent abdominal pain

Recurrent abdominal pain in small children is named as “intestinal colic” or “infantile abdominal cramps”. It is conditioned by spasm different division of the bowel due to transitory malnutrition and maldigestion, overfeeding, aerophagia (swallowing of air during breast sucking), food (cow's milk) allergy. The colic clinically reveals itself by anxiety, child` weeping and motor exaggeration. The child twists his legs “pedaling the bicycle”, closes the eye and the babys` fase gets red. The abdominal distention and food regurtation can occur. This condition lasts from several minutes up to hours. Deeling firstly with a child who has a suspected infantile colic it is necessary to exclude the wide spread surgical disease like intussusceptins, hernias` strangulation, appendicitis, inflammation of Meckel's diverticulum.

Recurrent abdominal pain

- **The intestinal colic can be seen in older children and it can be called as "recidivated abdominal pain". Often the reason of this condition is not clear. In cases which are not related with organic gastrointestinal pathology capable to cause the pain the cause could be psychogenic. In particular it is considered when the child usually complaints with abdomen cramps before he or she has to go to school.**

**The semiotics of appetite loss
(anorexia).**

Appetite loss?

- **The parental complaints of their children appetite loss most often can be define as a result of educational mistakes and ungrounded anxiety. In their two, six and ten years the children usually look lean. In this ages they provoke impression that they are underfed because before they used to look more fatty.**

What do we need to know about appetite in children?

- In common situations the children often refuse of heavy and fatty meals eating if the parents insist them. Also it is important to know that small amounts of food, particularly sweets (including soft drinks) at gap between usual meals intake (lunch or dinner etc.) strongly reduce the appetite in children.**
- And the next physiological point should be considered when the parents complaints with their child` appetite loss. Two or three glasses of cow's milk intake by the child aged 2-5 years per day can satisfy his or her needs in food at hot season of the year.**

