

Good morning!





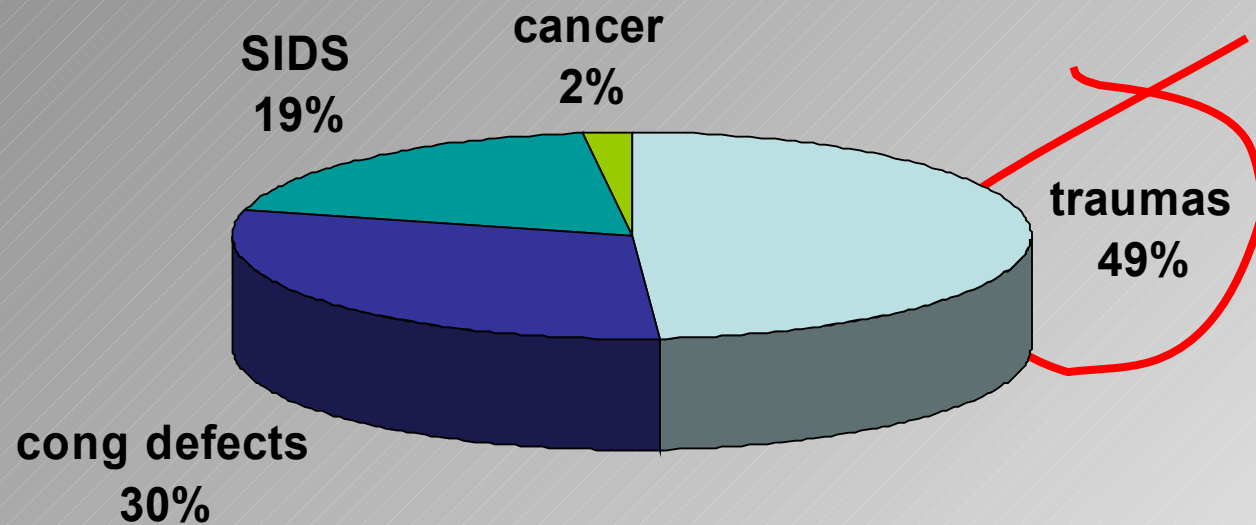
# Jan Godzinski

Chair of Emergency Medicine, Medical  
University and Dept. Of Pediatric  
Surgery, Marciniak Hospital, Wrocław,  
Poland.

## - AN OVERVIEW



# causes of death in children

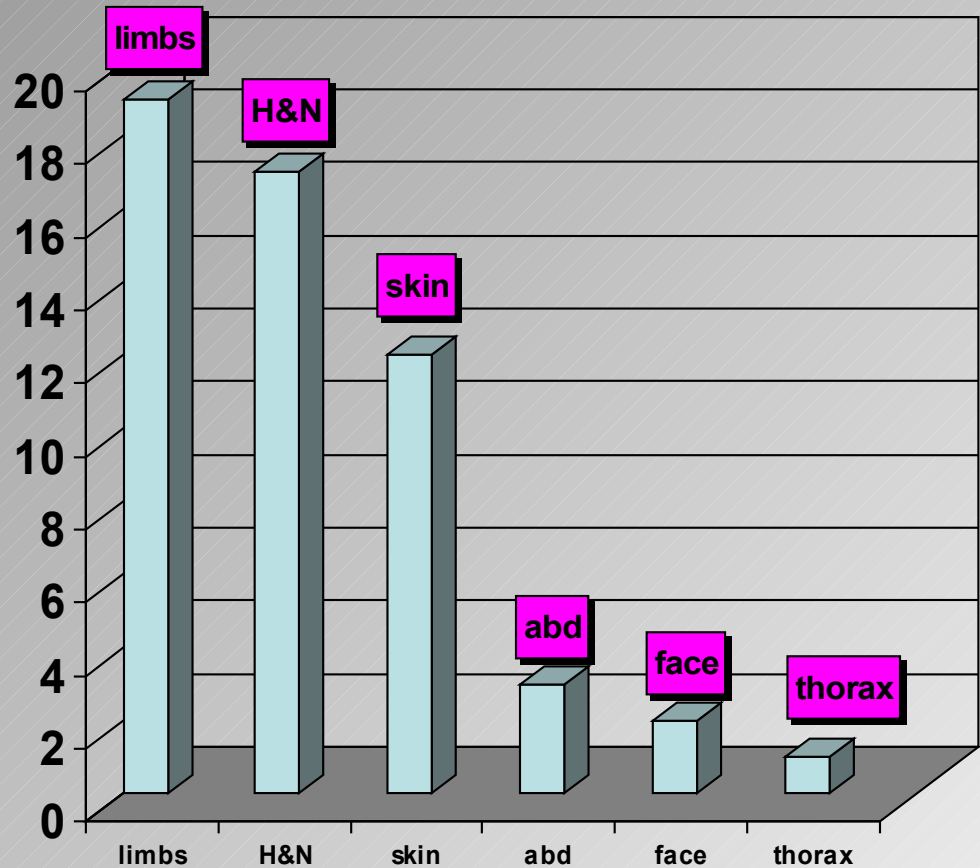


# trauma in children

- related to traffic accidents (and similar causes) – 44.9%
- (all!) other – 55.1%

# most frequent injuries in children

- multiple 43%
- limbs 19%
- head & neck 17%
- skin 12%
- abdomen 3%
- face 2.2 %
- thorax 0.9%



