

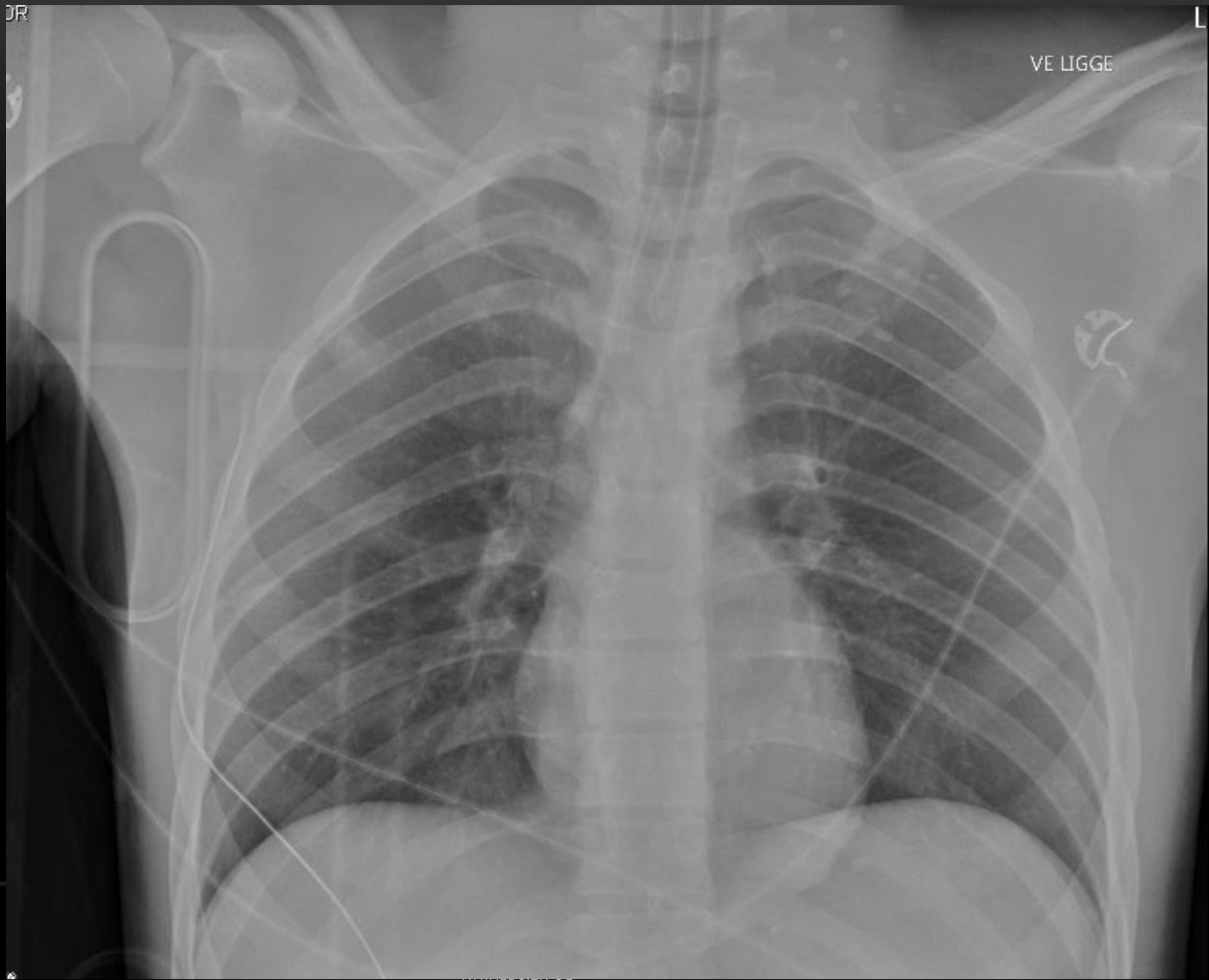
MULTITRAUMA WITH PELVIC INJURY AND BLEEDING

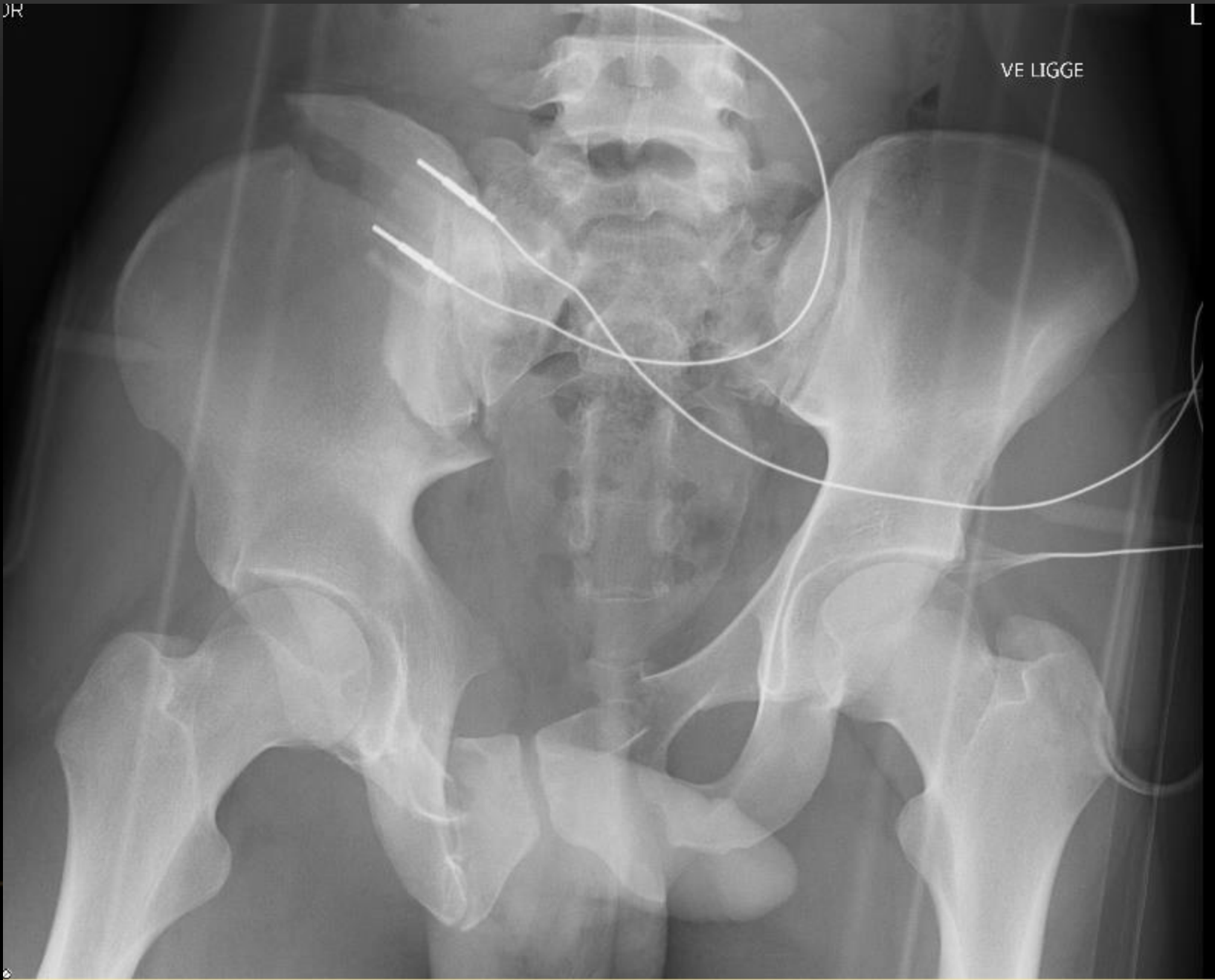
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Department of Clinical Research, University of Southern Denmark

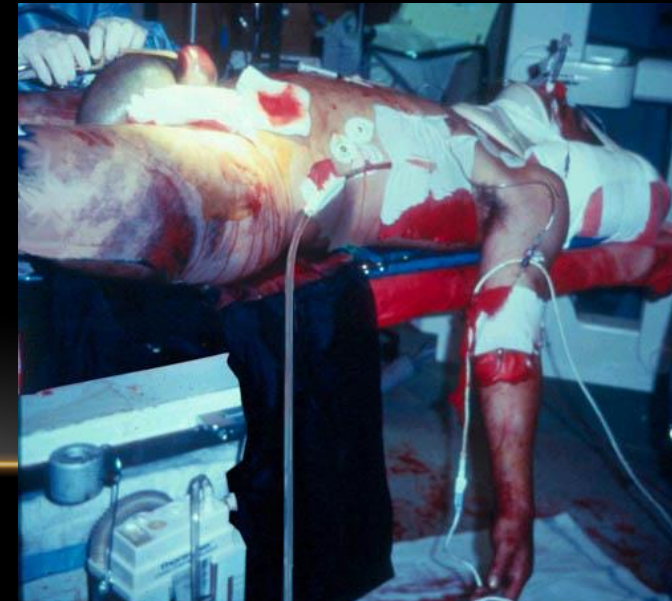
- 21 yo male
- Traume 1 hour before arrival
- Car against house. Trapped in car, another passenger thrown out of car
- At arrival GCS 12 (3+4+5).Intubated because of descending BP and GCS
- Displaced and unstable right humerus and femur
- Prehospital; PVK in left arm, spine board
- FAST-scanning after pelvic sling shows free fluid in pelvis