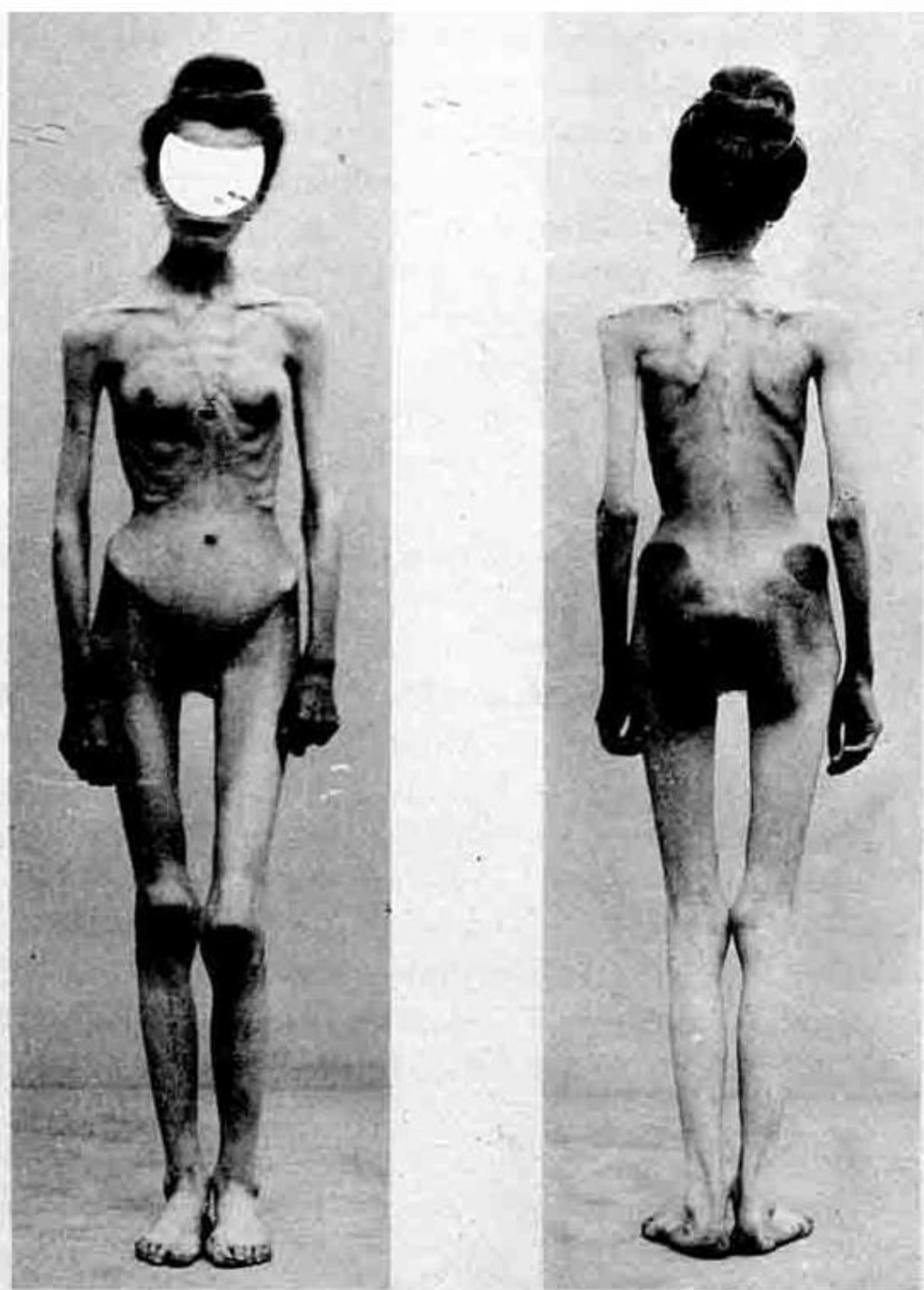
The true anorexia and weight loss

- **The simple weighing of the child reveals the real appetite loss because in all situation described above there the children do not loss the weight.**
- **However the true anorexia and weight loss is indicative for many diseases onset like a gastrointestinal illnesses and common chronic infections and intoxications.**

The nervous form of anorexia

- The enormous importance in European and north American girl-teenagers gains the nervous form of anorexia on background of juvenile dysmorphophobia as a sort of psychic dysfunctions in puberty. Some girls do not want to change their figure proportions getting a young woman. They strictly refuse from meals even hide from them. If they have to eat by effort immediately after they provoke vomiting by their selves emptying stomach. The long lasting and intensive physical exercises “to loss the weight” are also characteristic for this patients` group. The on time non-recognized condition can lead the female-teen to the life-threatening state.**

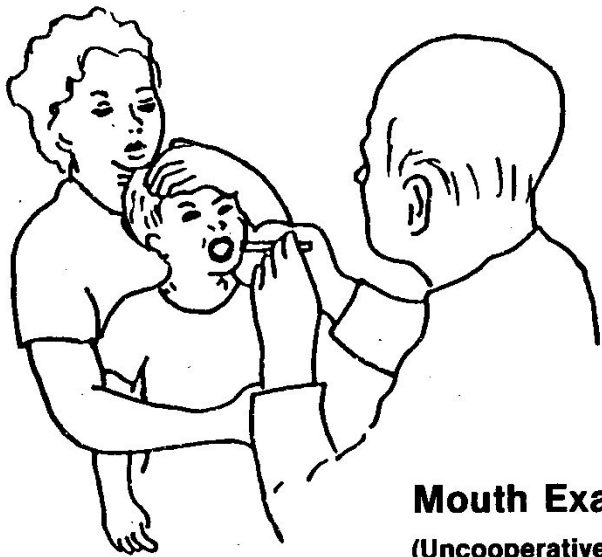
**This child must
be treated
immediately !**



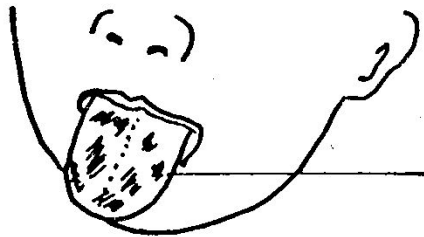
Disphagia is a difficulties in meals intake due to impossibility of chewing or swallowing.

The semiotics of stomatitis.

