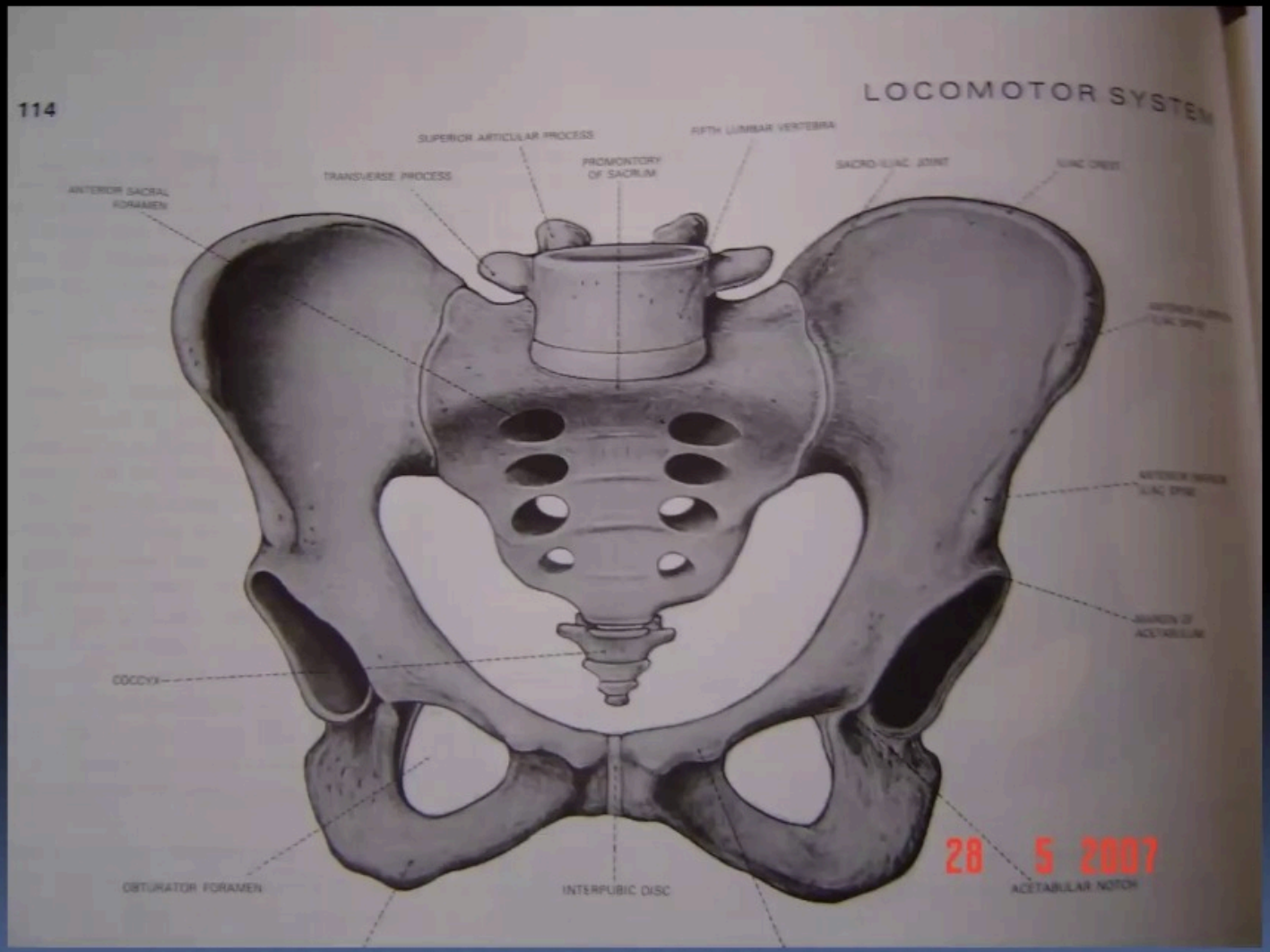
PELVIC FRACTURES

Vincent Mutiso

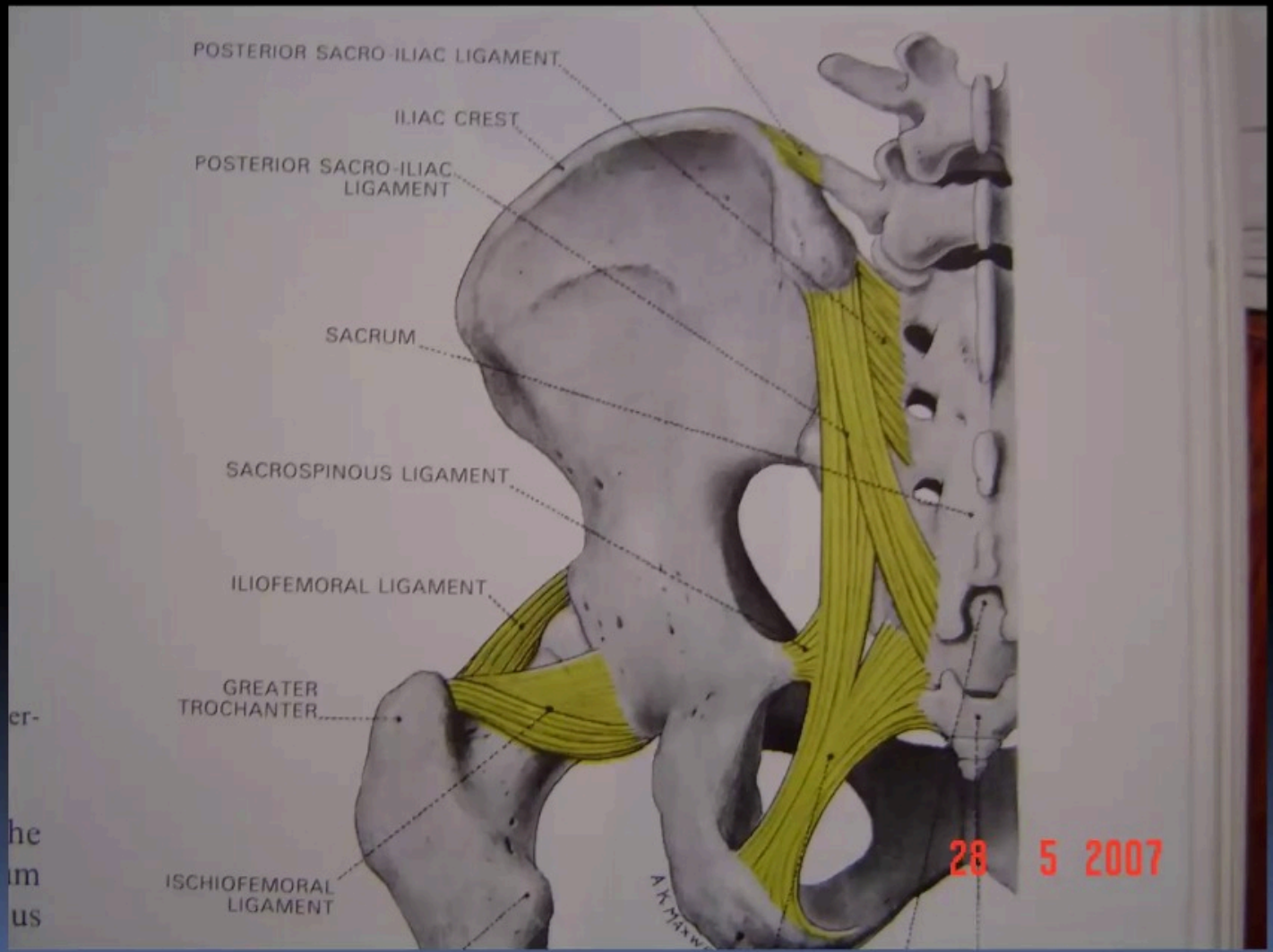
anatomy


114
LOCOMOTOR SYSTEM
SUPERIOR ARTICULAR PROCESS
FIFTH LUMBAR VERTEBRA
PROMONTORY OF SACRUM
TRANSVERSE PROCESS
ANTERIOR SACRAL FORAMEN
COCCYX
OBTURATOR FORAMEN
INTERPUBIC DISC
ACETABULAR NOTCH
28 5 2007