COMPLEX PELVIC FRACTUS

- Loss of mechanical stability
 - Rotational stability
 - Vertical stability
- Significant injury of soft tissues
 - Organs
 - Vessels, nerves
 - Muscle, ligaments
 - Skin (OBS perineum)



CAUSES OF DEATH

- Early
 - Exsanguination
 - "Irreversible shock"
 - Massive transfusions
- Late
 - Multi organ failure
 - SIRS
 - Sepsis
 - Perforated skin or organs



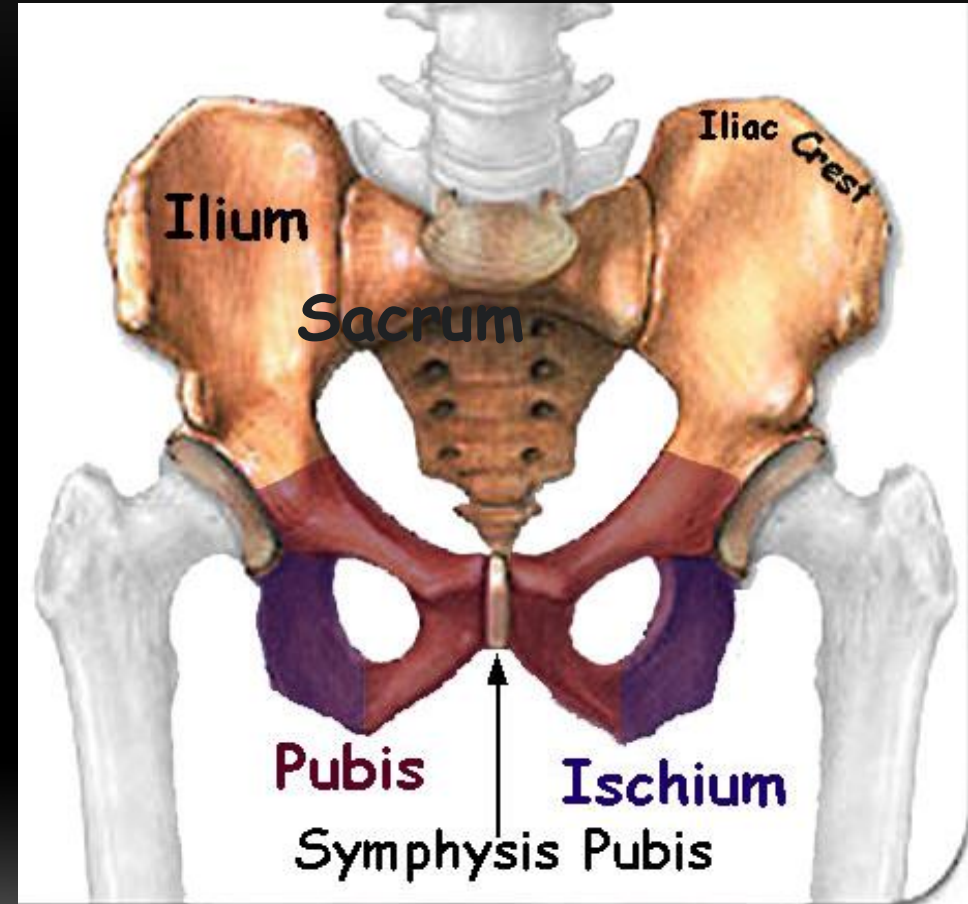
TREATMENT STRATEGY

- Mechanical stabilisation
- Reduce volume of pelvis
 - reduce bleeding from fracture surface
 - Tamponade
- Haemodynamic stabilisation
 - Replace bloodloss (and coagulation factors)
 - Control bleeding



MECHANICAL STABILISATION - ANATOMY

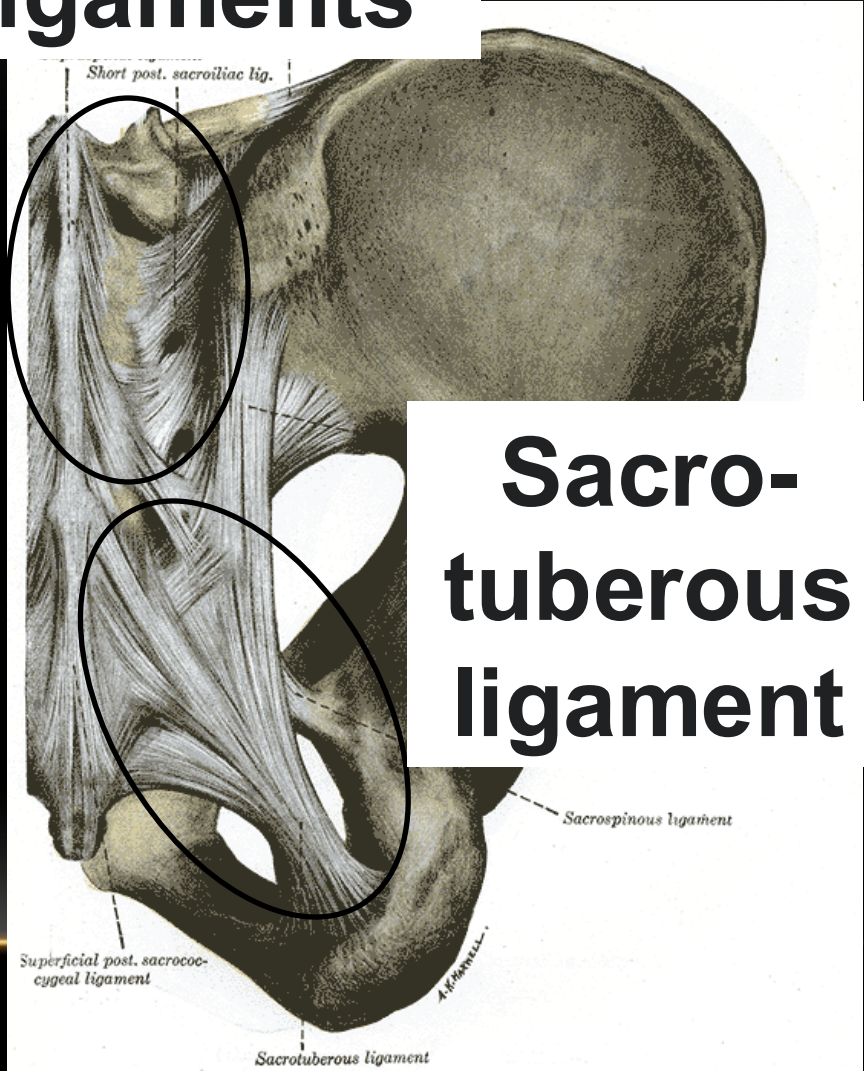
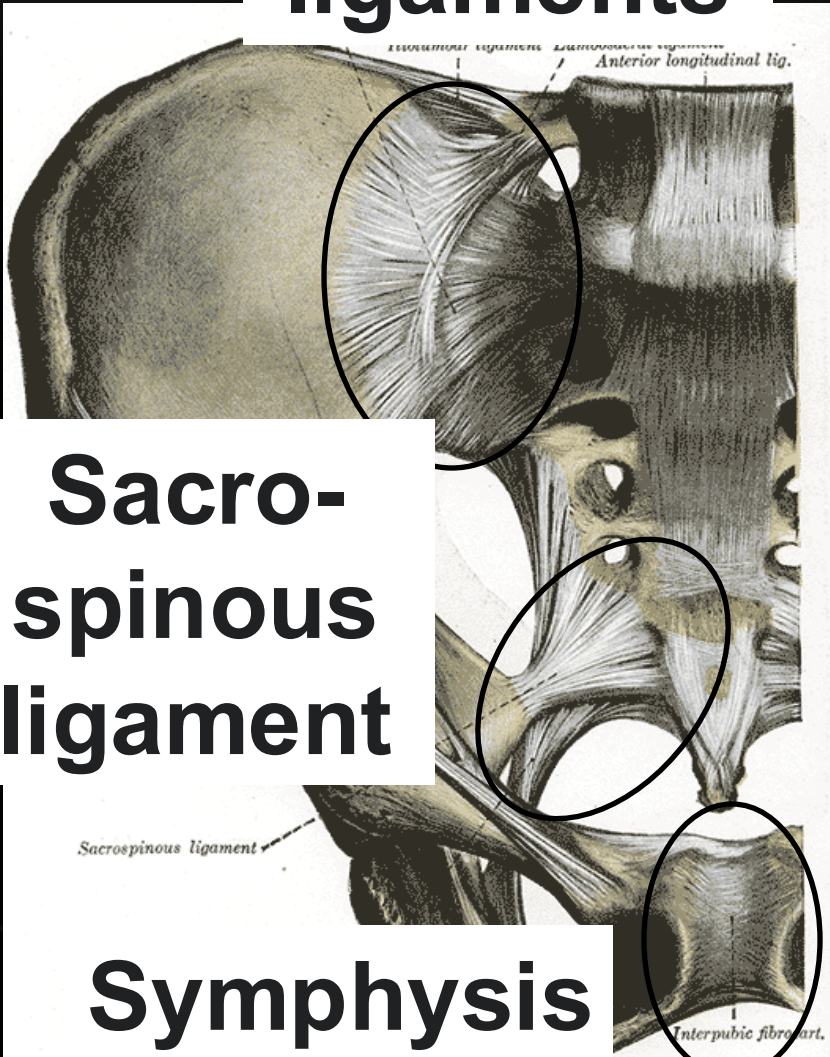
- Three bones
 - Innominate
 - Ilium
 - Ischium
 - Pubis
 - Sacrum
- No osseous stability
- Hold together by symphysis and ligaments