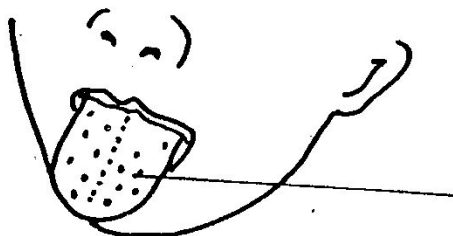
- **Most often the child cannot eat because of inflammatory process in mouth or pharynx which causes a pain. In this condition the children usually refuse from meals.**
- **The inflammation of oral mucosa (stomatitis) is a common clinical condition especially in infants and children in their first years.**
- **There are several types of stomatitis based on their causes and clinical characteristics.**



Mouth Examination
(Uncooperative Child)



Monilial Stomatitis
white flaky plaques



Herpetic Stomatitis
small ulcers

1. Monilial stomatitis (Thrush):

It is most common in neonatal period and early infancy. Clinically, there is white flaky plaques covering all or part of the tongue, gingiva and oral mucosa. These plaques when removed leave a bright inflamed base. The condition is mildly painful and may cause feeding difficulty.

2. Herpetic (ulcerative) stomatitis:

It is caused by herpes simplex viral infection and mainly seen between 1 — 3 years. It is the commonest cause of mouth ulcerations in children. Clinically, it starts with high fever, severe mouth pain, salivation and refusal of feeding. Examination of oral cavity reveals small ulcers (2 — 10 mm in diameter) over the tongue, gingiva and oral mucosa. The condition usually lasts for 4 — 7 days. Pain disappears few days before complete healing of ulcers.

Aphthous ulcer

- It is a single or few ulcers that appear on oral mucosa. The cause is unknown but it may follow stress. Secondary bacterial infection with streptococci may cause more discomfort.



Nursing the child with stomatitis

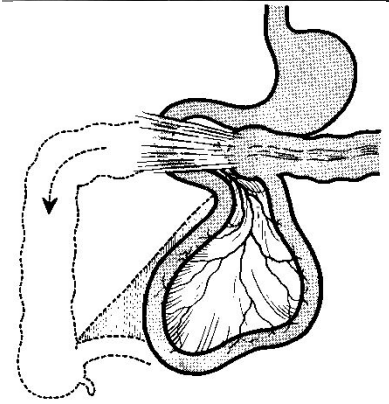
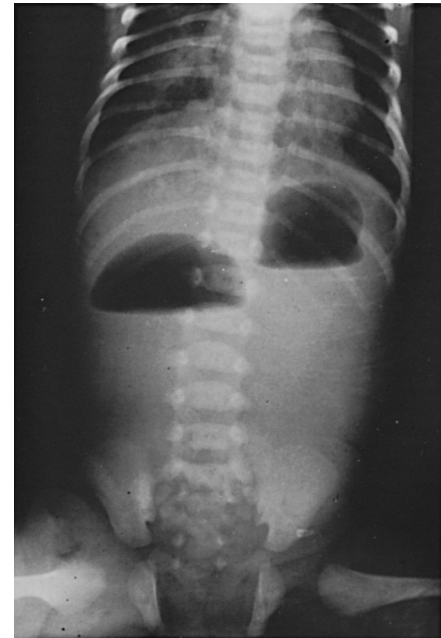
- **Nursing the child with stomatitis first of all the consideration about severity of water and meals refusing has to be done. The water restriction quickly could lead a child to a dehydration which in conditions of high fever is a life-threatening condition. So the body fluids` maintenance is the most important goal of nursing. It provides by careful giving of drink by cup, nipple, eye-dropper, syringe. Some time the nose gastric tube should be introduced. IV line and intravenous fluids prescription also is a method of choice if the child can not ingest a meals.**

**Vomiting and out-of-stomach
regurgitation (esophageal
reflux).**

The vomiting and regurgitation in newborns

The vomiting and regurgitation in newborns can be a result of anatomical obstacles. They are gastropyloric spasm or atresia, atresia of duodenum and other divisions of gut. So called obstructive vomiting is characteristic for this life-threatening disease.

The correct **guideline of care** in obstructive vomiting is to make for the nurse stuff the order “NPO” (“nothing per os”) for the child. After that the persistent nasogastric tube insertion for the stomach decompression can be done.



The aerophagia and/or deficiency of stomach cardiac valve function

In well infants the aerophagia and/or deficiency of stomach cardiac valve function can lead them to benign functional esophageal reflux (regurgitation). In this condition the children belch easily and even vomit. The typical nursing sign of aerophagia is the snapping sound appearing when a child is sucking a mother's breast. The incomplete capsulation of baby's oral cavity in breast sucking, the short bridle of his or her tongue, taut mother's breast and especially the congenital fission of the lip predispose the children to an aerophagic regurgitations. Providing the well nursing all of this predictors have to be corrected.