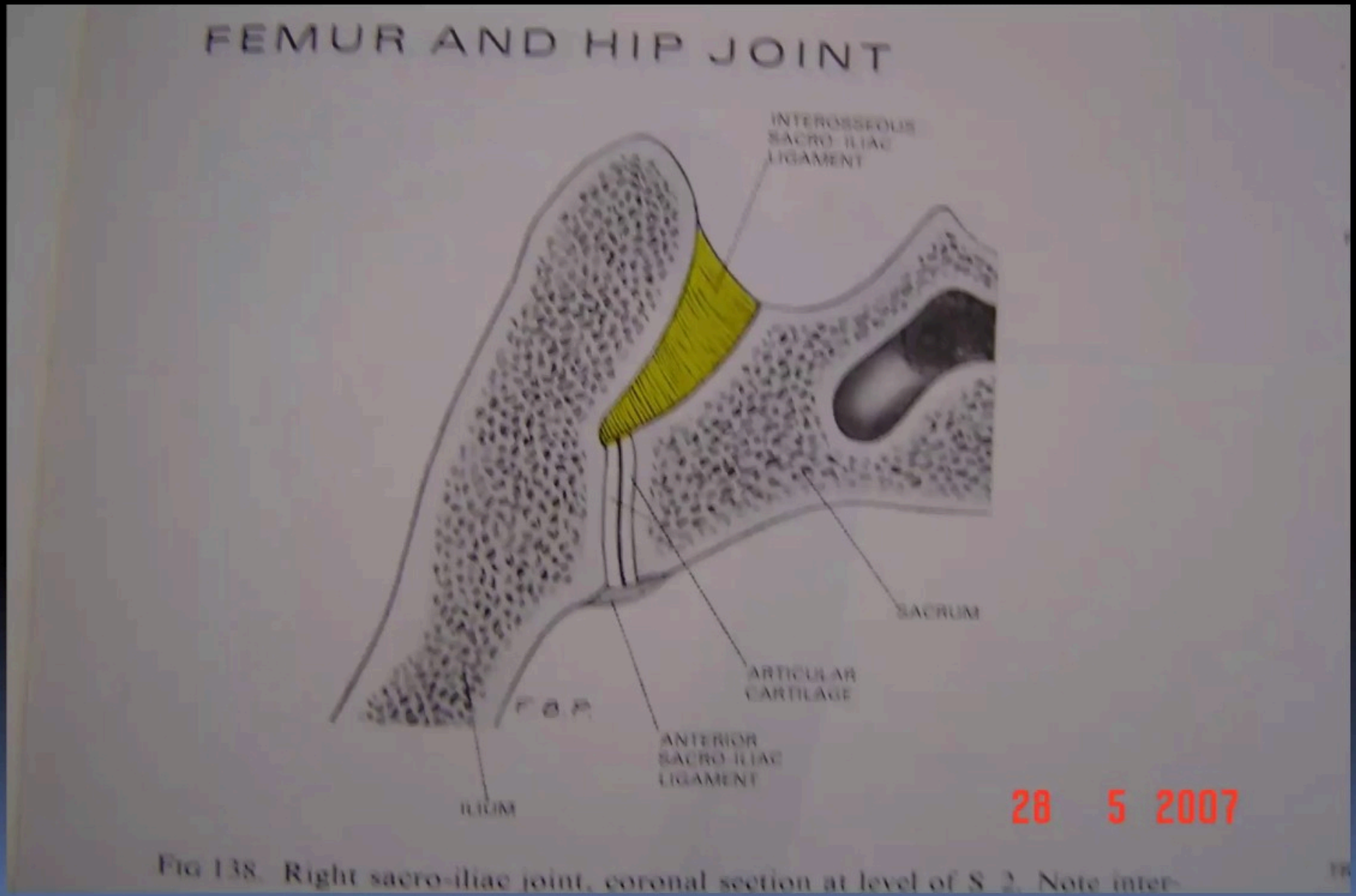
bones

- Iliac
- Pubis
- Ischium
- sacrum

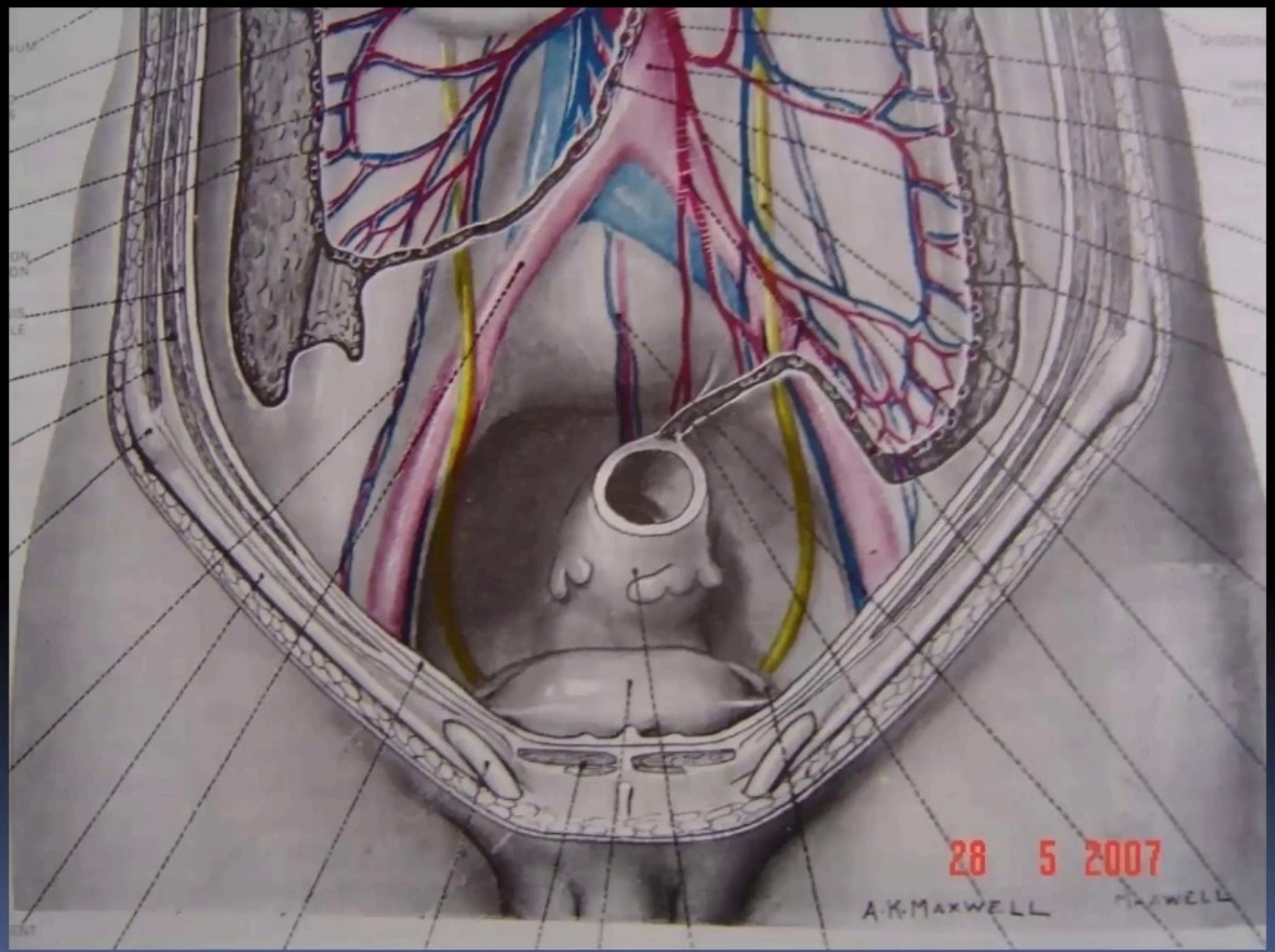
ligaments


POSTERIOR SACRO-ILIAC LIGAMENT
ILIAC CREST
POSTERIOR SACRO-ILIAC LIGAMENT
SACRUM
SACROSPINOUS LIGAMENT
ILIOFEMORAL LIGAMENT
GREATER TROCHANTER
ISCHIOFEMORAL LIGAMENT
28 5 2007