# What is challenging?

1. In terms of the survival
2. In terms of the functional outcome

# survival

1. CNS
2. Thorax
3. Major vessels
4. Abdomen
5. Genito-urinary
6. Muscles and bones
7. Peripheral nerves

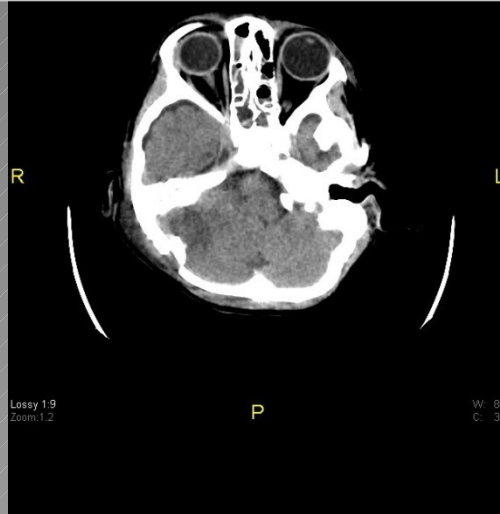
# CNS

- Injury of head or brain??
- 85% are minor injuries

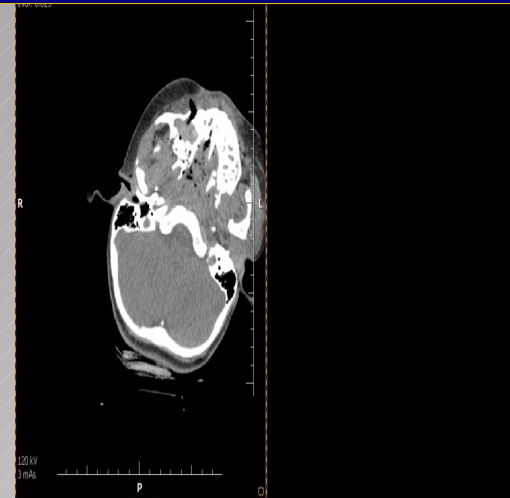
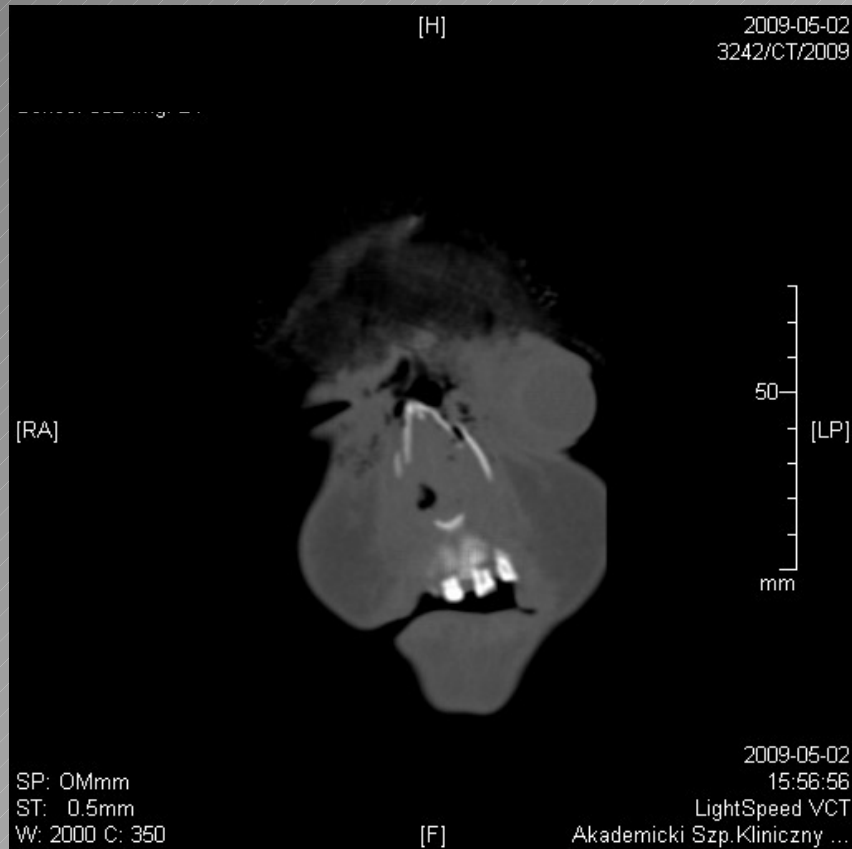


- history
- observation
- CT
- Xray ?

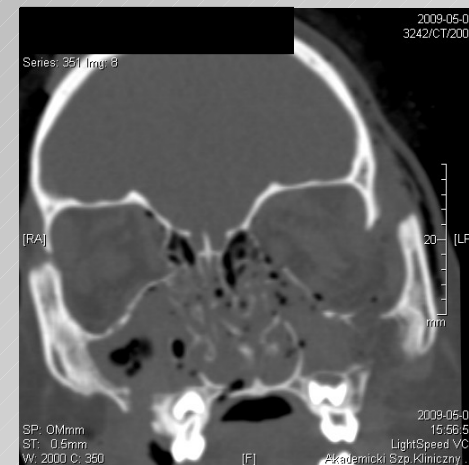
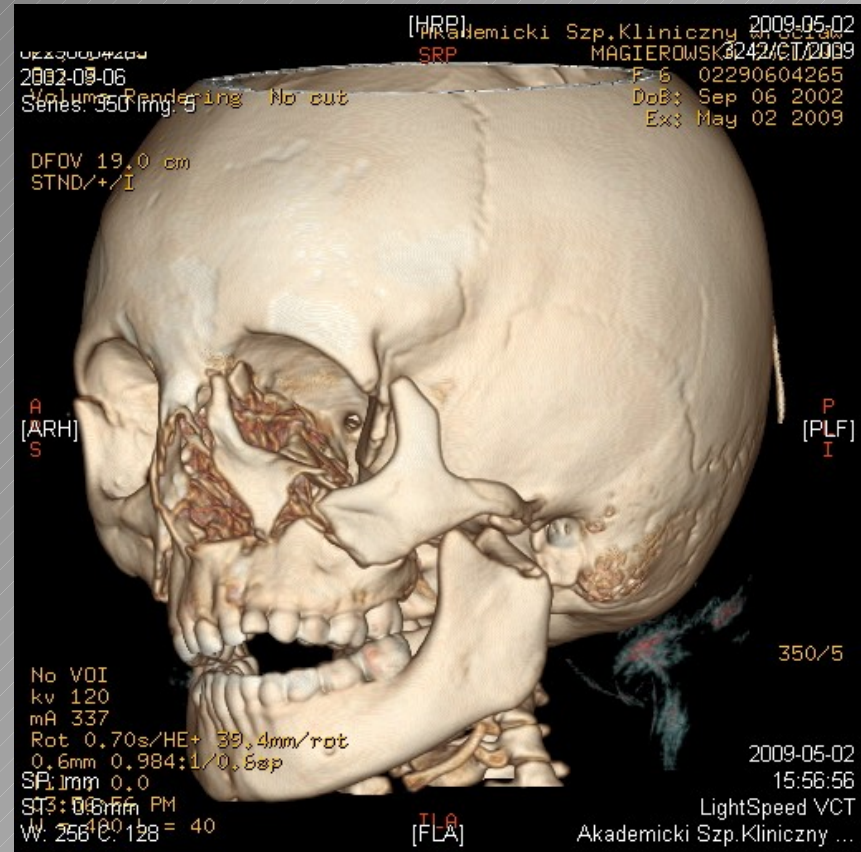
# Cranial fracture and perirenal haematoma



# Extensive fracture of the orbit, mandible and zygomatic bone, leak of the C-S fluid



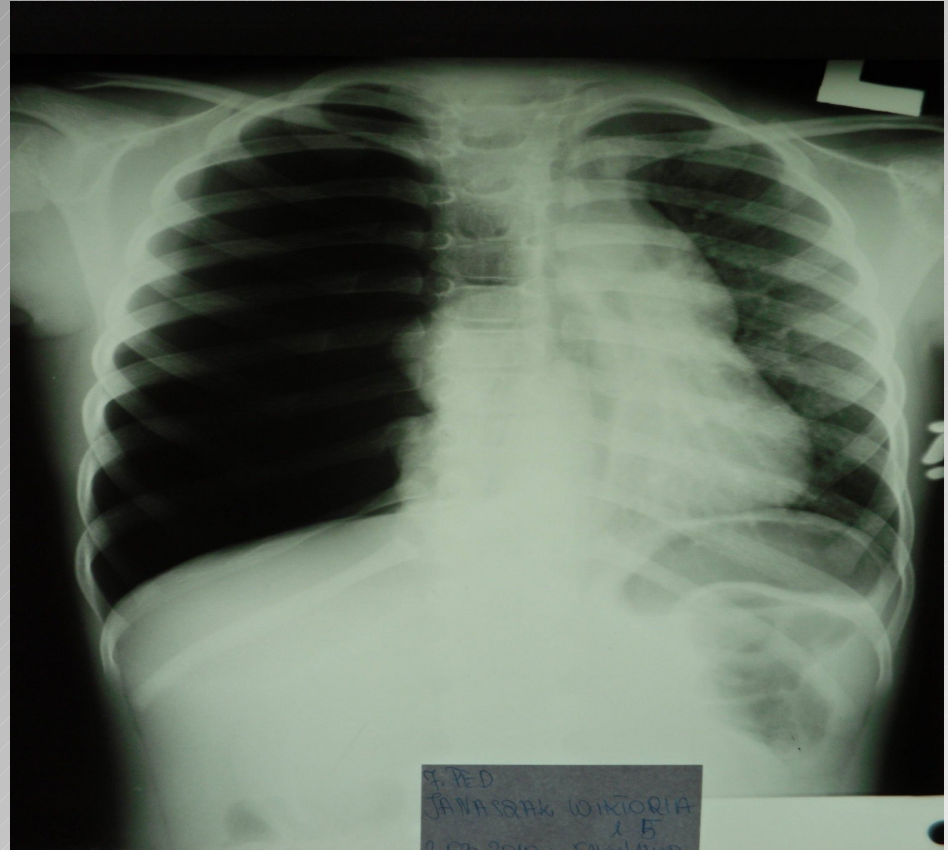
Extensive fracture of the orbit, mandible and zygomatic bone, rather function importance