**The semiotics of diarrhea,
gastroenteritis and dehydration
in children.**

The diarrhea

- The diarrhea is defined as a frequent defecations with changing in nature of stool from solid to watery. The enlarged ***water spot of imbrued diaper*** after stool pass is an essential sign of diarrhea in infants.

Functional benign diarrhea

The symptomatic or functional benign diarrhea quite often reflects the dysfunction of bowel due to qualitative or quantitative inaccuracy of nursing or overheating in small children. Also big amount of fruit juices and/or low fat intake in infantile diet can be accused as causes. Usually the normalization of care brings to children quick improvement of stools.

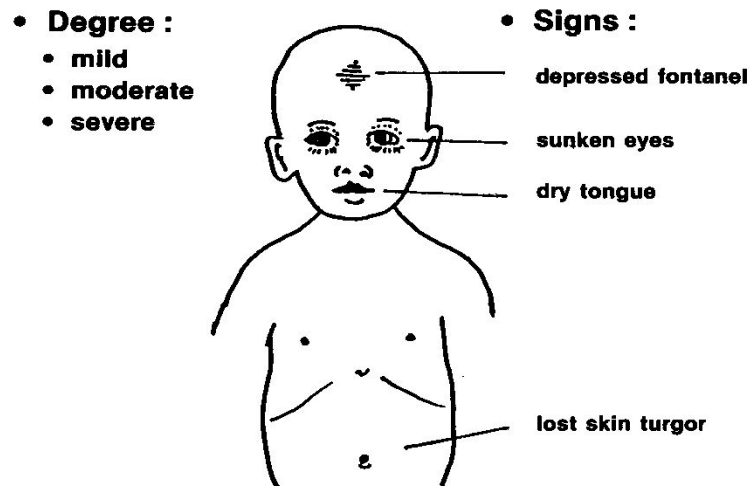
Gastroenteritis

- **The most frequent cause of diarrhea in children is the gastrointestinal infections. Acute gastroenteritis by far is the most common cause of acute diarrhea. In gastroenteritis the watery stool develops as a result of hypersecretion of gastric and intestinal contents and surplus formation of gut slime because of microbial activity as well as quick pass of food masses due to hyperperistaltics in bowel.**
- **The illness is much commoner in underdeveloped countries where serious complications are common especially in infants.**

The signs of dehydration associated with gastroenteritis :

- Several serious complications as a toxicity, septicemia commonly occur especially in infants with severe gastroenteritis. The most important complication is dehydration.

Dehydration



How to help a child started acute diarrhea (gastroenteritis)?

- **From the very beginning the recommendations to give the additional amount of fluids as a rehydrative salts` solutions to the baby and do not stop breast feeding are very useful to protect complications.**

**Persistent (chronic) diarrhea
and maldigestion.**

Chronic diarrhea

- Persistence of diarrhea for more than **2 weeks** or reappearance after initial improvement has to be defined as a chronic diarrhea and should suggest the following possibilities :
- 1. **Persistent infection** : Giardiasis is a common cause of persistent mild watery diarrhea.
- 2. **Milk allergy**: It may occur with severe mucosal damage. Severe watery diarrhea occurs on cow milk feeding (no allergy to human milk). Therapeutic withdrawal of cow milk results in a rapid improvement.
- 3. **Insufficiency of the digestion** (malabsorption, maldigestion) can be several types. Every one can be delimited on the grounds of clinical studies and stools` investigations.

Insufficiency of the digestion

- a) **Digestive intolerance to proteins and fats.** The pancreatic digestive fermentable insufficiency due to hereditary pancreatic cystic fibrosis (mucoviscidosis) reveals by chronic diarrhea. The lack of pancreatic enzymes like trypsin, chymotrypsin and lipase in the gut predisposes the affected child to polyfecaly (abnormally big amount of stools >200 g/day), putrefaction in bowel and steatorrhea (fatty stool). The parents describe the child's stool as a whitish, sticky, hard washed off excrements with very strong unpleasant odor. The chronic diarrhea and malnutrition (internal deficiency of meals' ingredients intake) cause physical retardation and deficiency of thrive.