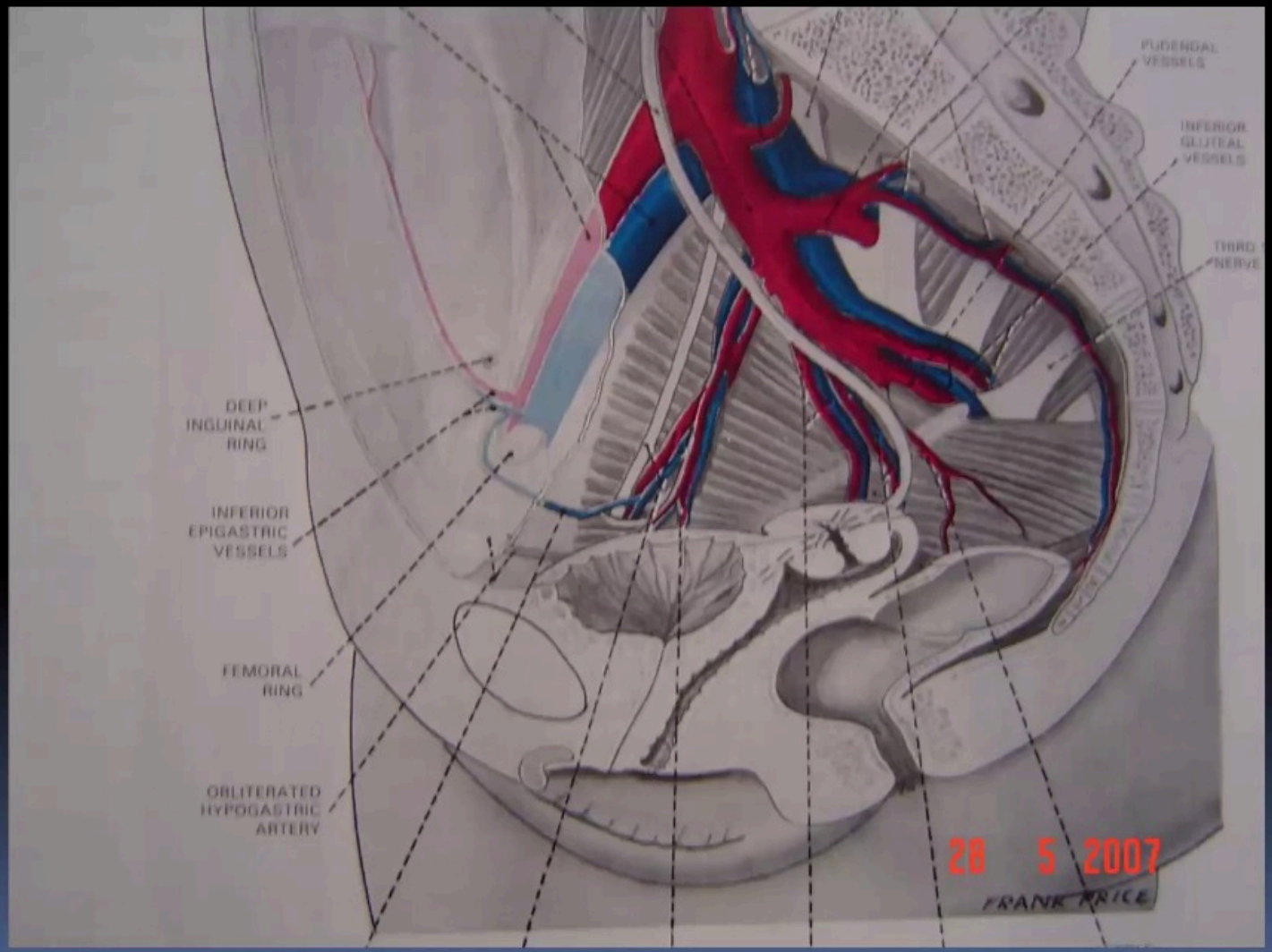
Soft tissue structures

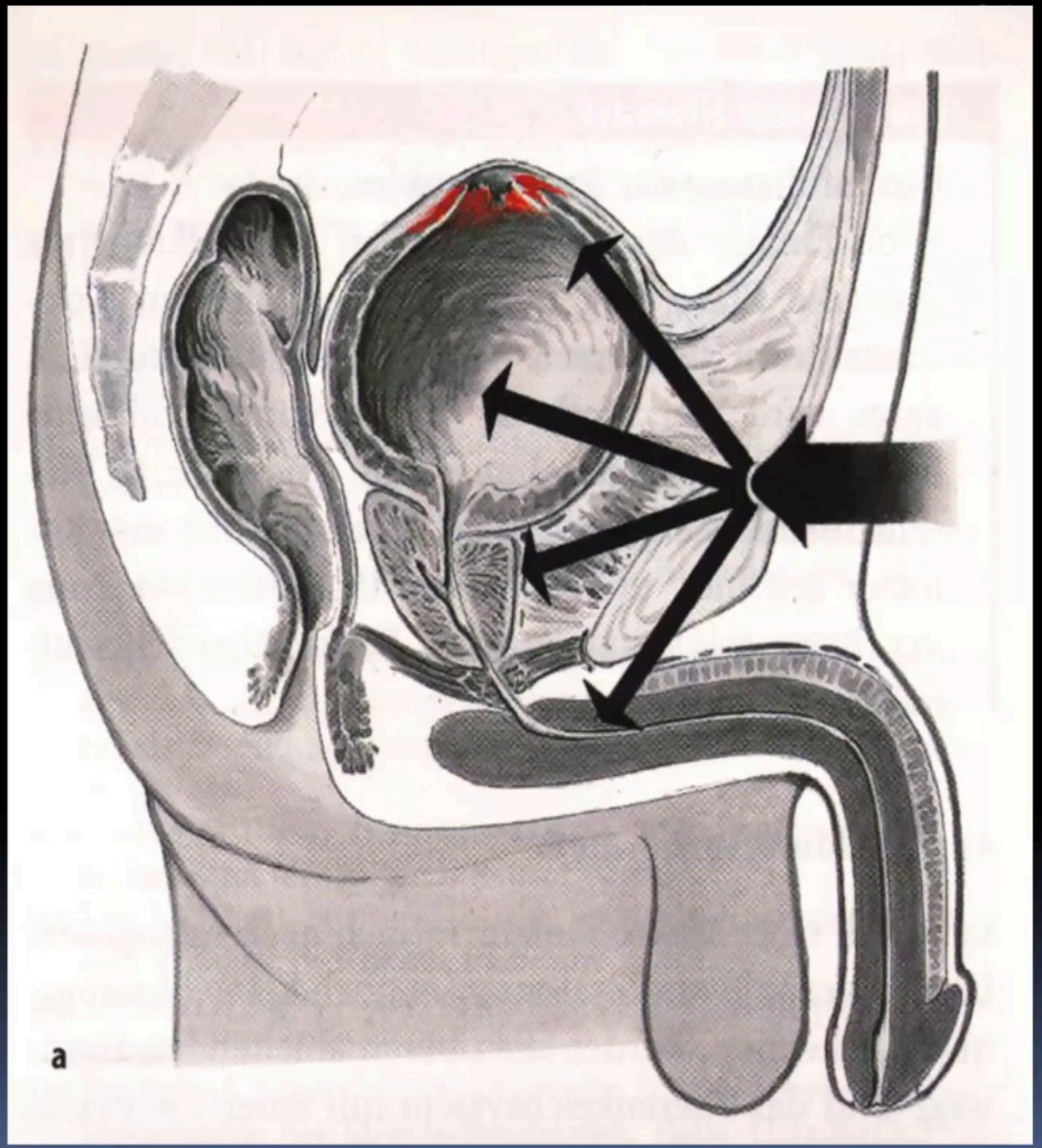


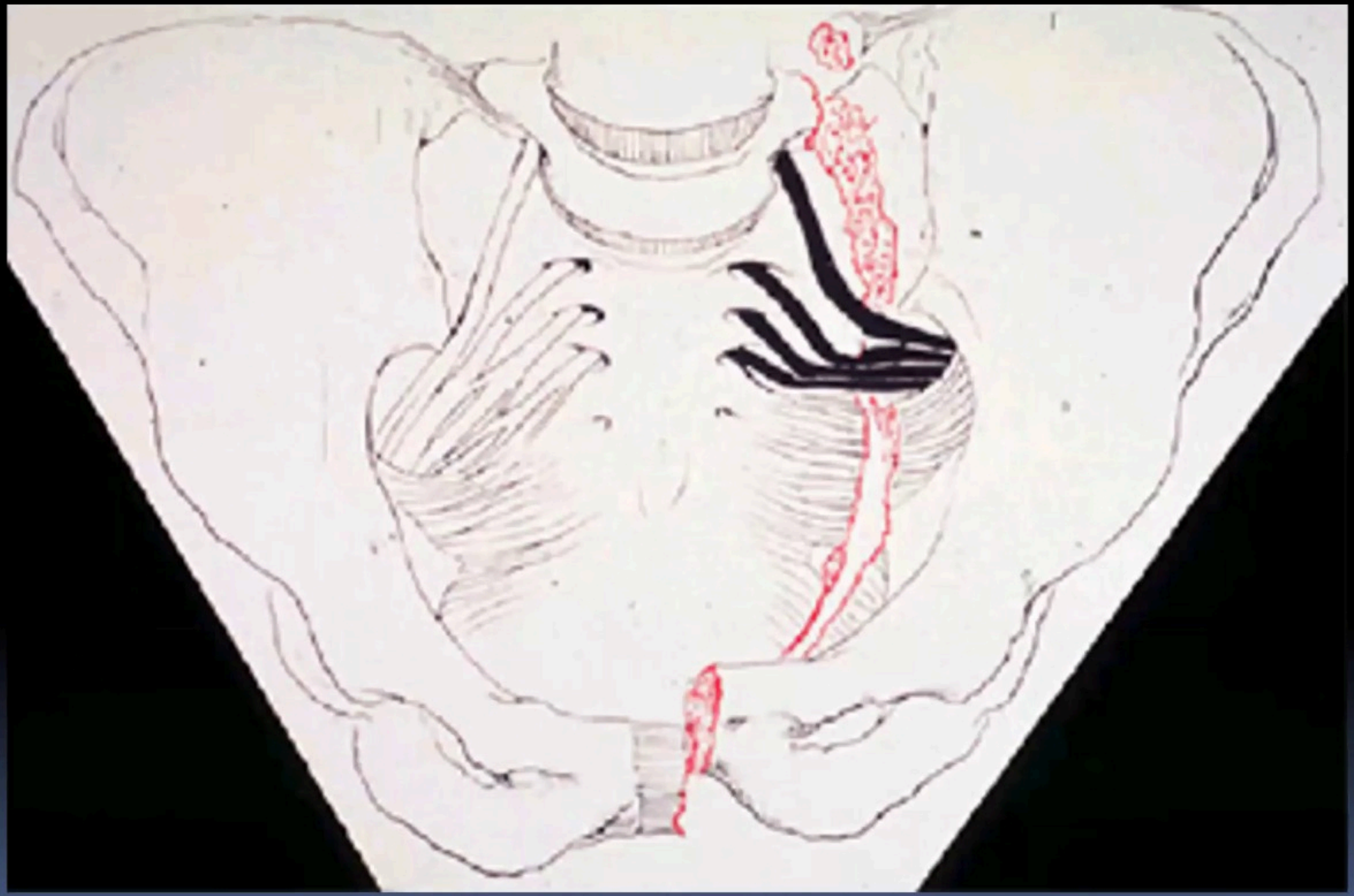
Pelvic contents



Female reproductive system




a



The Child's Pelvis

- Fundamental Differences:
  - Bones more malleable
  - Cartilage capable of absorbing more energy
  - Joints more elastic
  - Triradiate Cartilage

Elasticity of Joints

- Sacroiliac Joint and Pubic Symphysis more elastic
- Allows significant displacement
- Allows for single break in the ring
- Thick periosteum – apparent dislocations may have a periosteal tube that heals like a fracture

Mech. Of Injury

- RTA
- Falls
- Other

RTA

- Motor vehicles
  - occupant
    - ejected
  - pedestrian
  - cyclist
  - handcart
  - motorcycle

RTA

- Type of vehicle
- Where in vehicle
  - belted
  - airbags
  - pickup

Falls

- Age, Gender, Physiology
- Height
  - 3.6M / 12 feet
    (about level of first floor)

Other

- Gunshot injuries
  - low velocity
  - high velocity
    - .shape of bullet
    - .cavitation

Blasts

- A lot of energy
- Pressure waves
- Secondary missiles

Classification

- Ring structure
- Stable / Unstable

Young & Burgess

- APC I: symphysis < 2.5cm
  - II: > 2.5cm ant SI diastasis
    - sacrosp. & sacrotub lig disrupted
  - III: SI disloc + vasc injury
- LC
- VS

Young & Burgess

- LC I: ramus # +sacral ala compression
  - II: ramus# + ipsilat post ilium # disloc
  - III: ipsilat LC + contralat APC (windswept)

VS

- VS post sup force hemipelvis
  63% hypovol shock
  25% mortality

Tile / AO

Type A : Stable

Type B : Rotationally unstable

Type C : Rotationally and Vertically unstable

Type A

- A1 : # not involving pelvic ring
- A2 : # ring minimally displaced
- A3 :