# thorax

- contusion
- (tension) pneumothorax (note 90% - „idiopathic, not trauma – related)
- heart - extremely rare ( do not forget the hematoepricardium – heart tamponade)

- history
- physical examination
- blood gases
- Xray (CT: whether we need it always?)
- thoracic drainage
- thoracotomy

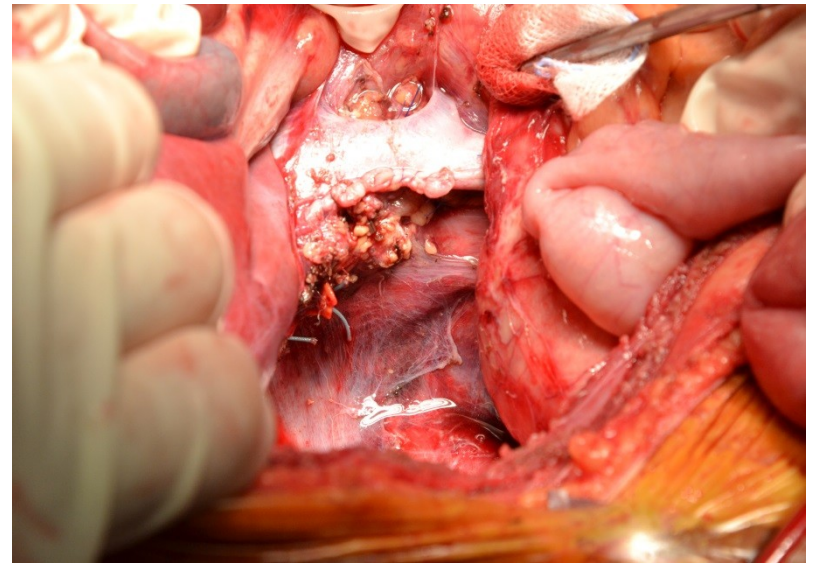
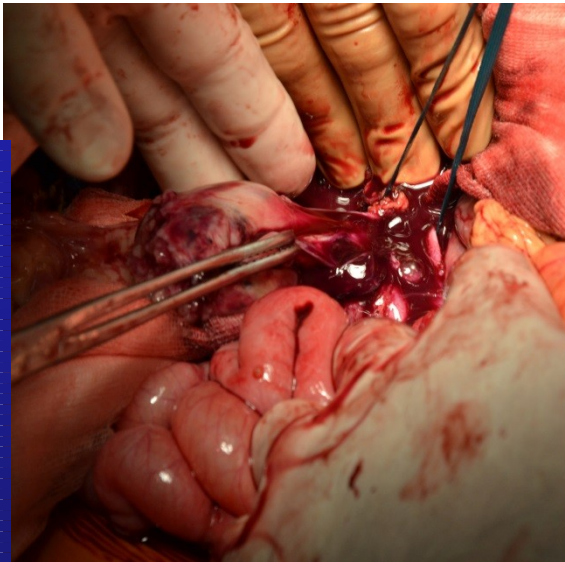




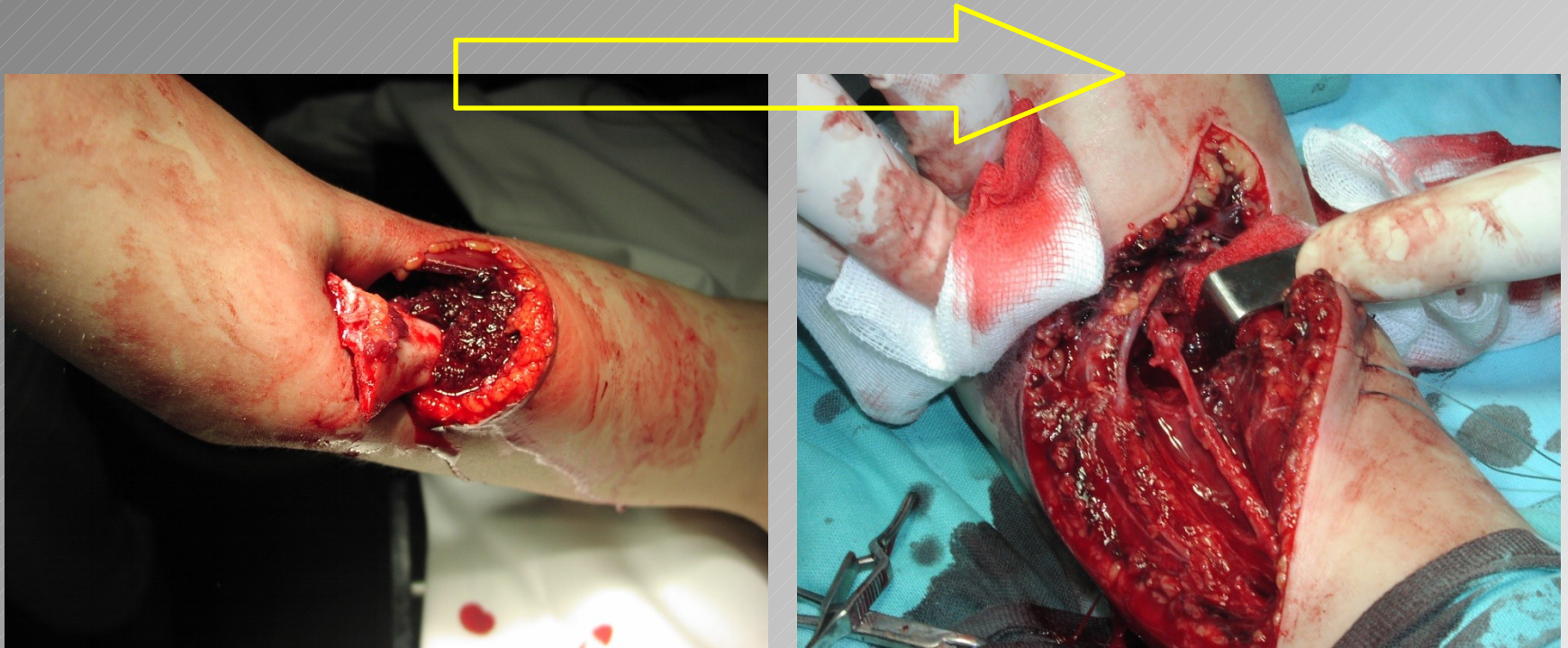
# vessels

- Massive bleeding – more frequent from ruptured organs than from vessels
- Trauma-related is 2-times less frequent than iatrogenic

v. cava rupture  
and  
reconstruction  
following  
nephrectomy due  
to grade 5 injury  
of the right kidney



Vascular injuries – more frequent in case of major trauma of the proximal parts of limbs



brachial artery section and supracondylar open fracture:  
pre-op and post-reconstruction pictures



- Assess the bleeding
- Is it a case of an acute ischemia of the limb ?
- Stop the bleeding with dressing or Esmarck - as shortly as it is possible -
- Write down the time of the accident (duration of ischemia)
- Reconstruction of vessels or .. amputation

# abdominal trauma

- Blunt or penetrating
- Related to traffic accidents or not
- Associated with CNS injuries or not
- Favourable prognosis or fatal prognosis

Most frequently

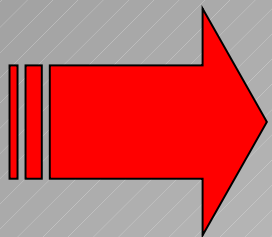
# abdominal trauma

- Blunt or penetrating
- Related to traffic accidents or not
- Associated with CNS injuries or not
- Favourable prognosis or fatal prognosis

# Marciniak Hospital (85-bed Dept. Of Pediatric Surgery) Wroclaw:

over:

- 6000 admissions a year
- 5000 operations and other interventions under general anaesthesia a year
- 40% of patients admitted for trauma



Since > 12 years there were 2 deaths of patients with abdominal trauma not associated with serious CNS injury, other associations matter less

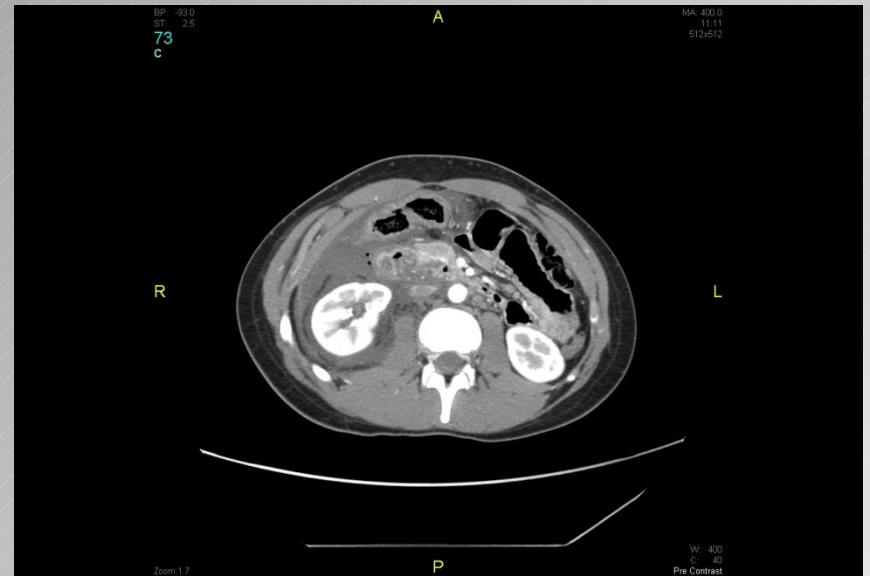
# abdominal cavity

- Nearly only blunt (87%)
- Alimentary tract
  - Perforations – immediate (penetrating trauma) or delayed (blunt)
    - Free air (stomach, large bowel) - pneumoperitoneum
    - Air in the retroperitoneum (duodenum, rectum)
  - Mesenteric and intra parietal hematomas
    - USG/CT – haematoma visible +/- hemoperitoneum
    - X-ray - ileus
- Immediate haemorrhage from the intra-abd organs (liver, spleen, kidneys, pancreas/duodenum), main vessels and mesenteric vessels
- Delayed results of crushing (pancreatic pseudocyst, urinoma, bile leak\*)

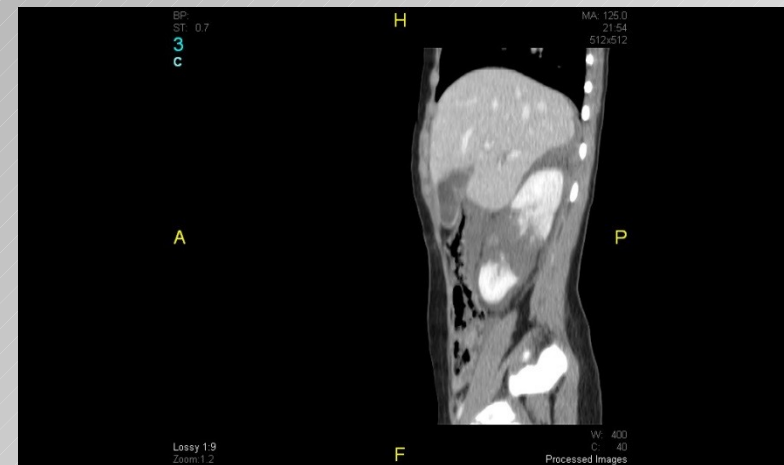
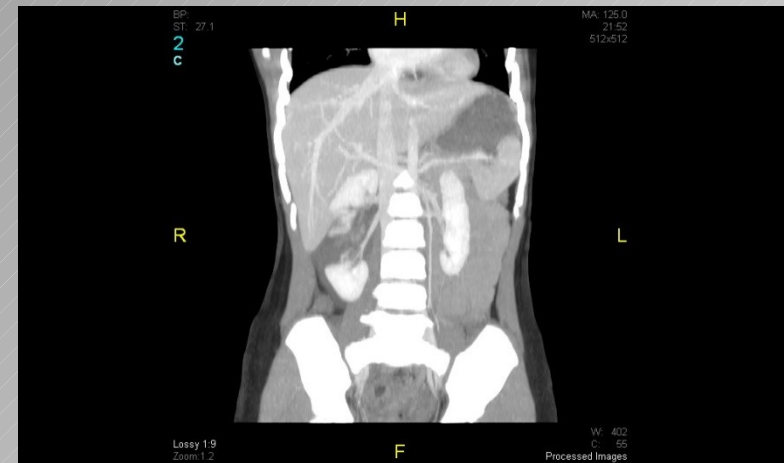
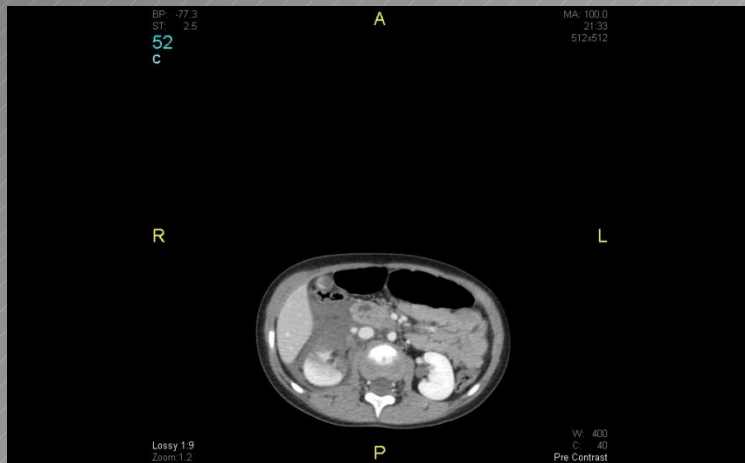