Insufficiency of the digestion

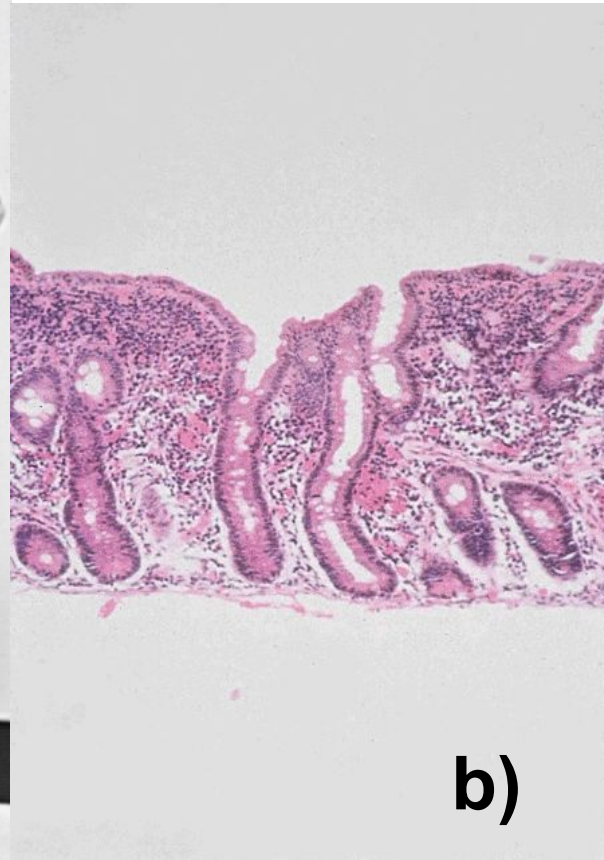
- **b) Lactose intolerance.** It occurs due to acquired or congenital mucosal damage and loss of lactase enzyme in the small gut. Severe watery diarrhea occurs on refeeding with breast or cow milk. Stool is acidic (its pH is below 5) and contains sugar. So the stool examinations for pH and reducing substance (carbohydrates) are important. The abdominal flatulence expresses the intestinal colic. The stool is usually greenish because of bilerubin oxidation into biliverdin in condition of low pH (less than 5). The acidic stool causes the irritation of napkin area.

Insufficiency of the digestion

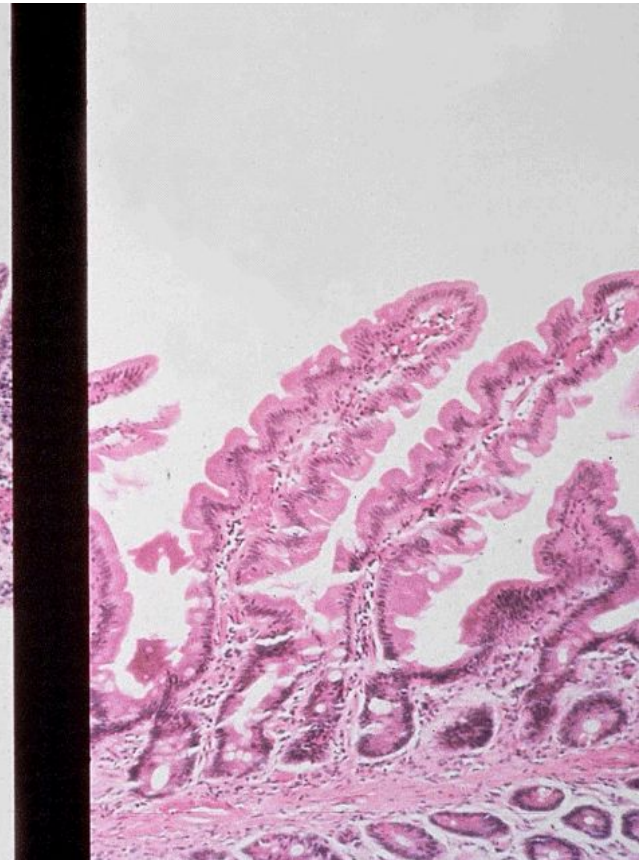
- **c) Chronic diarrhoea due to cereal protein – gliadin intolerance (**tropical sprou** as an aquired form and **celiac disease** as a congenital form). The condition is characterized by multipotential maldigestion of fats, proteins and carbohydrates. The main pathogenic trigger factor of celiac disease is cereal protein - gliadin, which acts against enterocytes in predisposed children as an cytotoxic poison. The frequent repeated attacks of diarrhea cause marasmus in affected children.**



a)



b)



Celiac disease

a) An 18-mo-old boy with active celiac disease. Note the loose skin folds, marked proximal muscle wasting, and full abdomen. The child looks ill.

b) Left panel: Small bowel biopsy from a child with gluten-sensitive enteropathy. Subtotal villous atrophy with crypt hyperplasia is noted. The surface epithelium is flattened and contains chronic inflammatory cells. Increased inflammatory cell content is noted in the lamina propria as well. Right panel: A normal small bowel biopsy for comparison.