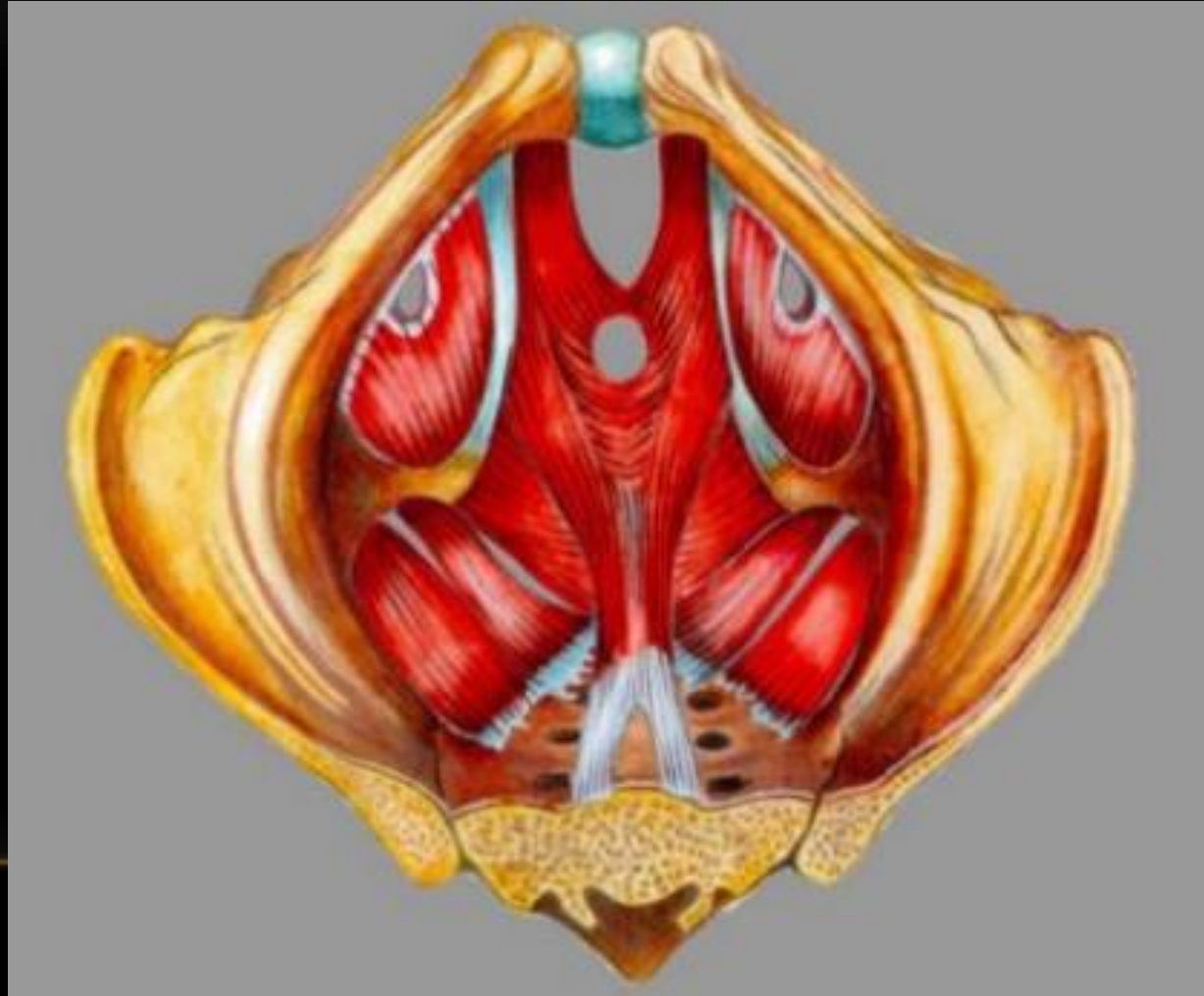
LIGAMENTS

Anterior SI ligaments

Posterior SI ligaments

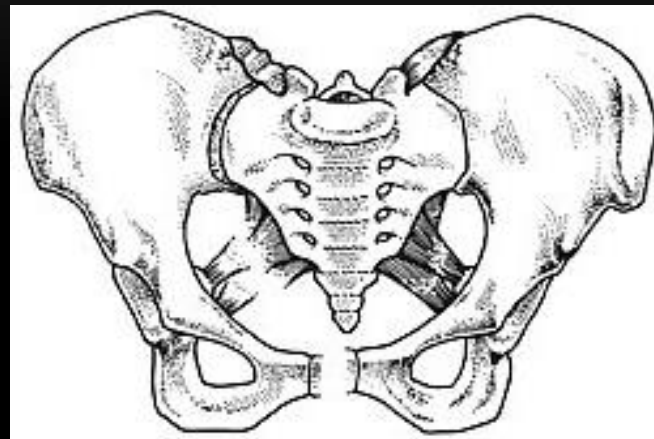


PELVIC FLOOR



TYPE B FRACTURE OPEN BOOK

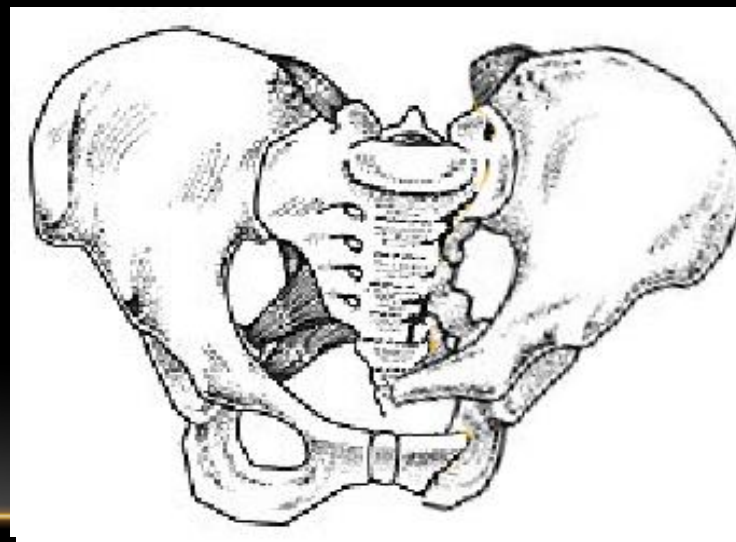
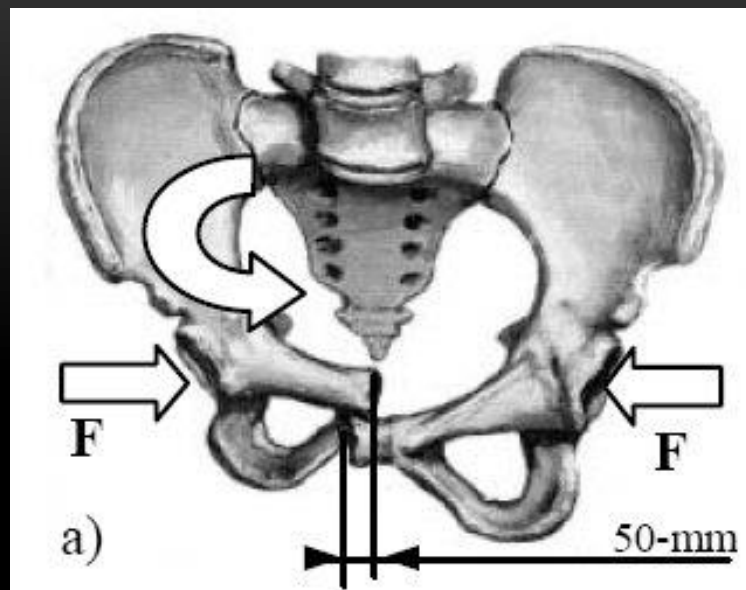
- Unstable in front
- Rotational unstable
- Partial rupture of SI ligaments (uni- or bilateral)
- Rupture in pelvic floor
- Vertically stable