perforation of the  
large bowel, free  
air in the  
abdomen

# Rupture of duodenum, air in the retroperitoneum, contusion of the head of pancreas and right kidney, accuracy of CT

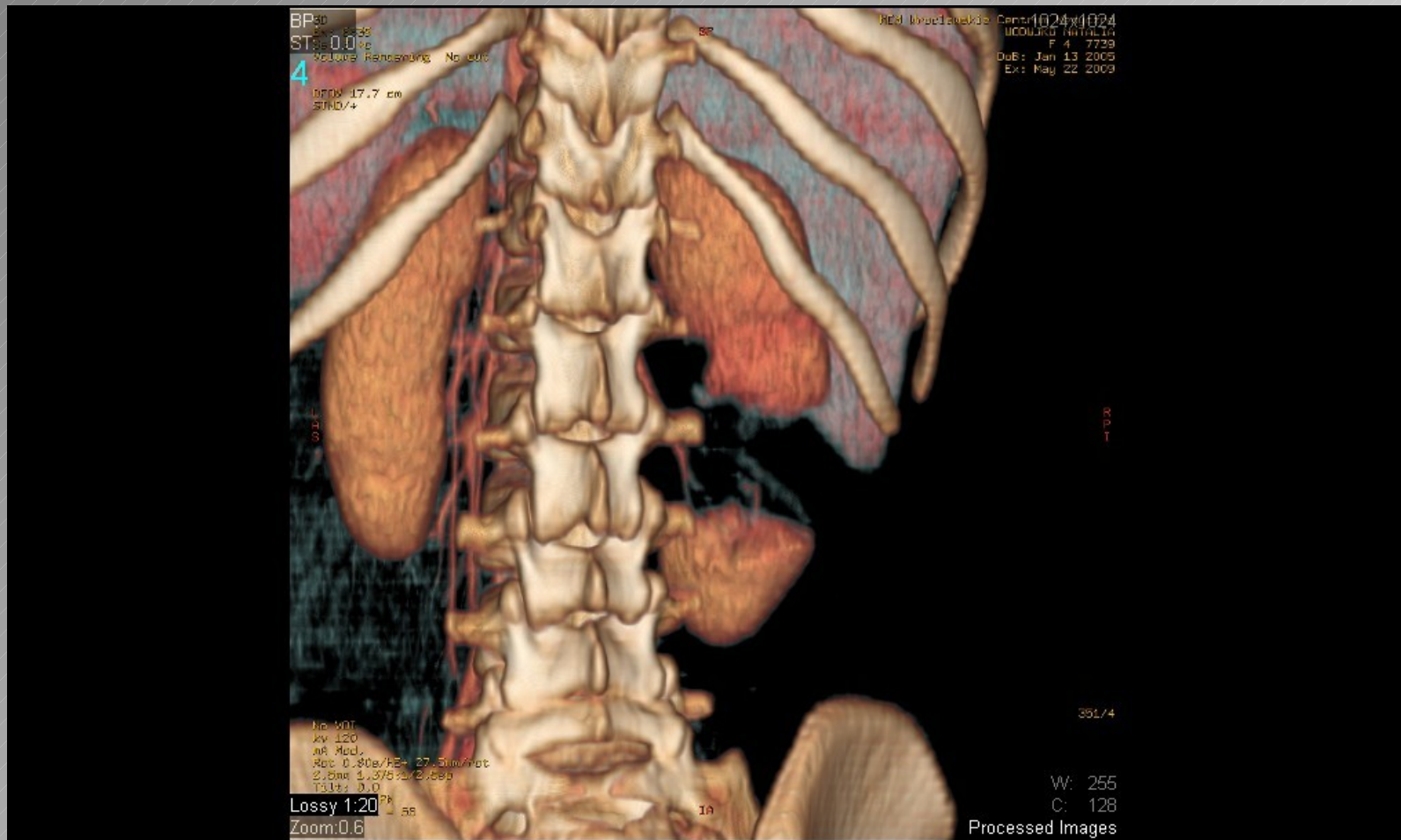


# Rupture of the right kidney and contusion of the pancreas





# Rupture of the right kidney and contusion of the pancreas



# Imaging

- X-ray
- Usg
- CT

Note:

- very early imaging may not evidence all the injuries
- this does not mean that we shall delay the diagnostics \* we shall consider repeated examinations

# Interventions

- Laparotomy
- Lavage
- Laparoscopy

# Interventions

- Laparotomy
  - If the injuries are clearly defined (pneumoperitoneum, intra-abd haemorrhage, peritonitis, extensive rupture of the intra-abd or/and retroperitoneal organs)
- Lavage
  - Search for reasons either for laparotomy or wait-and-see policy, never really sure, usually requires GA in children
- Laparoscopy
  - Same harm to the child as lavage and much better exploration, some repairs and immediate conversion to open surgery possible; ? a risk of gas embolism in case of major vascular injuries ?

# Interventions

- Laparotomy

If the injuries are clearly defined (pneumoperitoneum, intra-abd haemorrhage, peritonitis, extensive rupture of the intra-abd or/and retroperitoneal organs)

- Lavage

- Search for reasons either for laparotomy or wait-and-see policy, never really sure, usually requires GA in children

- Laparoscopy

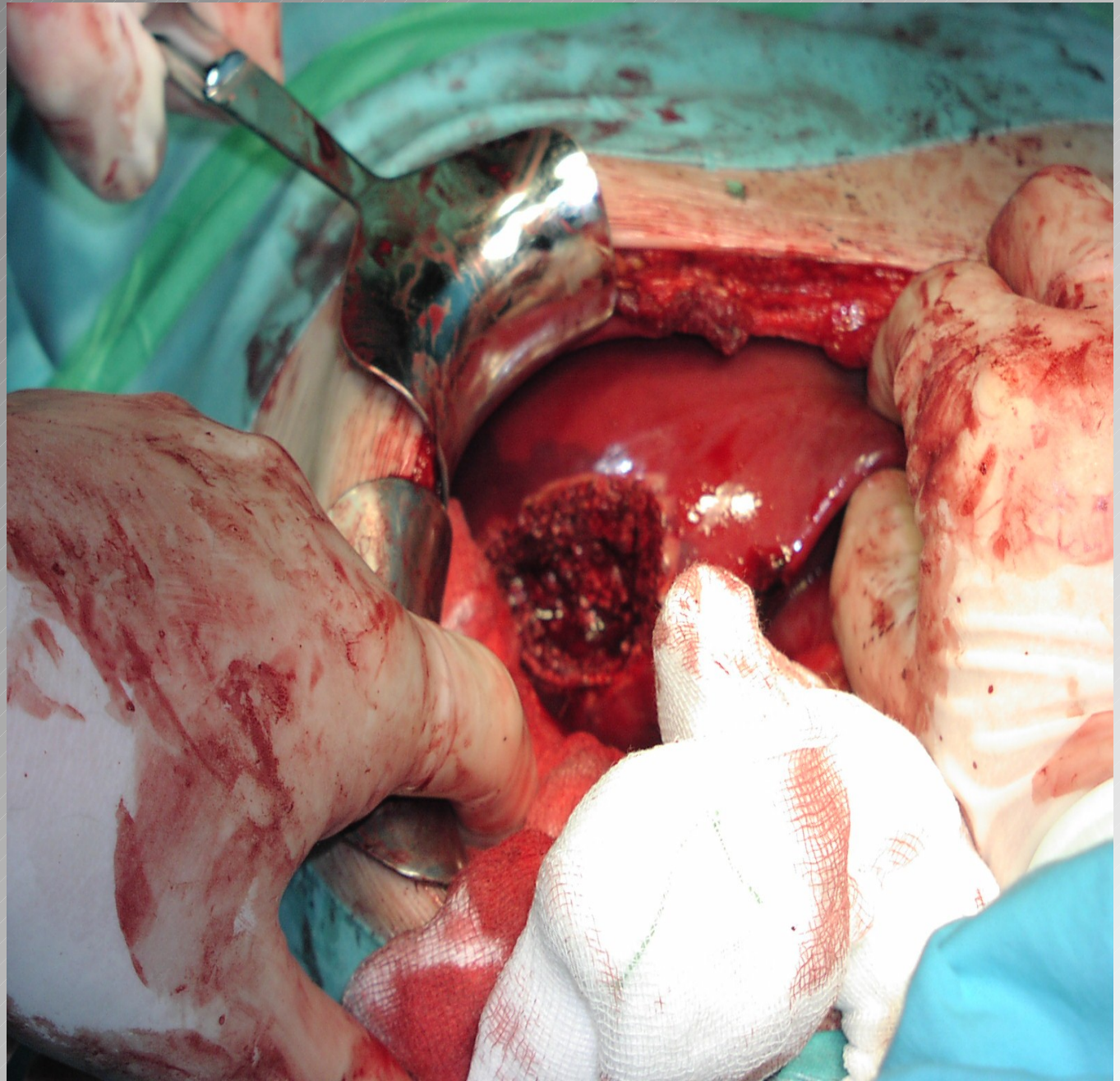
- Same harm to the child as lavage and much better exploration, some repairs and immediate conversion to open surgery possible; ? a risk of gas embolism in case of major vascular injuries ?