B

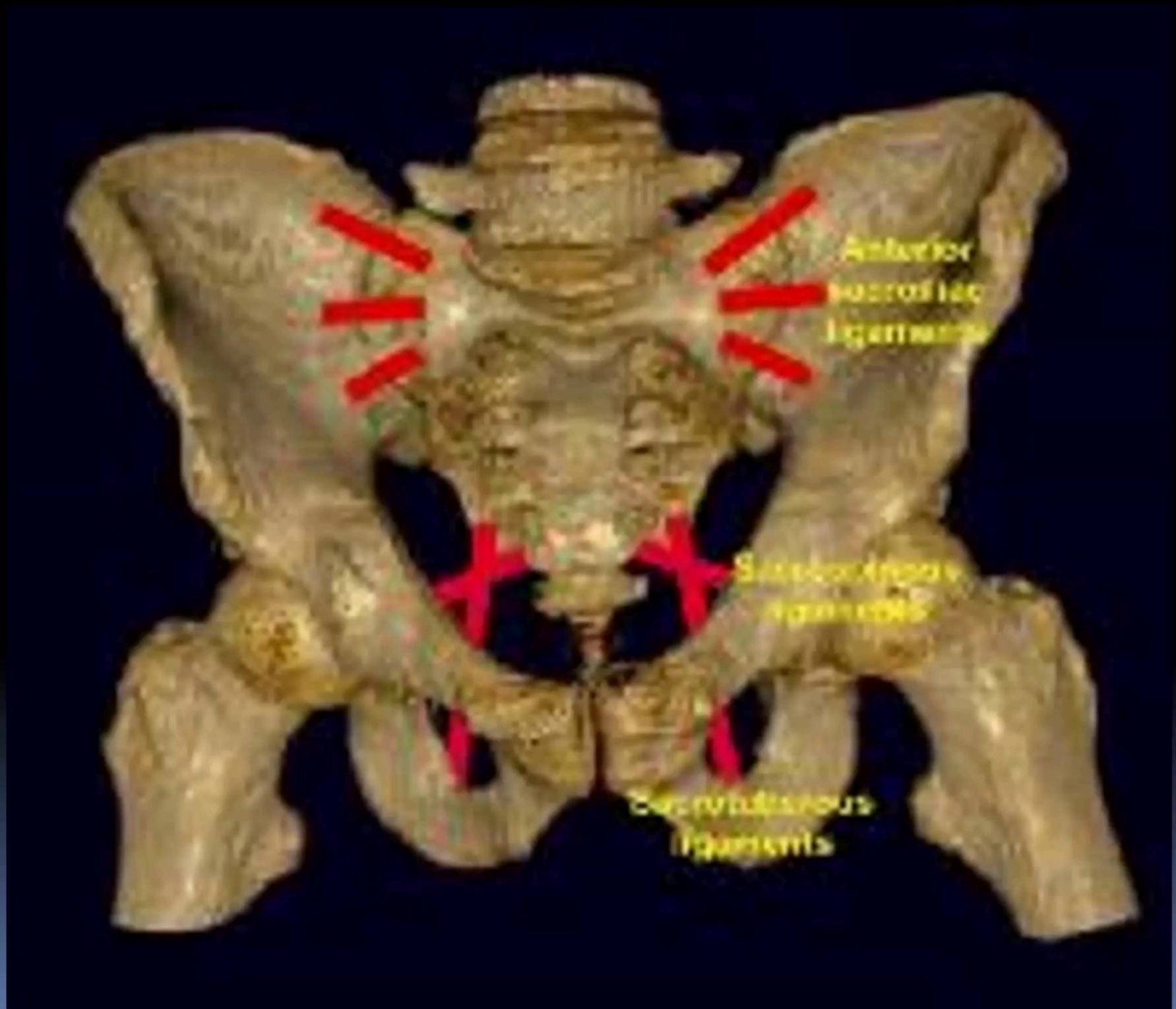
- B1 : AP compression(open book)
- B2 : LC ipsilat
- B3 : LC contralat

C

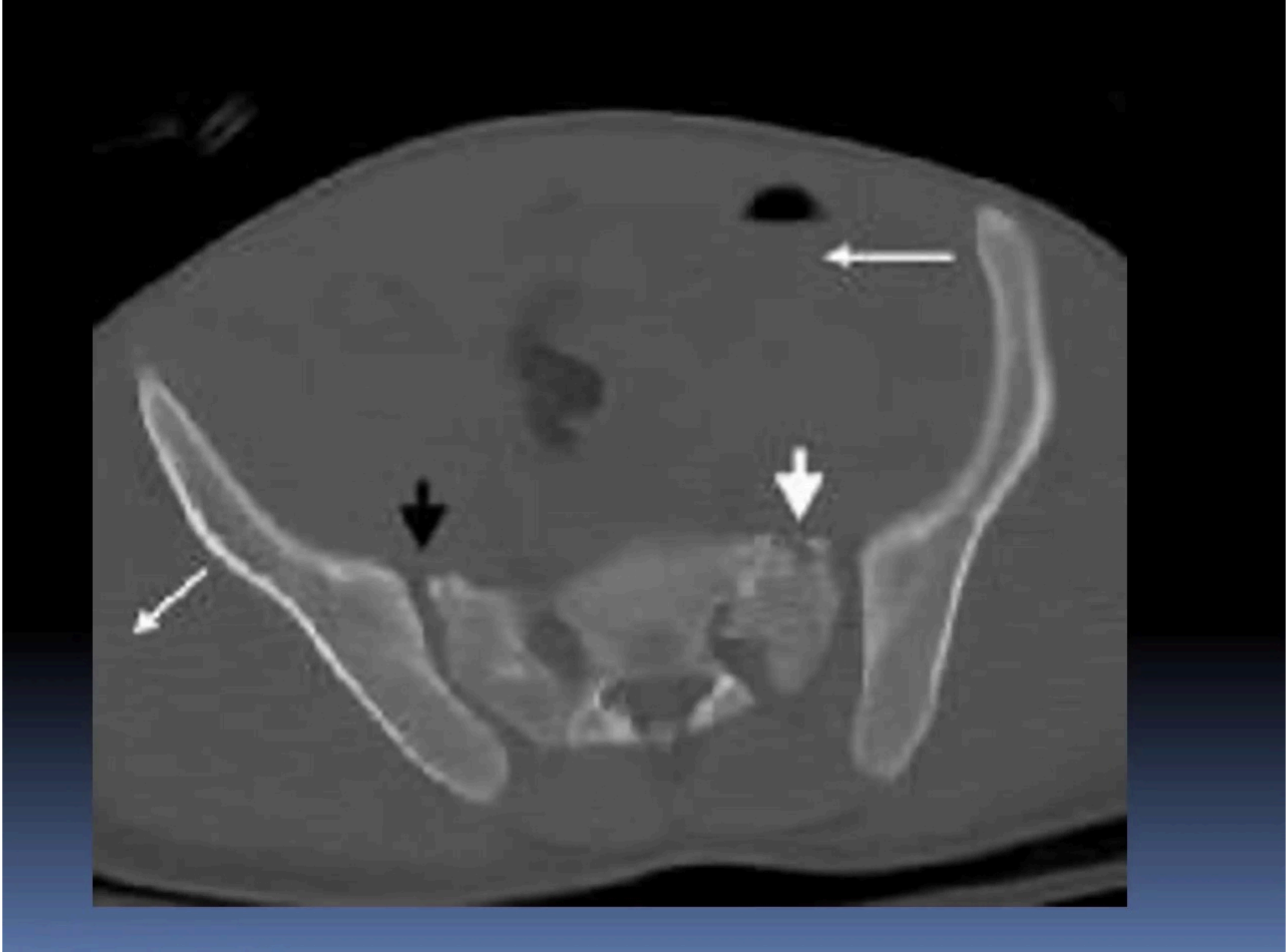
- C1 : Unilat Vert Unstable
- C2 : Bilat vert unstable
- C3 : Ass with Acetabular #