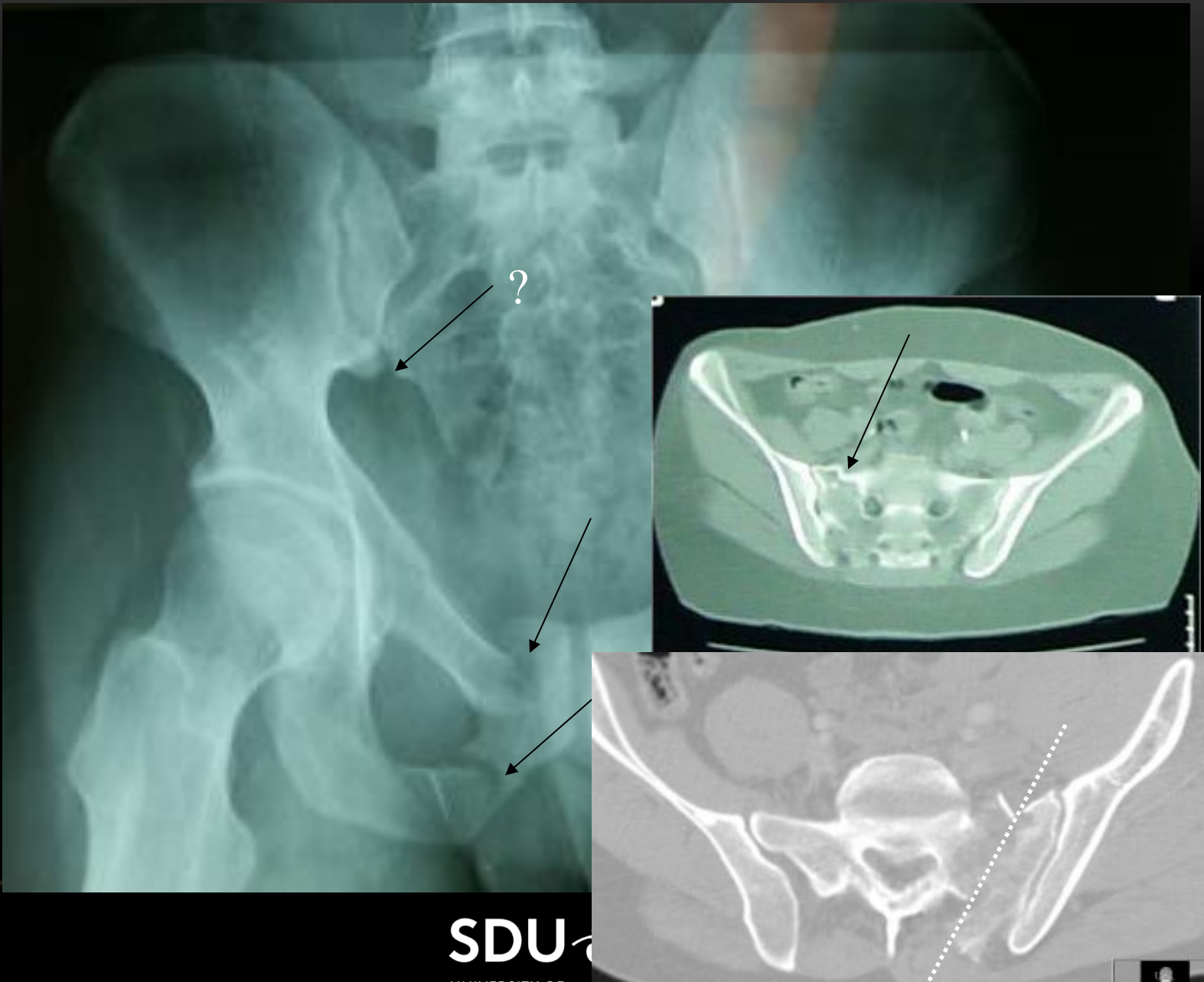




TYPE B FRACTURE LATERAL COMPRESSION

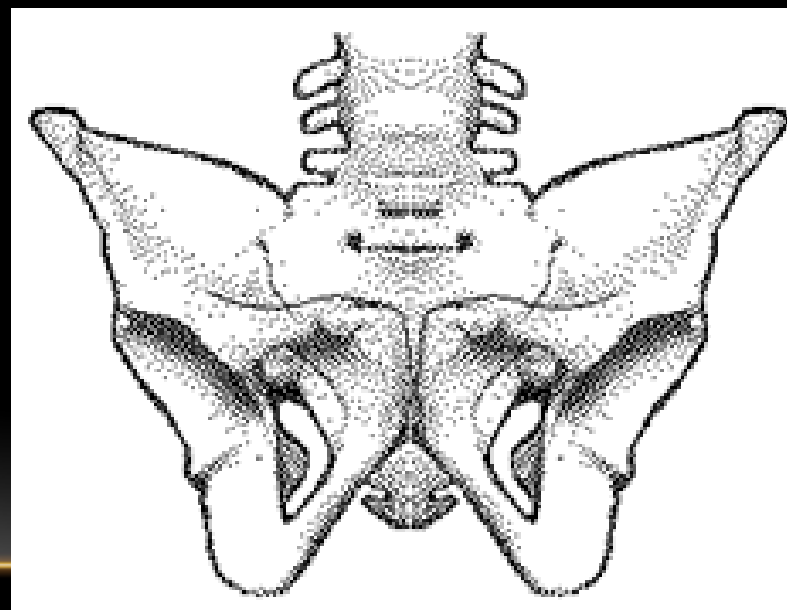
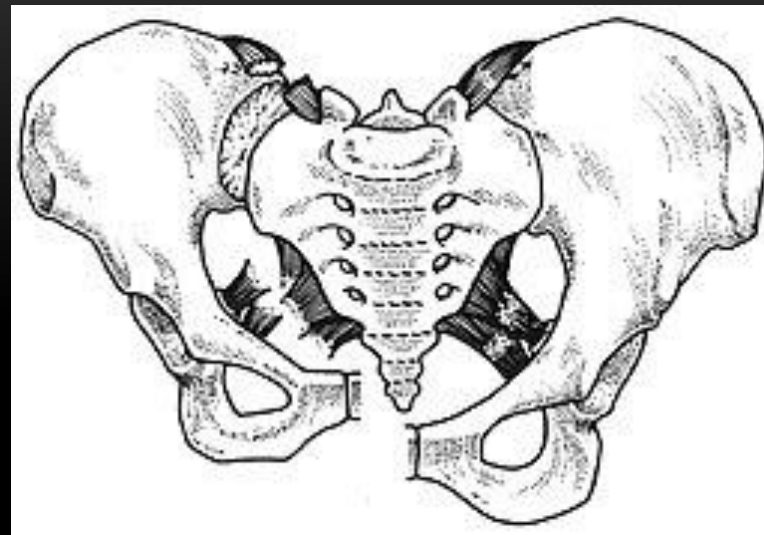
- Fracture of ramus (ipsi- , contra- or bilateral)
- Partial lesion in SI joint (anterior compression of sacrum)
- Intact pelvic floor





TYPE C (VERTICAL SHEAR)

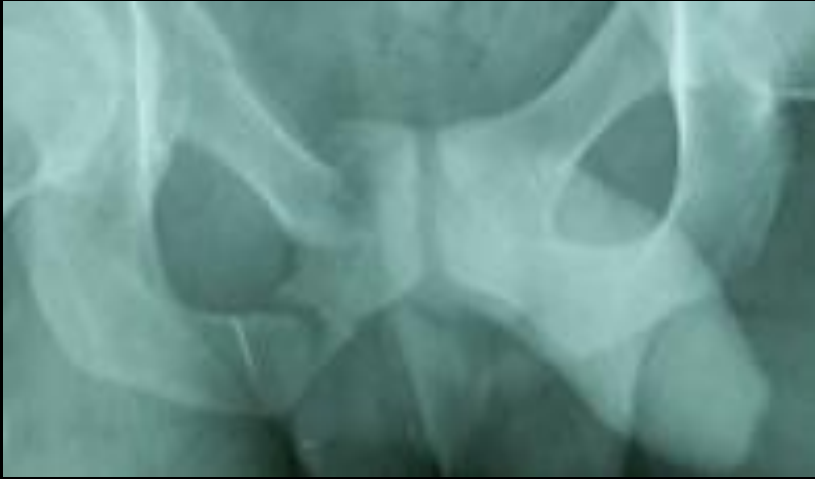
- Complete rupture of posterior SI ligaments
- Any type of anterior lesion
- Ruptured pelvic floor
- Vertically and rotational unstable