- **Spleen rupture –  
and surgical repair**





- Dissection of the contusion area in the liver – bleeding control - complete



# Bones and muscles

- fractures
- compartment syndrome
- mm injuries – open or crushing
- Injuries of tendons
- Luxations (rare in childhood)
- „Decolage”
- Impact of associating vascular and nerve injuries





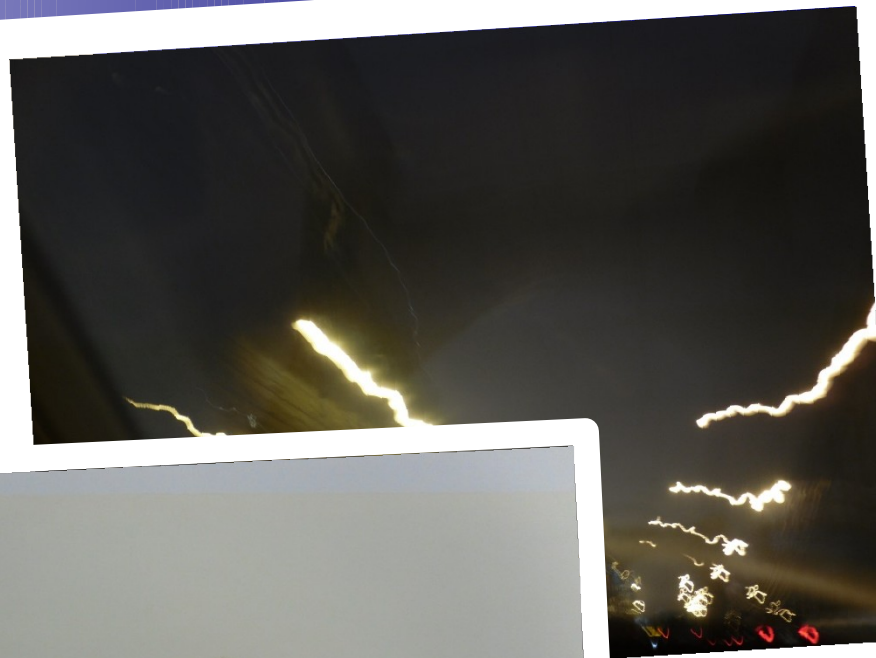
• CNS	• thorax	75%	• death
	• vessels		• variety of non fatal consequences of trauma and complications
	• abdomen		
	• G-U		
	• Mm and bones		
	• Peripheral nerves		

- thorax
- vessels
- abdomen
- G-U
- Mm and bones
- Peripheral nerves

- variety of non fatal consequences of trauma and complications



rather functional outcome  
related challenges, but not only



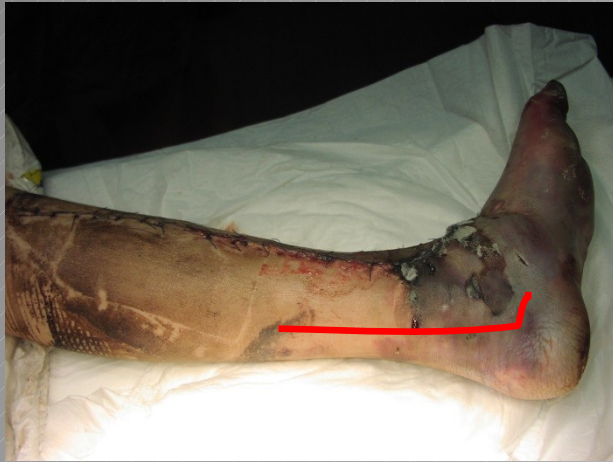
6-year-old boy hit by the tramway, resuscitated when under the tramway for the time necessary to lift the wagoon, Hb at admission=2.4 !!!!!!!







The only blood supply – in red, HBO support –  
finaly – progresing necrosis and amputation



the „better” leg ...