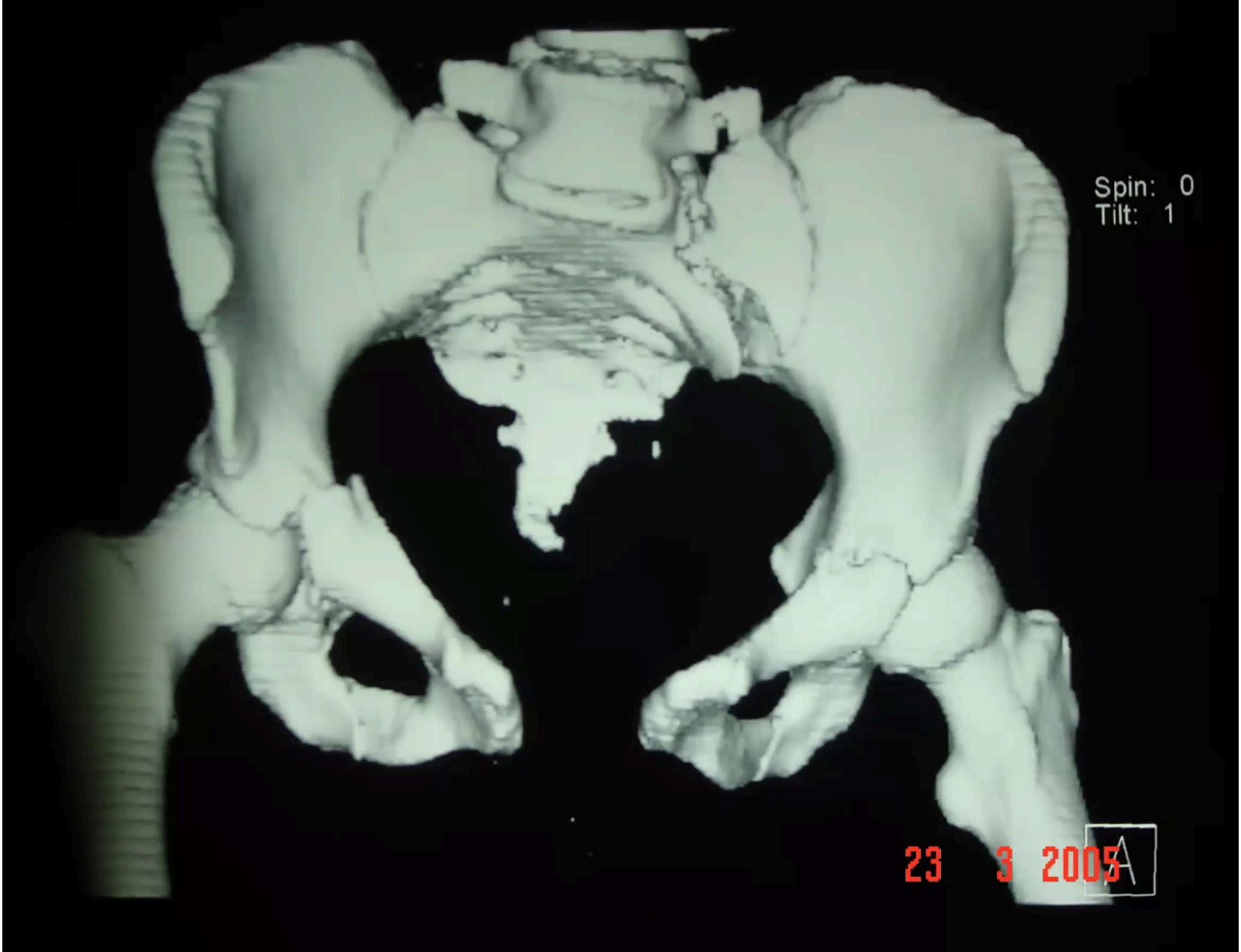
Practical ATLS classification

- Closed (Lateral compression) 60 - 70%
- Open book (AP compression) 15 -20%
- Vertical shear (shear) 5 – 15%


Anterior
sacroiliac
ligaments
Sacrotuberous
ligaments
Sacrospinous
ligaments


17 8 2004




Spin: 0
Tilt: 1
23 3 2005
A

Dealing with C

- Takes 1.5 – 4.5L (actually can take Whole blood vol.)

Receive patient

- Primary Survey and Resuscitation
- ABCs

History

- What happened
  - self
  - eyewitness
  - those who transported the patient

P#

- Allergies
- Medications
- Past illness
- Last meal
- Events/ environment

P#

- Alert
- Vocal
- Painful stimuli
- Unresponsive

P#

- Vital signs

Normally

- T, P, RR, BP (vital signs) give a very good indication of the state of the patients health

Multiply injured

- Intravascular fluids escape
  - directly – haemorrage
  - indirectly - escape

Circulating vol

- Blood loss
- Obligatory tiss. edema

Two Hit Hypothesis

- First insult may lead to
  Systemic Inflammatory Response Syndrome
  Multiple Organ Dysfunction Syndrome
  (ARDS, Renal, Liver, etc)
  Second Hit – can result in death

Fluids escape intravascular space

- Leaky vessel walls.
- Usual suspects – IL 1,2,6,8, 10
  - PAF (Plt activating factor)
  - TNF (Tumour necrosis factor)
  - MCP-1 (monocyte chemotactic factor 1)

P#

- Drop in Systolic Blood Pressure

Grade III shock
IVF crystalloids / colloids
Blood

Secondary survey

- PXR

blunt trauma
P instability
haematuria
blood on PR/VE

Examination

- Inspection
  - expose adequately
  - limb lengths
  - rotations

inspection

- Bruises
- Lacerations
- Haematomas
- Blood at urethral meatus

P#

- Compression / Distraction

PR

- High riding prostate
- Sphincter tone
- Blood

VE

- Blood
  (do not forget females may be pregnant)

Gluteal examination

- Do not forget

Gluteal examination

- Penetrating injuries to this area are associated with up to 50% of significant intra abdominal injury
- Gunshot injuries

Investigations

- X- Rays (AP Pelvis most informative)
- FAST

  (Focused Assessment Sonography in Trauma)
- DPL (supraumbilical)

  (Diagnostic Peritoneal Lavage)