Malnutrition.

- **Severe complicated chronic diarrhea due to congenital or acquired causes may lead to underfeeding. Frequent repeated attacks cause marasmus.**

- ***The guideline of care for children suffering from intolerance of foods` components is their dietary restriction.*** The exception (canceling) the products, containing cereals, in celiac disease brings recovery to affected children.

Constipation

Constipation

Bristol Stools Chart

Type 1



Separate hard lumps, like nuts (hard to pass)

Type 2



Sausage-shaped but lumpy

Type 3



Like a sausage but with cracks on its surface

Type 4



Like a sausage or snake, smooth & soft

Type 5



Soft blobs with clear-cut edges (passed easily)

Type 6



Fluffy pieces with ragged edges, a mushy stool

Type 7



Watery, no solid pieces, ENTIRELY LIQUID



- **The constipation is defined as a rare (more than every 48 hours) bowel emptying accompanying with strong efforts to defecation which last more than 20 seconds every one and/or appearing of dry and solid fecal masses.**
- **The constipation can be a result of functional and anatomical rectal disorders like innate anal narrowing and painful rifts, colonic agangliosis or Hirschsprung's disease, chronic colitis).**
- **The alimentary factor has a big importance also. The alimentary dependent constipation happens when the meals contain a lot of rough components such as indigestible seeds of fruits and berries, hard bread and **low fat and water**. On the other hand the refined food, which may be completely utilized in bowel also predisposes a child to constipation because of stool masses volume lack.**
- **During the breast feeding the constipation can appear in underfed children. In chronic cases like starvation or pylorostenosis this sort of constipation usually coexists with the malnutritive state of the patient and even alimentary marasmus.**
- **In well infants with good weight gain in breast feeding the stools sometimes can be rare in consequence of good breast milk digestion leading to small amount of fecal masses. In this condition the child passes painlessly normal stool but not every day.**
- **At last the constipation in some children develops due to undesirable habit to delay the defecation. It decreases the rectal tone and makes the difficulties for rectal emptying. Bringing up the children the promotion of their normal stools and rhythmic defecations is very important. All predictors of constipation shown above are to be recognized and corrected.**

The particularities of the constipated children care.

- **The normal reflex of defecation has to be restored and supported by means of glycerin containing rectal suppositories insertions. They must be done to the patient bid or tid from beginning up to enough bowels` emptying will happen and then 1 time per day using after the breakfast. The normal rectal function as a rule can be easy maintained if the child is setting for 10 minutes every day after breakfast.**

Encopresis

Chronically dirty undershirts

- Encopresis is an incontinence of stools. The true encopresis is identified as involuntary excretion of fecal masses which usually are watery.
- Only for the infants the uncontrolled defecations are typical. The children aged 1 year and more should make them consciously. But from time to time the active toddlers during the playing should make stool in to the undershirts.
- Encopresis can be defined only as a **chronically dirty undershirts**. It is a real problem for child and his or her relatives.

- ***Encopresis in children is most often connected with chronic neglected constipation.*** The fluid part of fecal mass flows around the thick and solid fecal plug and forms encopresis. It is necessary to do all efforts in treatment of the constipation starting from full colonic emptying by several enemas.

Jaundice

- **High serum level of indirect (or unconjugated) bilirubin (more than 350 $\mu\text{mol/l}$ or 20 mg%) in newborns means that the neonatal jaundice is not physiologic and there is a danger for brain damage.**



Neonatal jaundice

Jaundice in hepatitis

- **Is mixed with high direct (conjugated) and indirect (inconjugated) bilirubin.**

Mechanical (obstructive) jaundice

- **The clinical manifestation of the jaundice starts gradually. Sometimes it can be intermittent. The skin gains the brown-greenish colour. In most cases also the itching exists. Big liver is very typical. The stool is whitish and urine dark yellow even brown. In serum the level of direct (conjugated) bilirubin is increased (more than 6 $\mu\text{mol/l}$ or more than 30% of total bilirubin).**