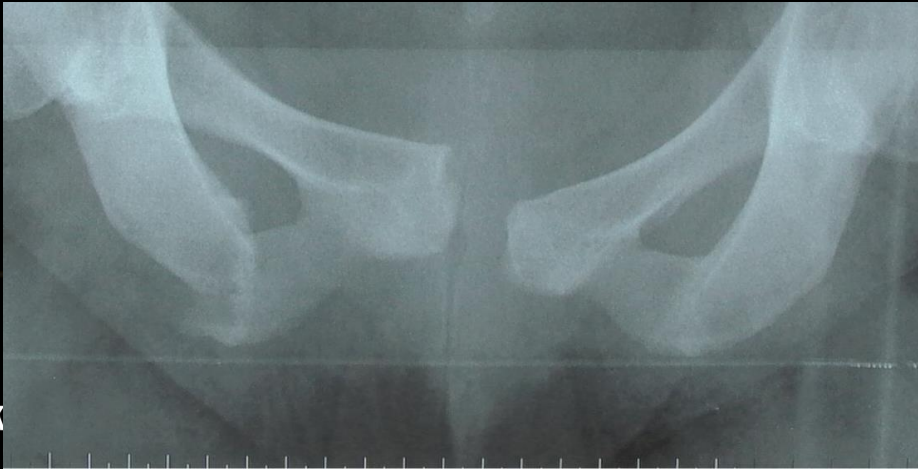




Open book



Lateral Compression



Vertical shear

TREATMENT STRATEGY

- Mechanical stabilisation
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 - Tamponade
- Haemodynamic stabilisation
 - Replace bloodloss (and coagulation factors)
 - Control bleeding



TREATMENT STRATEGY

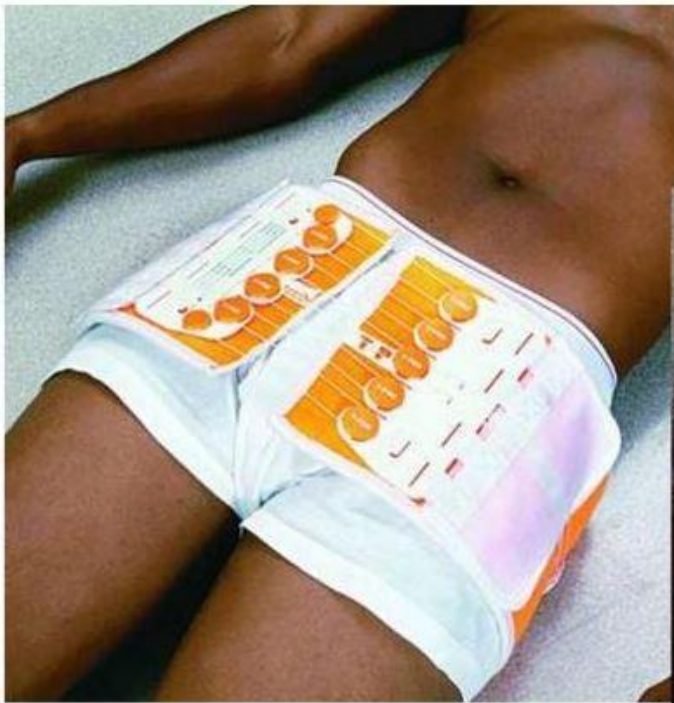
- Mechanical stabilisation
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TREATMENT

PELVIC BINDERS

NO

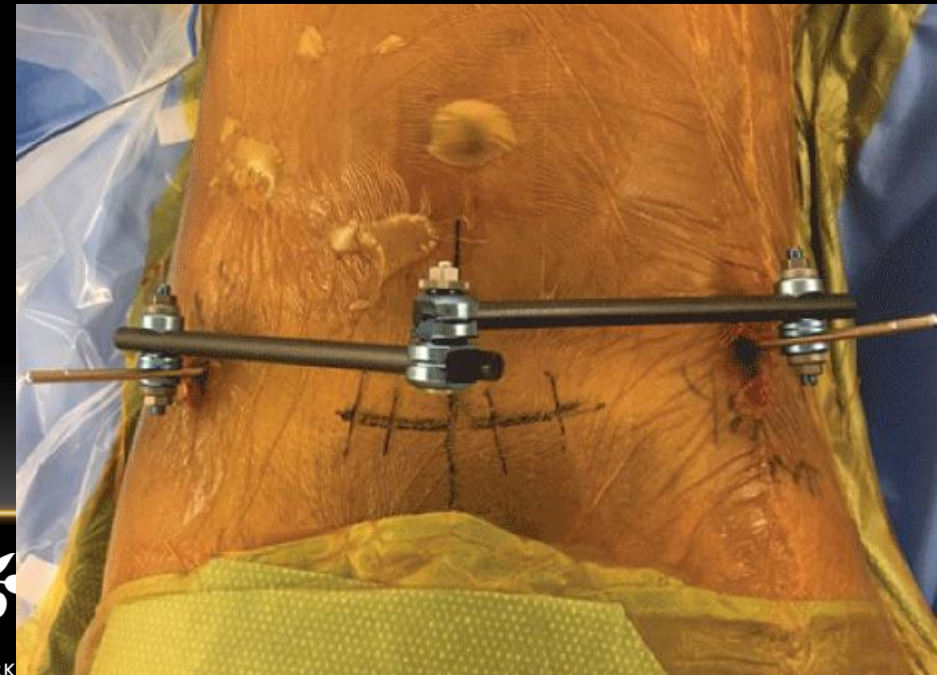
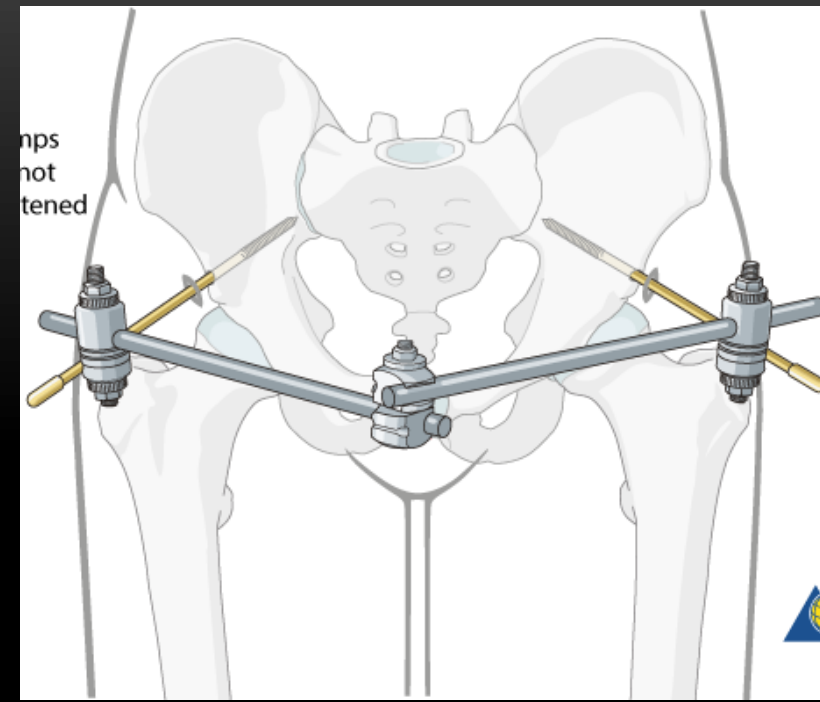


YES



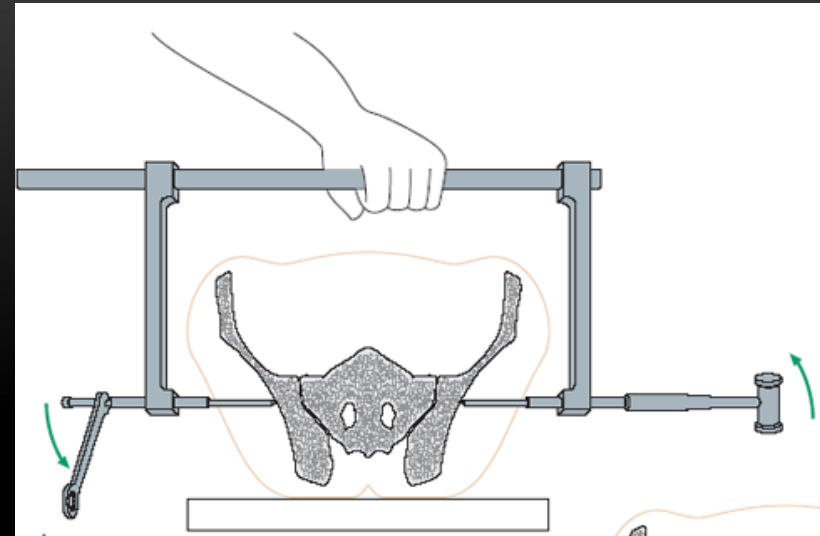
EXTERNAL FIXATION

- Known to most surgeons
- Effective in front (open book)
- Less effective in the back
- Can limit access
- Slow ($\frac{1}{2}$ -1 hour)
- Secondary dislocation