Radiographic Signs of Instability

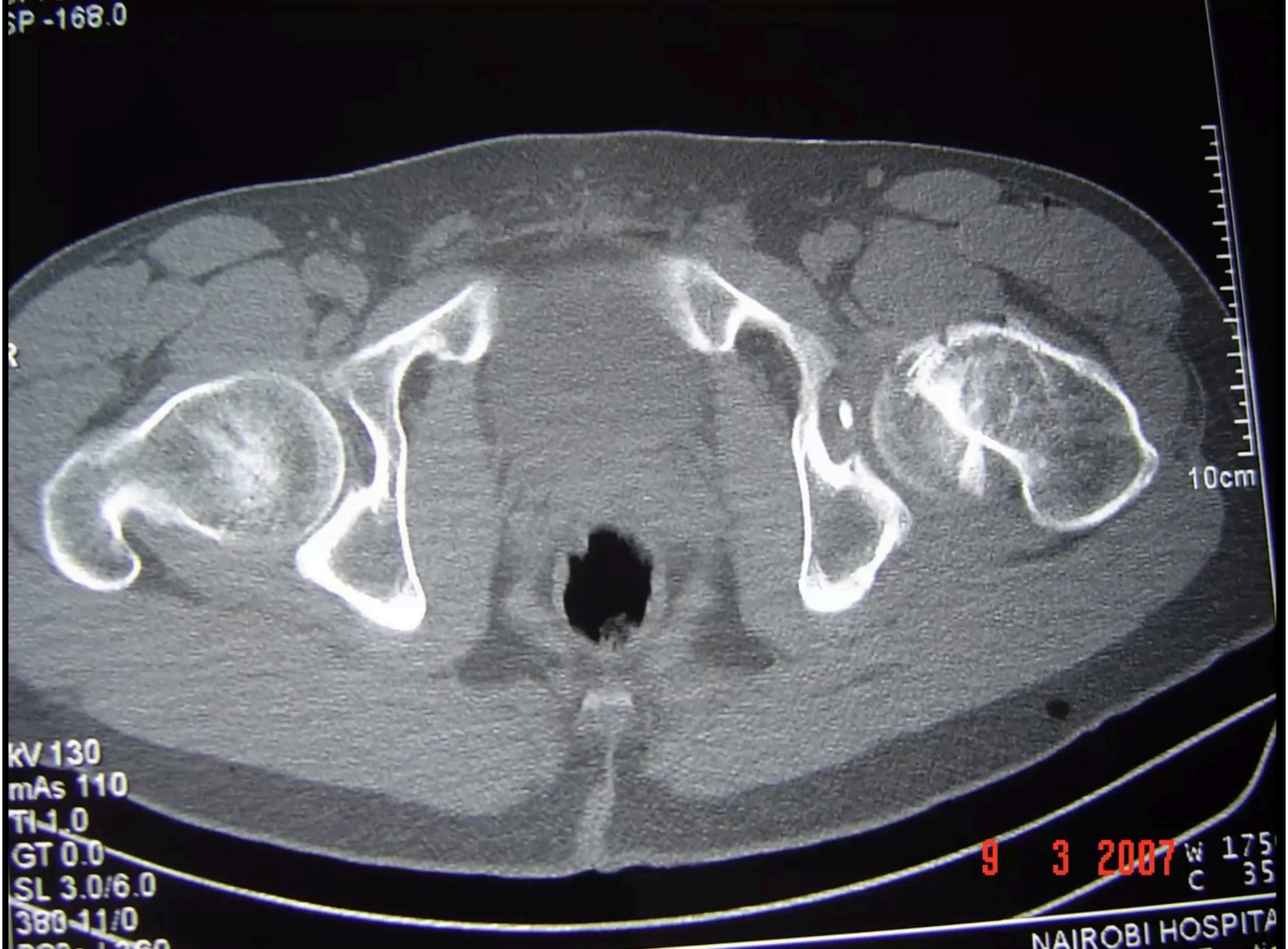
- Sacroiliac displacement of 5 mm in any plane
- Posterior fracture gap (rather than impaction)
- Avulsion of fifth lumbar transverse process, lateral border of sacrum (Sacrotuberous ligament), or ischial spine (sacrospinous ligament)

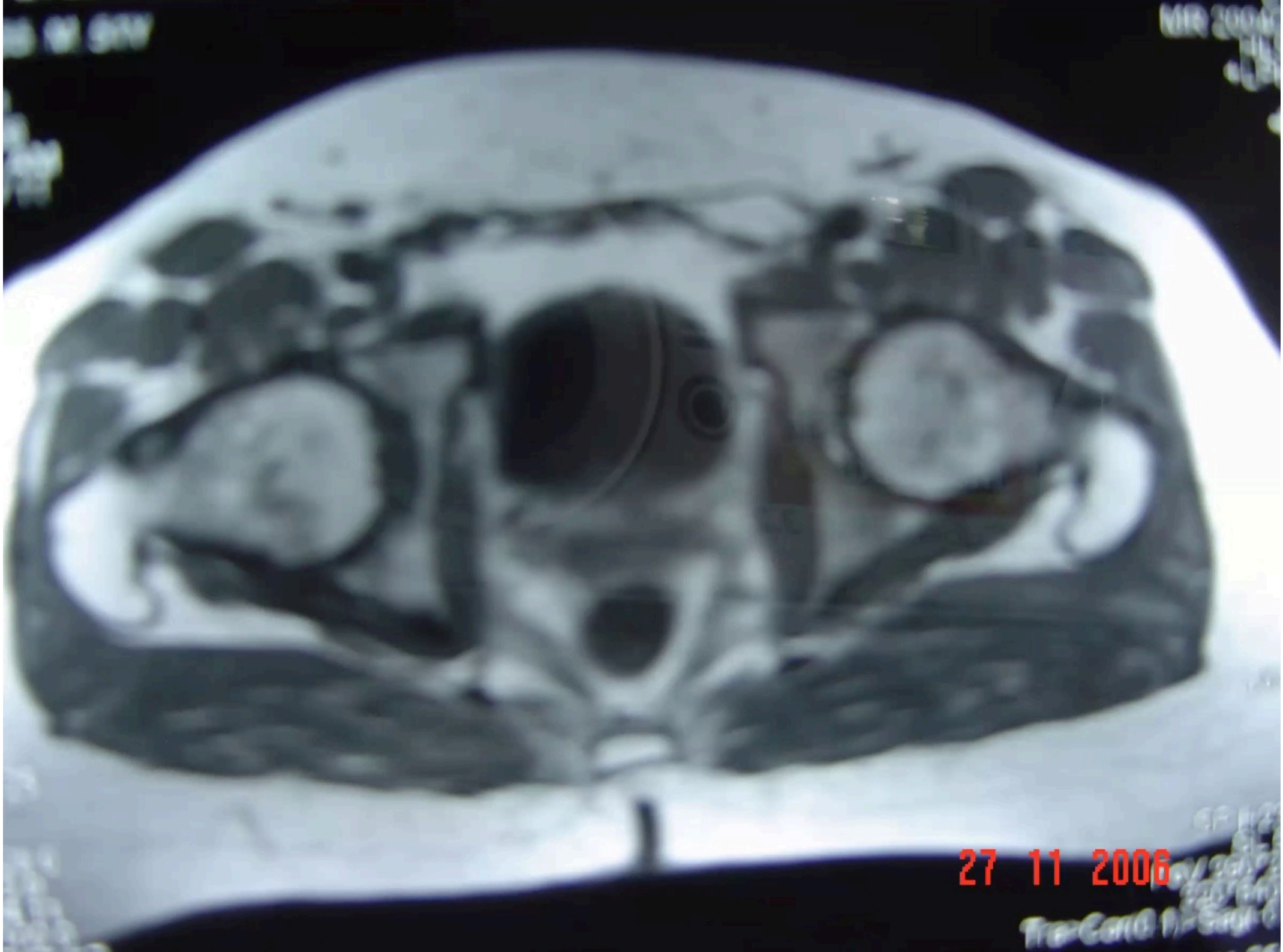
investigations

- Retrograde urethrography
- Cystography
- DPL
- US
- IVP

P#

- CT scan
- MRI


SP -168.0
10cm
kV 130
mAs 110
TI 1.0
GT 0.0
SL 3.0/6.0
9 3 2007
W 175
C 35
NAIROBI HOSPITA


27 11 2006

Rx

- ABCs
- Circulation
- Stabilize pelvis
  - bedsheet, commercial applications
- Involve the surgeon