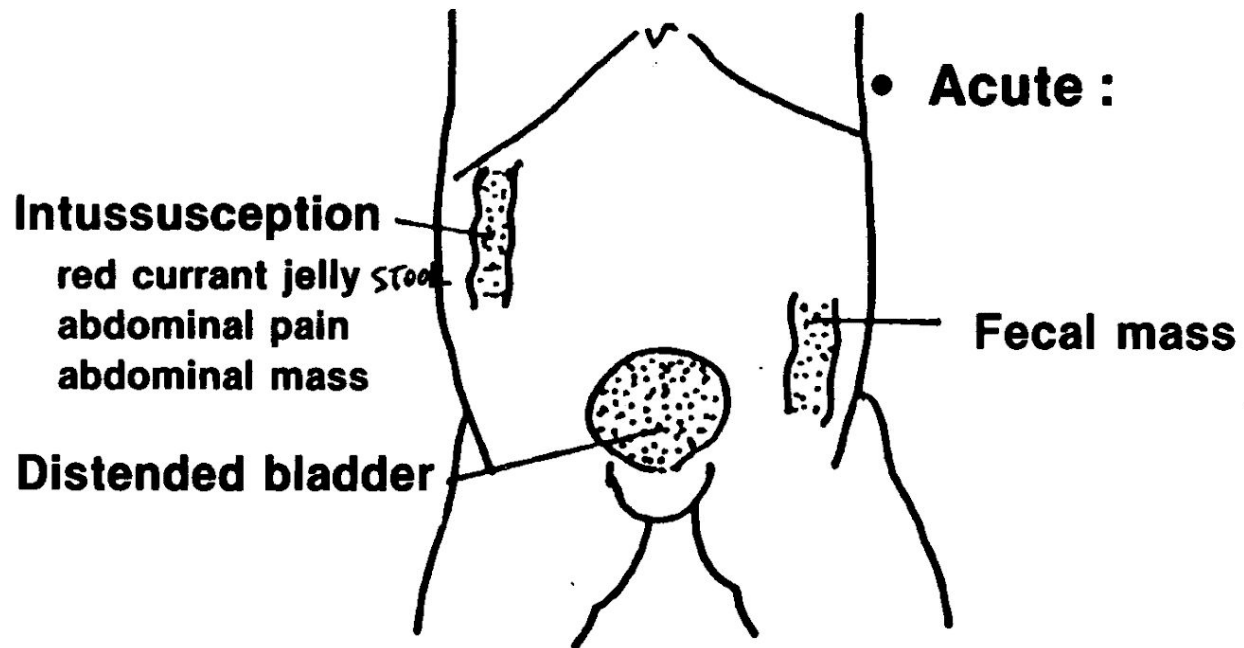
Hemolytic jaundice

- **The Syndrome of hemolytic jaundice forms from raised serum concentration of indirect (inconjugated) bilirubin due to pathological red blood cells disruption in children with hemolytical congenital or acquired anemias. The skin discoloration is “lemon pallor jaundice”.**

Abdominal masses.

Abdominal masses are either acute or chronic. Acute masses are usually symptomatic while chronic masses are commonly silent and discovered accidentally by parents or during routine abdominal examination.

Abdominal Masses



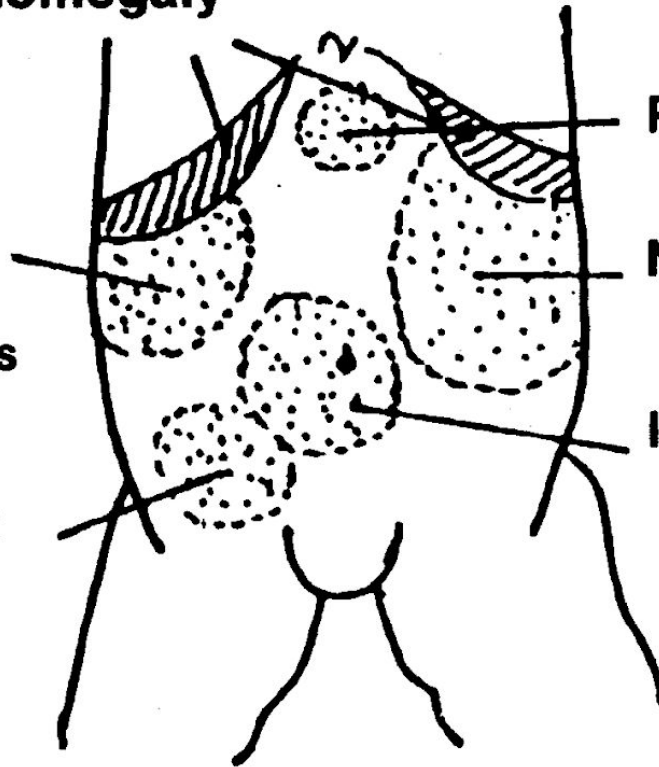
Abdominal masses.