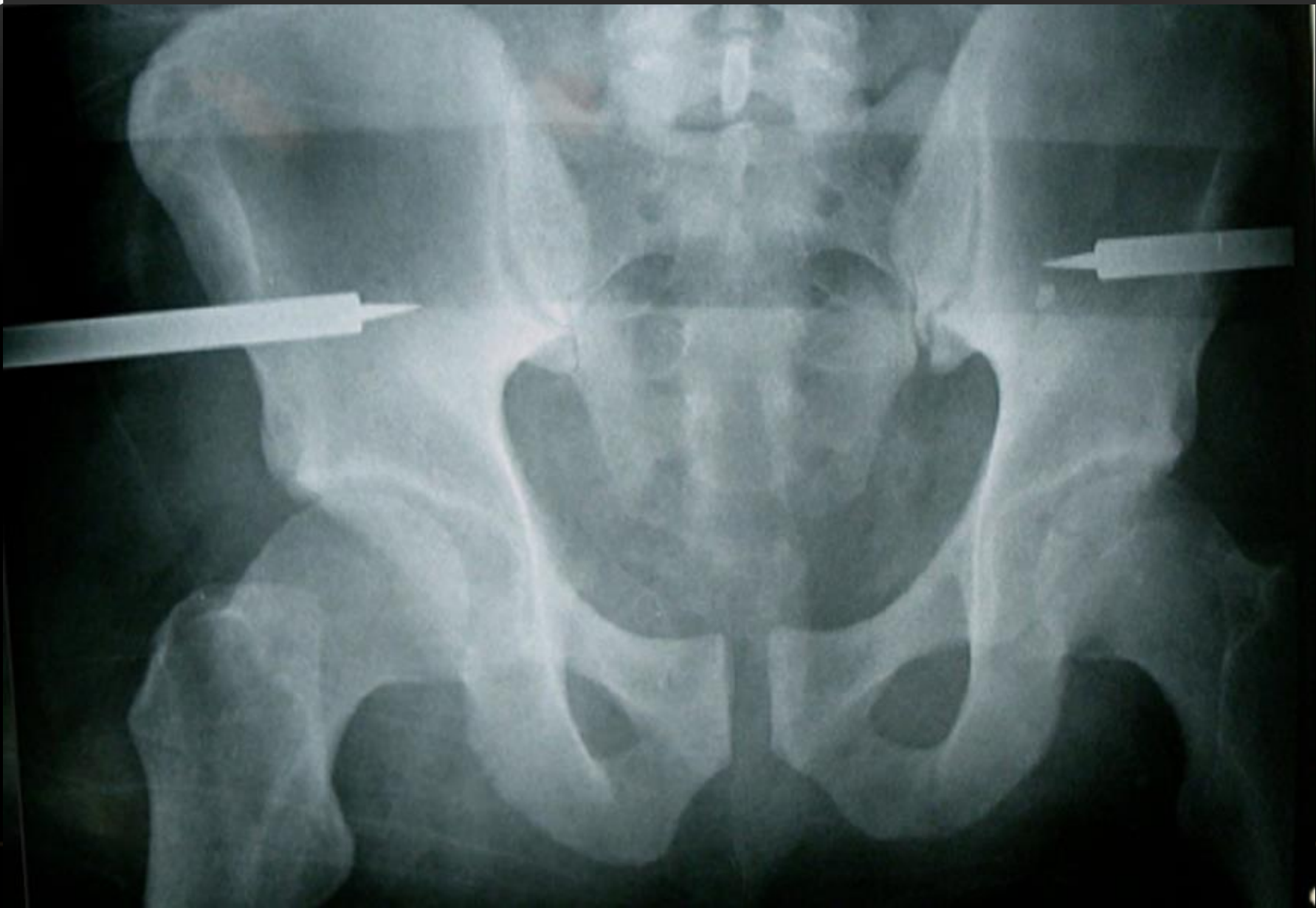


C-CLAMP

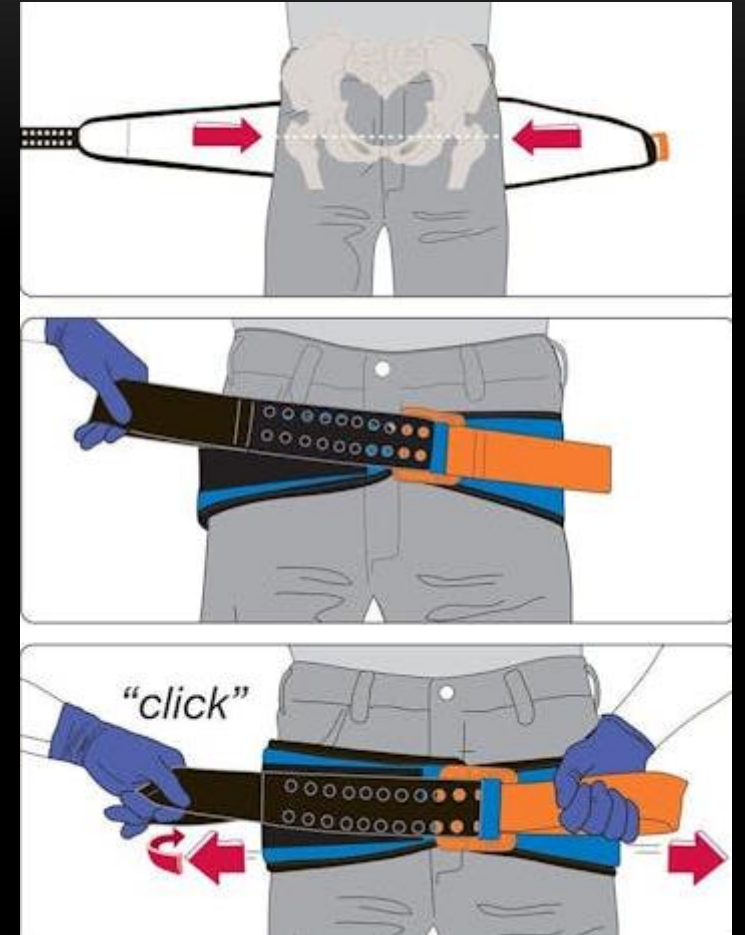
- Effective in back
- Fast (10 min)
- Free access to abdomen, plevis and extremities
- Special knowledge and equipment
- Not all fractures
- Damage of nerveroots







- In our case a pelvic sling was put on



2 large IV and NaCl was started.

A-needle

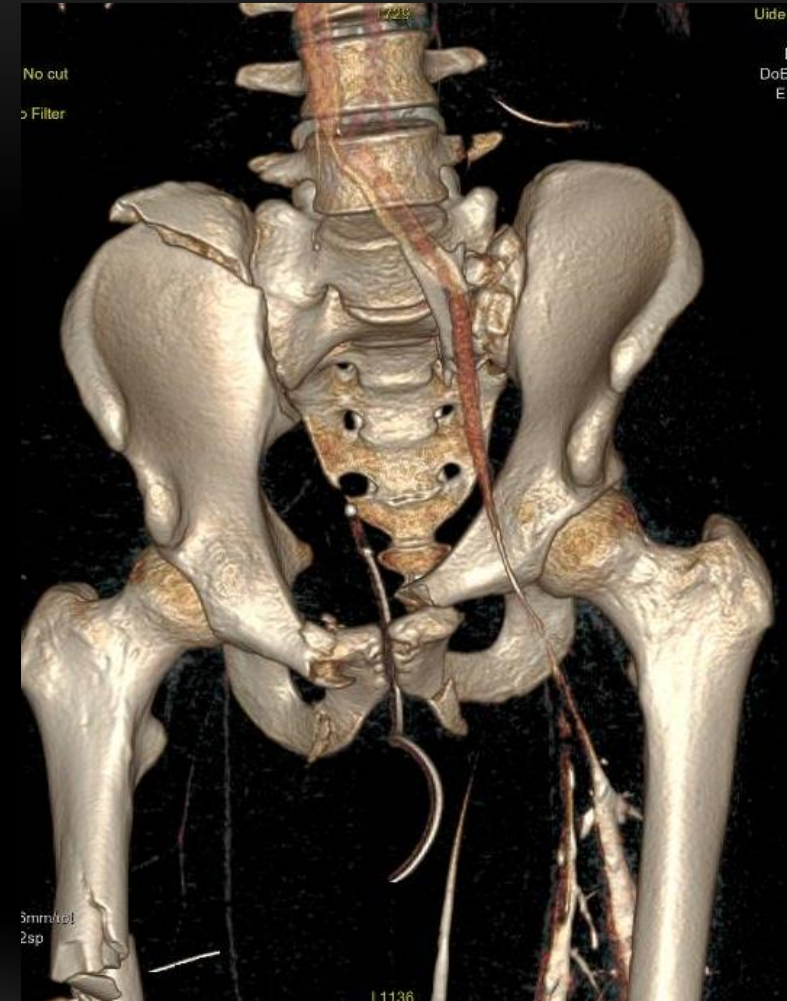
Extremities stabilised temporary by sandbags , no palpable pulse, vascular surgeon comes and finds doppler signal.