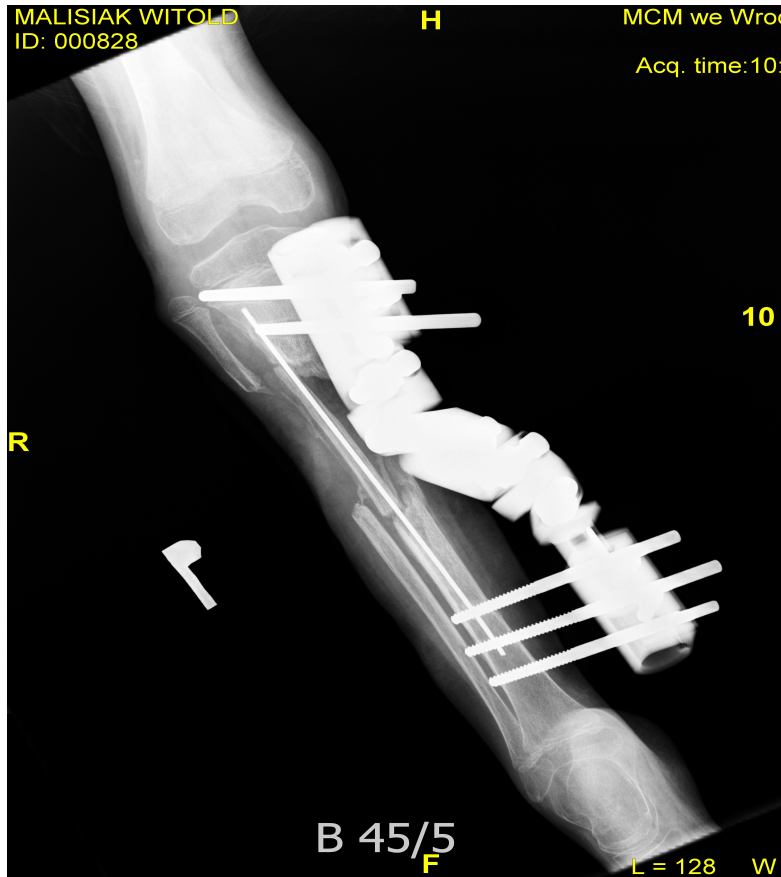




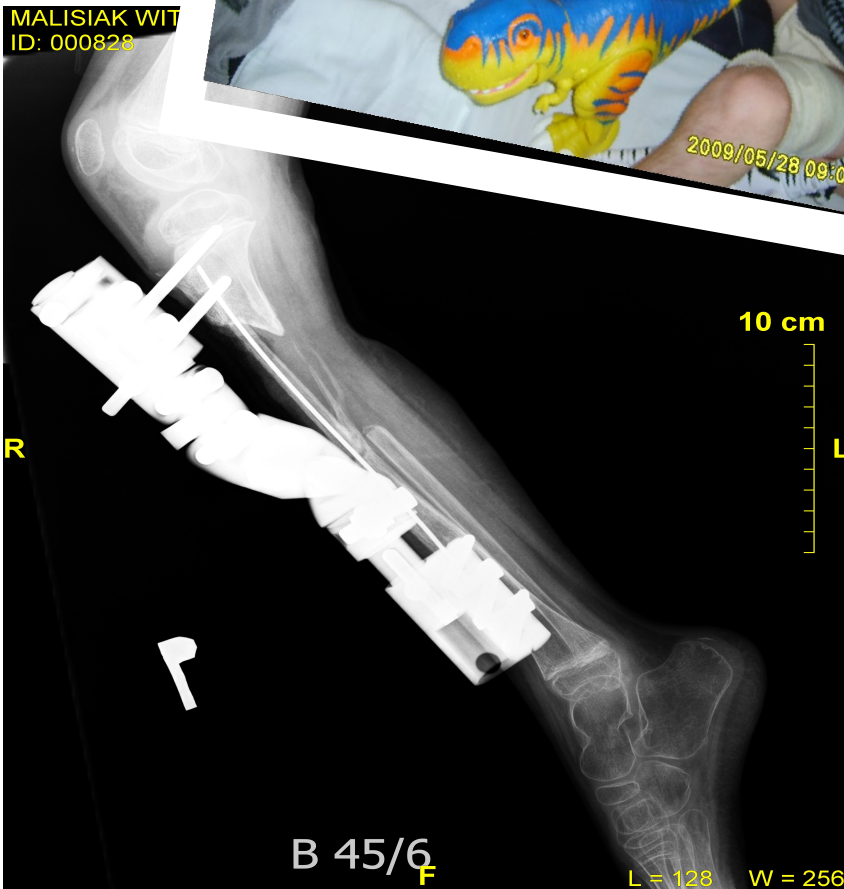
MALISIAK WITOLD  
ID: 000828

H

MCM we Wrocławiu  
RTG  
Acq. time: 10:53:15



MALISIAK WIT  
ID: 000828



**1 year later**





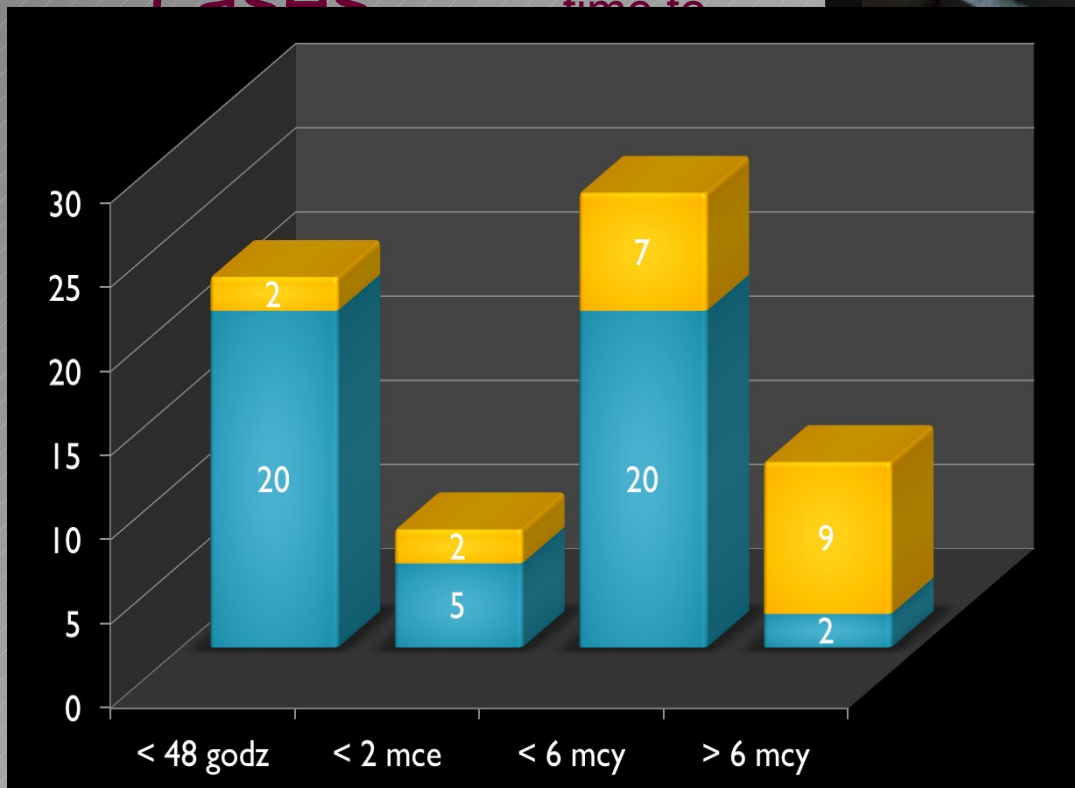


- CLASSICAL FUNCTIONAL ISSUE:

THE Nerve injuries

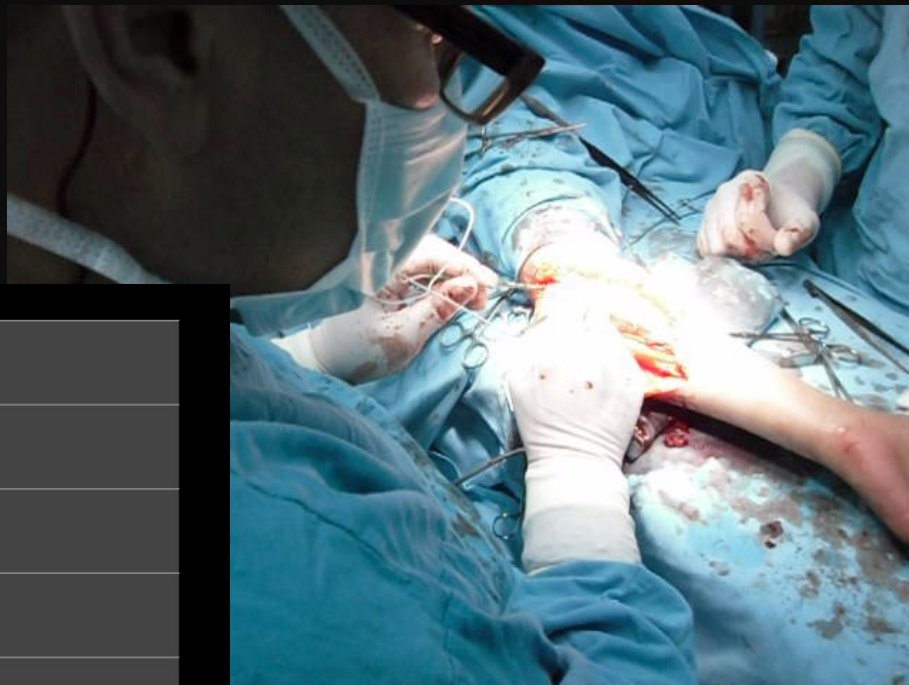
- Identify and repair – best immediate treatment

- Our data: 72 cases:



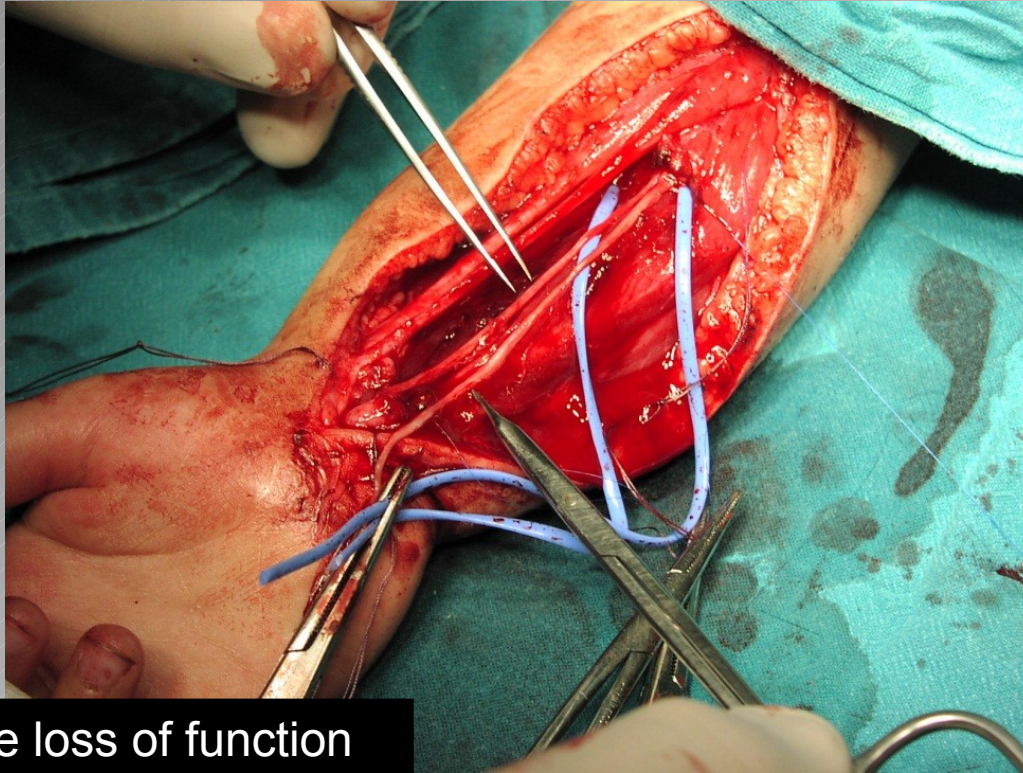
v.good & good

fair & poor





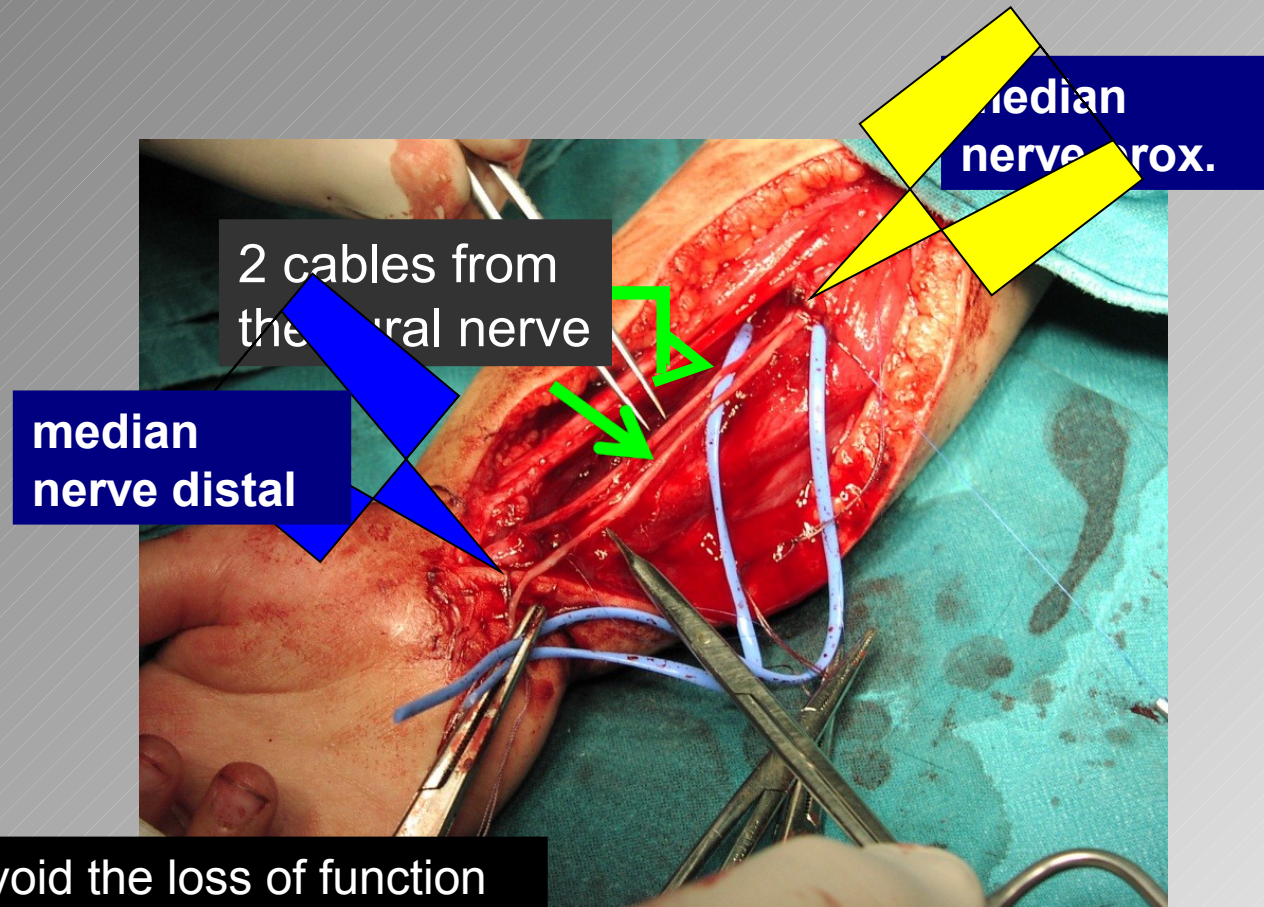
# avulsion of the distal median nerve



no way to avoid the loss of function

...

# avulsion of the distal median nerve



no way to avoid the loss of function  
... **BUT -**

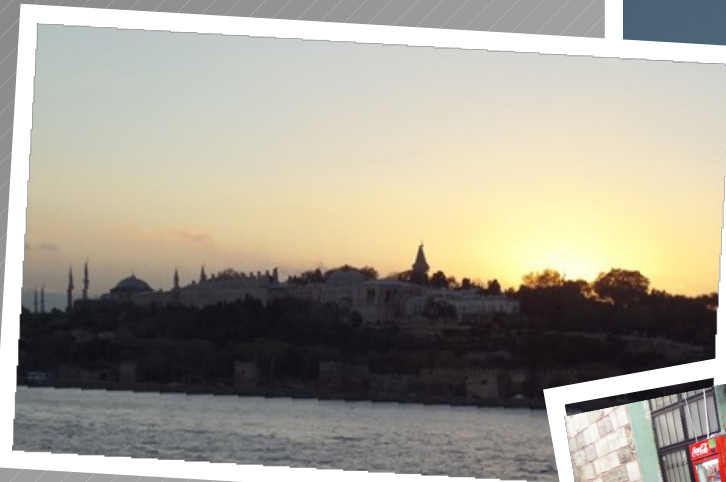
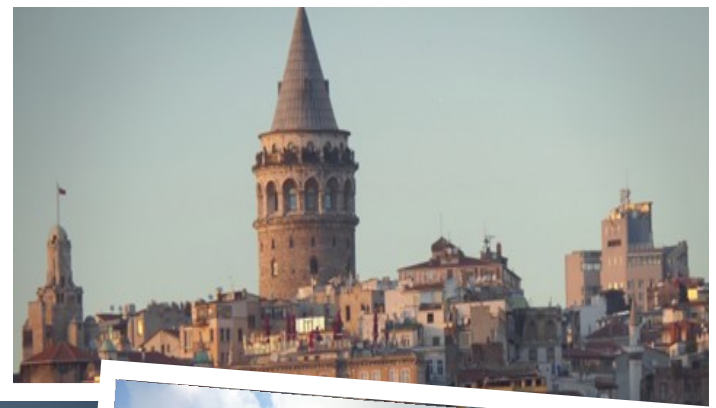
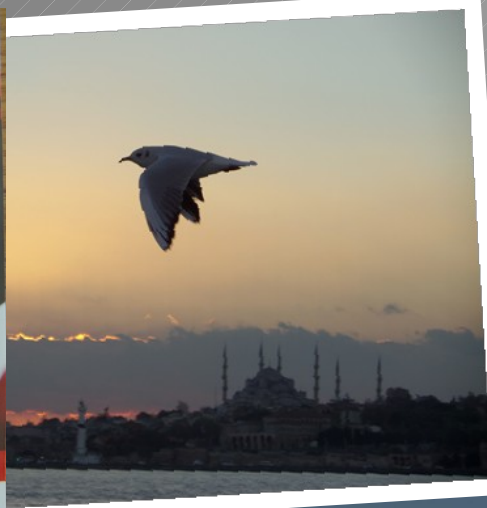
We like it!





- **the take-home message:  
children never  
give-up!!!**





Thank You Istanbul !  
and ....





Polskie Towarzystwo  
Medycyny Ratunkowej  
Polish Society for  
Emergency Medicine

Chair  
of  
Emergency  
Medicine



**SAVE YOUR TIME!!!**

**23<sup>rd</sup> Winter Symposium  
of Emergency Medicine  
and Intensive Care**

Karpacz, Poland  
March 12<sup>th</sup>-15<sup>th</sup>, 2014



**feel invited to Poland !!!**