- **Chronic :**

Hepatosplenomegaly

Renal mass
Wilms tumour
Hydronephrosis

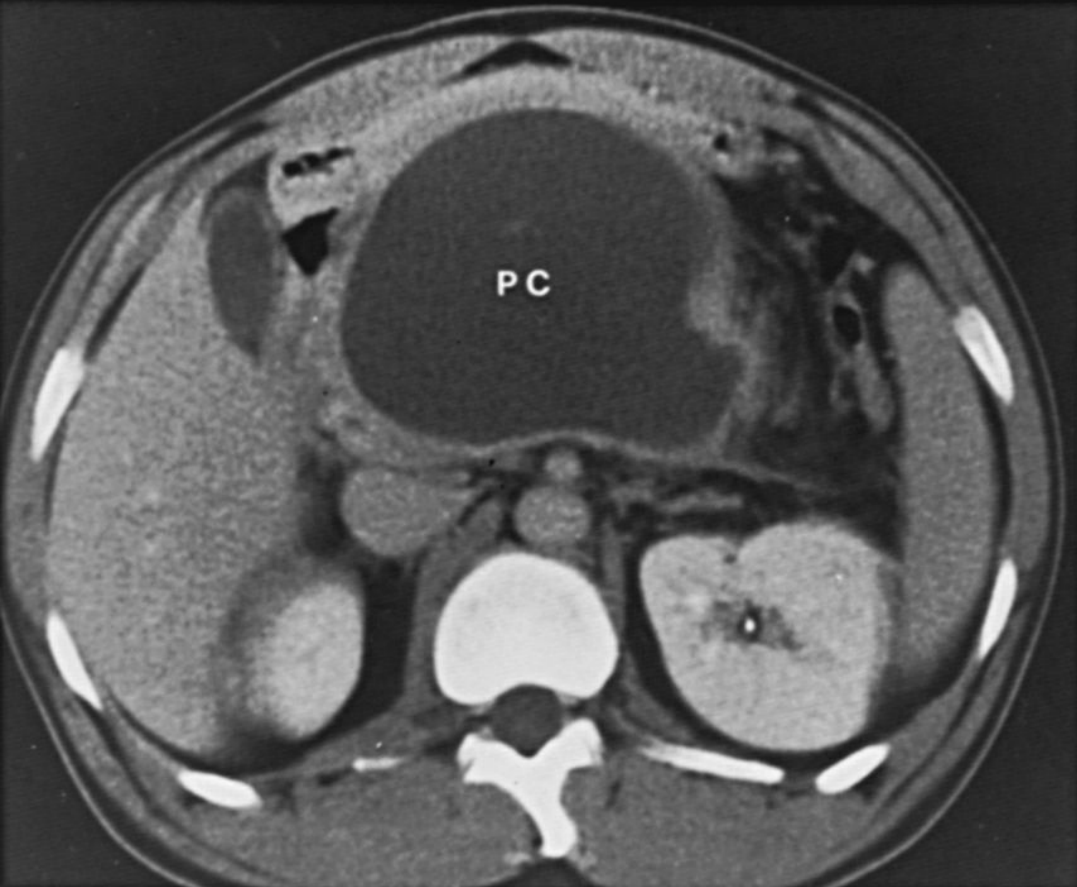
Ovarian cyst
(in ♀)



Pancreatic pseudocyst

Neuroblastoma

Intestinal lymphoma



Abdominal masses.

Pseudocyst (PC). Follow-up computed tomographic scan 5 mo after the episode of acute pancreatitis demonstrates a large pseudocyst (PC). This large pseudocyst will probably not resolve spontaneously and may need drainage.

(From Freeny P, Lawson T: The pancreas. In: Putman CE, Ravin CE [eds]: Textbook of Diagnostic Imaging. Philadelphia, WB Saunders, 1988.)

Thanks... and be healthy!