KAD is established

Send to CT Scan - BP 130/50, P 110 and sat 100%

Traume CT

- **C2 fracture**, Stable. Stiff neck collar
- **Kidney rupture**, med tilhørende retroperinealt hæmatom højre side. Ikke Kir intervention. Evt. Coiling senere
- **Pelvic fracture**. On the right side vertical shear-like fracture through the ileum, and ramus fracture. On the left side comminuted SI joint fracture and ramus fracture
- **Fat embolism** in left iliac vein internal. Not available for intervention according to vascular surgeon
- **Right-sided corpus femoris fracture**
- **Right-sided distal humerus fracture**, closed injury
- **Transverse process fracture lumbar**
- **Medial clavicle fracture right side**



Return from trauma scan

Currently undergoing transfusion with SAG-M, plasma and platelets, received 2 emergency packages

Achieved a good BT on this and no longer need for compression drugs.



OUH balanced component therapy.

Ordered as 4:4:1 package.

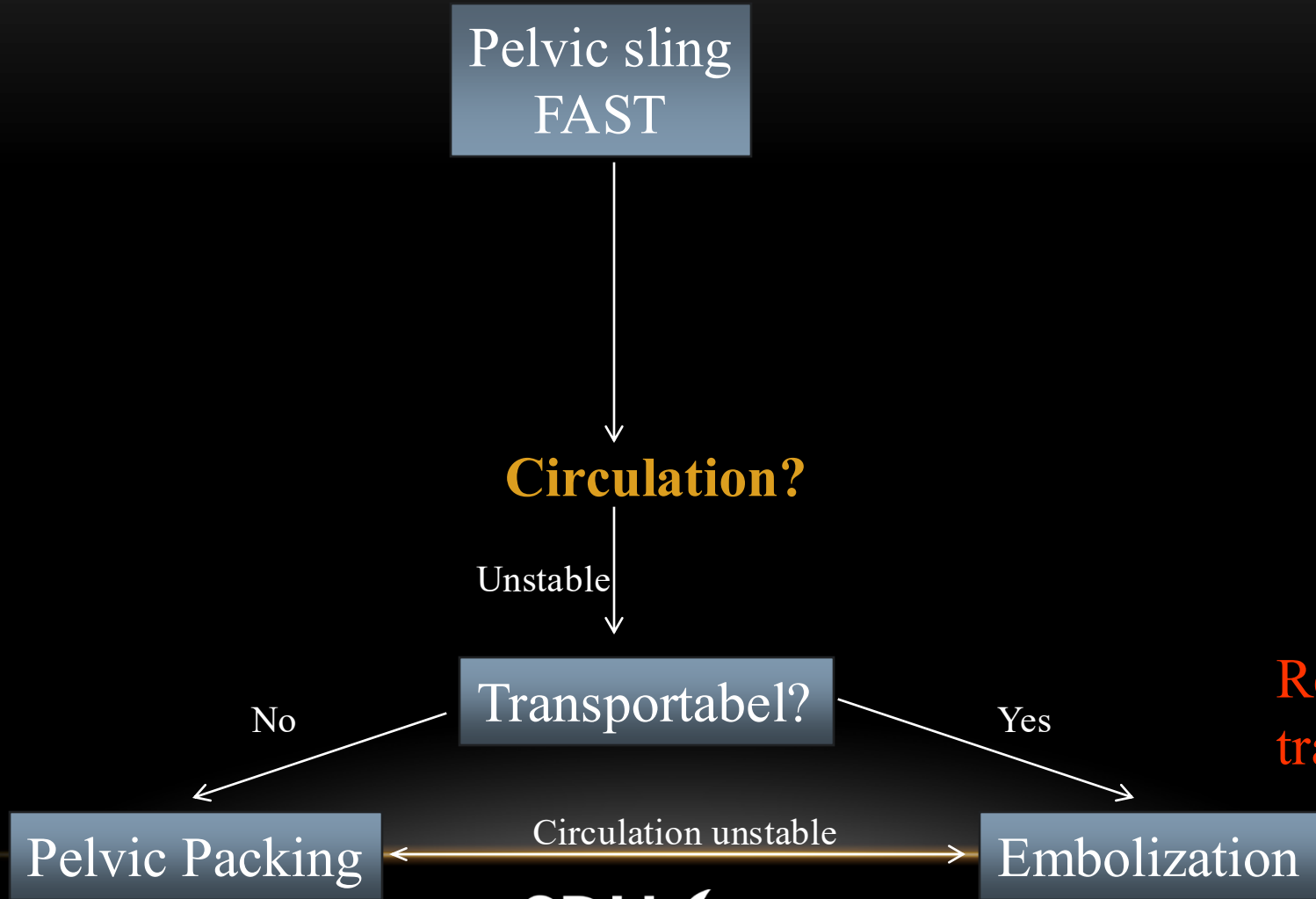
Contains:

4 SAGM,

4 fresh frozen plasma

1 platelet concentrate

MECHANICALLY AND HEMODYNAMICALLY UNSTABLE PATIENT WITH PELVIC FRACTURE



Remember balanced transfusion therapy!!!

Plan:

Still unstable:

1. Coiling:

Ongoing bleeding in the small pelvis to the left of the prostate/bladder from an internal iliac artery branch is embolized with coils.

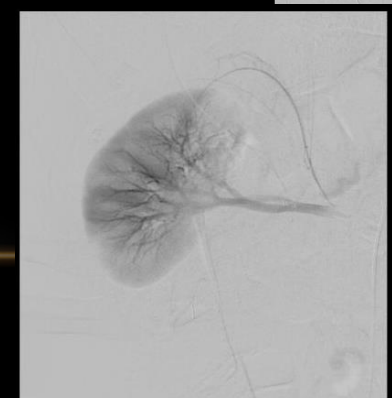
The deep femoral artery branch is embolized.

Subsequent pelvic angiography without ongoing arterial bleeding.

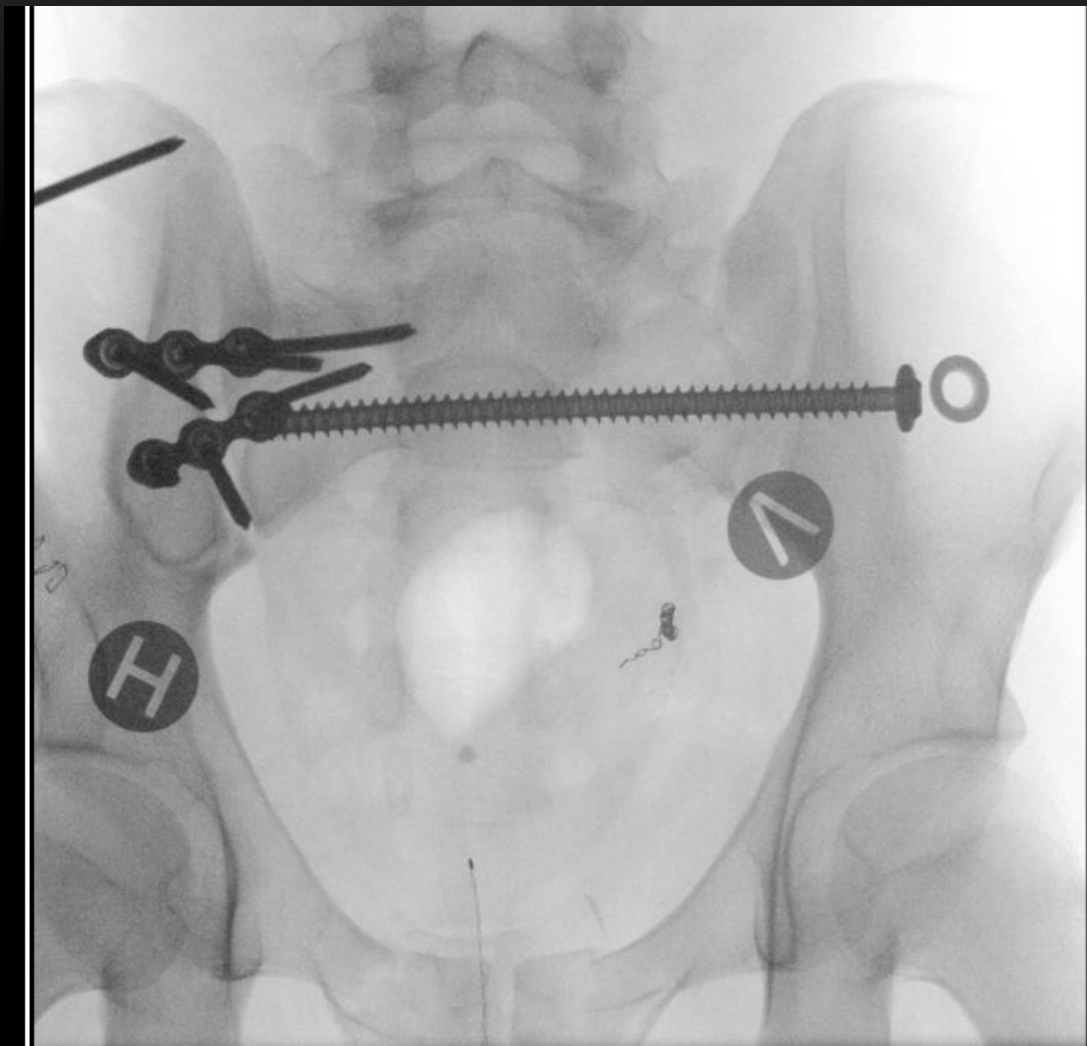
2. To the operating room

External fixation of the pelvis and right-sided femoral fracture.

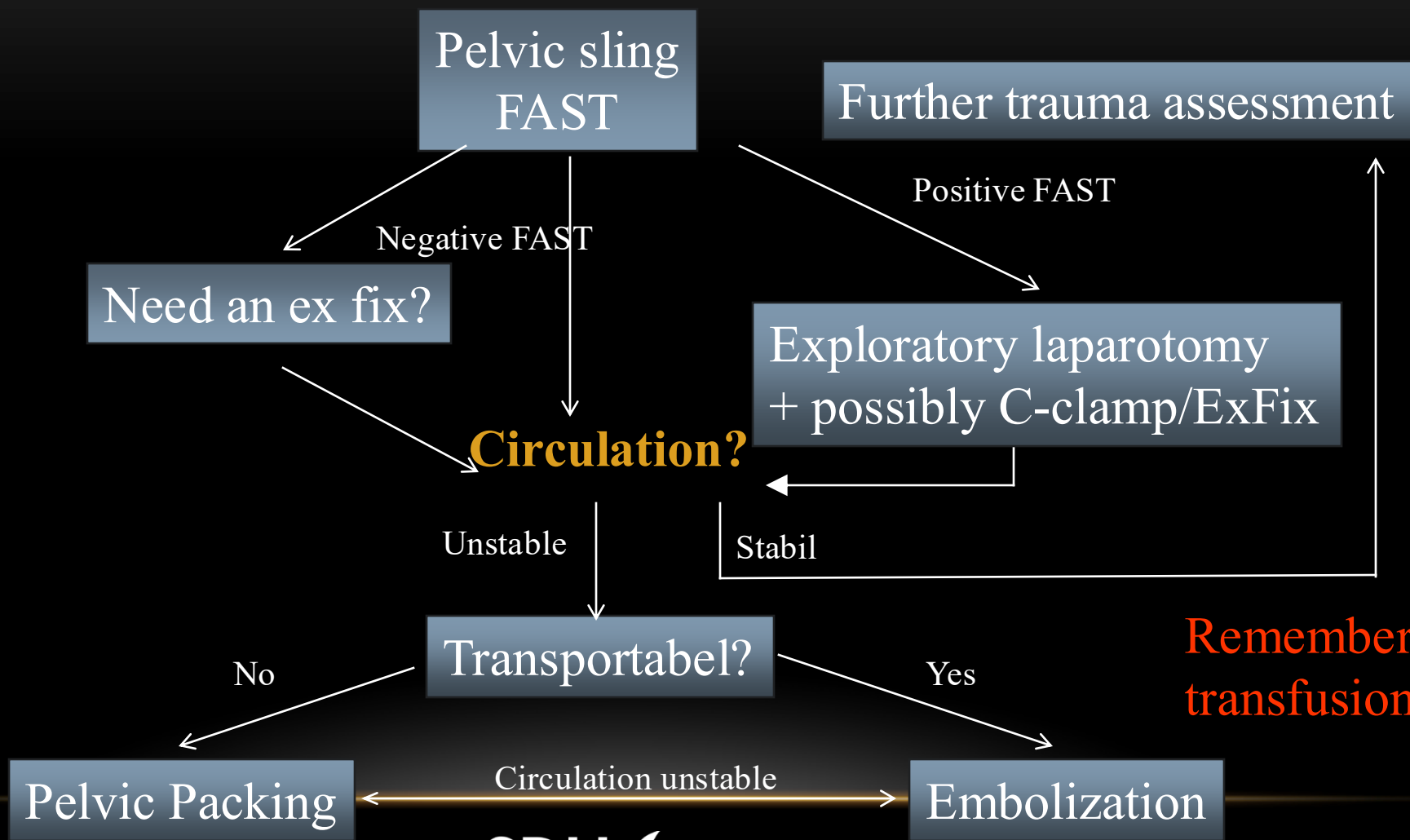
3. After this, the patient is transferred to Intensive Care.



DEFINITIVE SURGERY

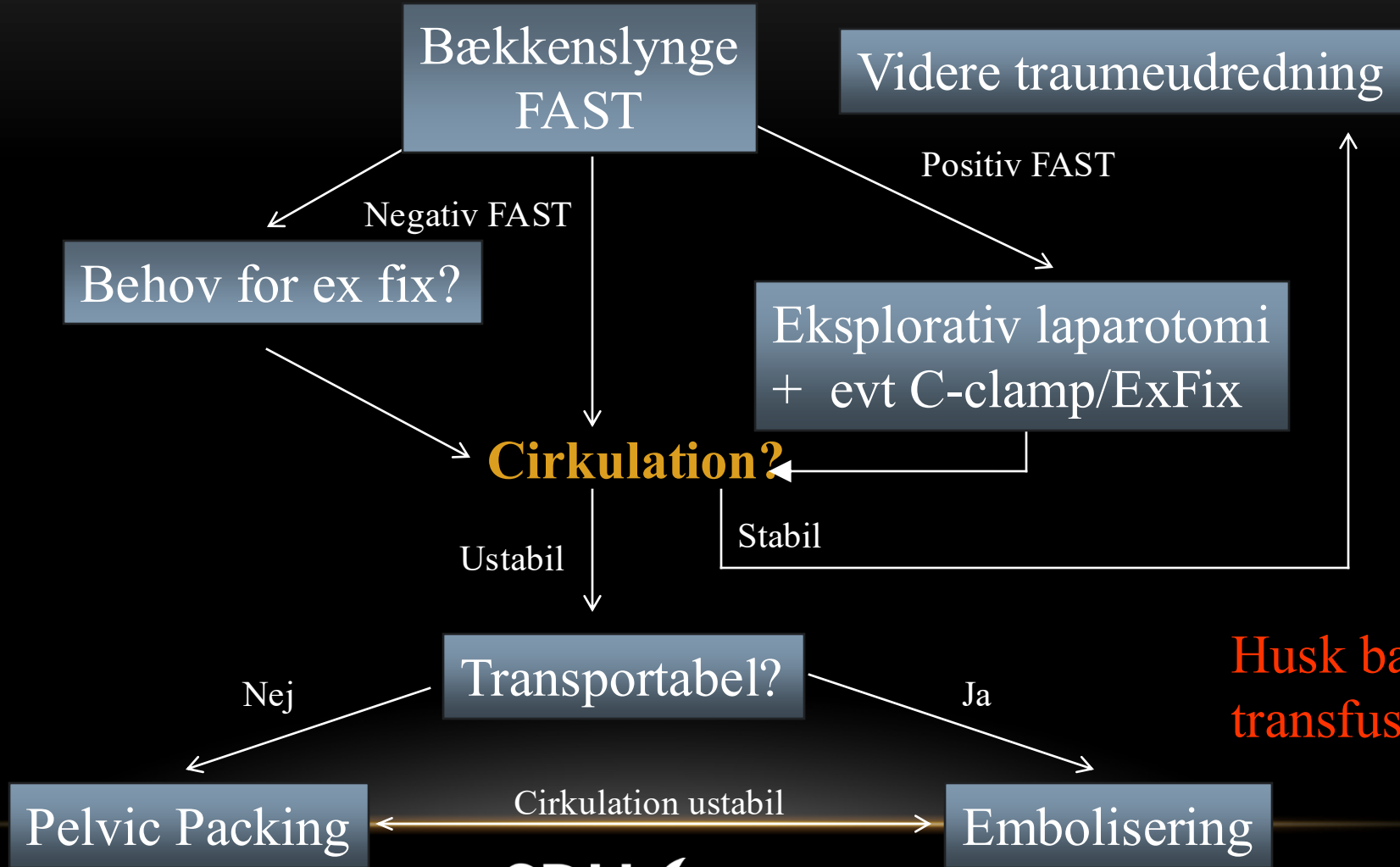


MECHANICALLY AND HEMODYNAMICALLY UNSTABLE PATIENT WITH PELVIC FRACTURE



Remember balanced transfusion therapy!!!

MEKANISK OG HÆMODYNAMISK USTABIL PATIENT MED BÆKKENFRAKTUR



Husk balanceret
transfusionsterapi!!!