P#

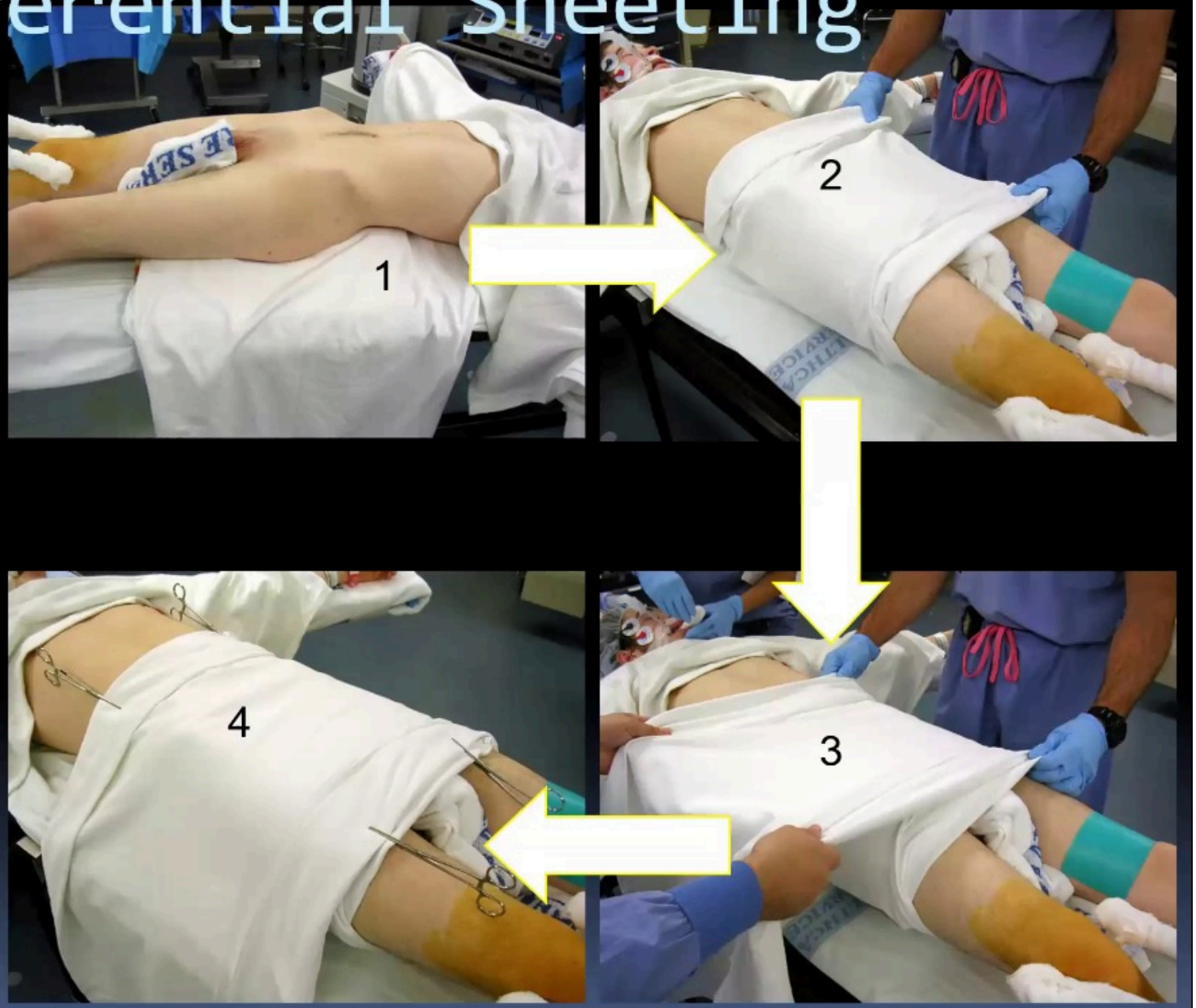
- Analgesics
- Antibiotics
- T.T

P# Stabilization

- Temporarily with a binder
- Traction
- External fixation
- Definitive fixation

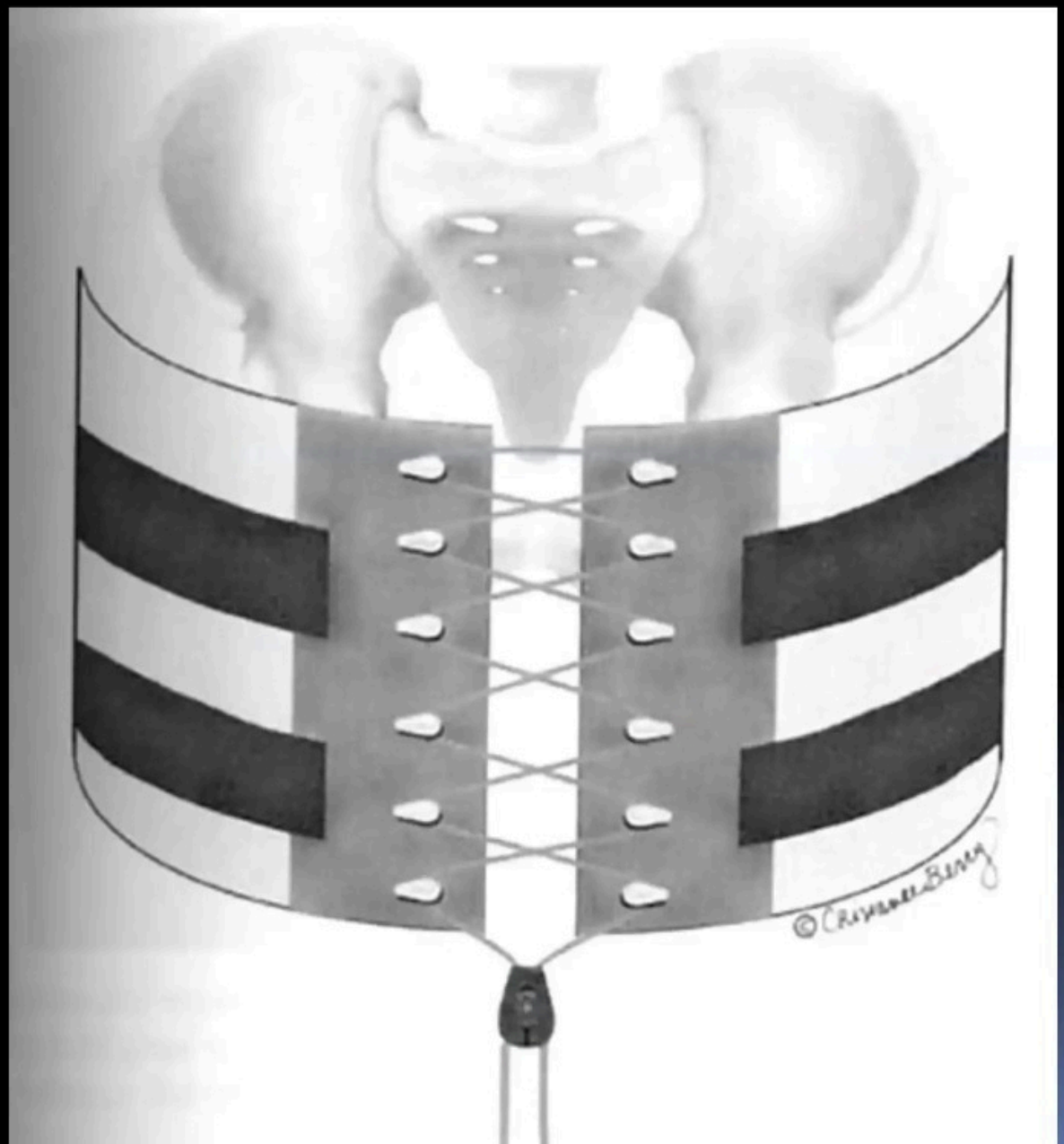
Circumferential Sheeting

- Supine
- 2 "Wrappers"
- Placement
- Apply
- "Clamper"
- 30 Seconds



Routt et al, JOT, 2002

HARBORVIEW MEDICAL CENTER

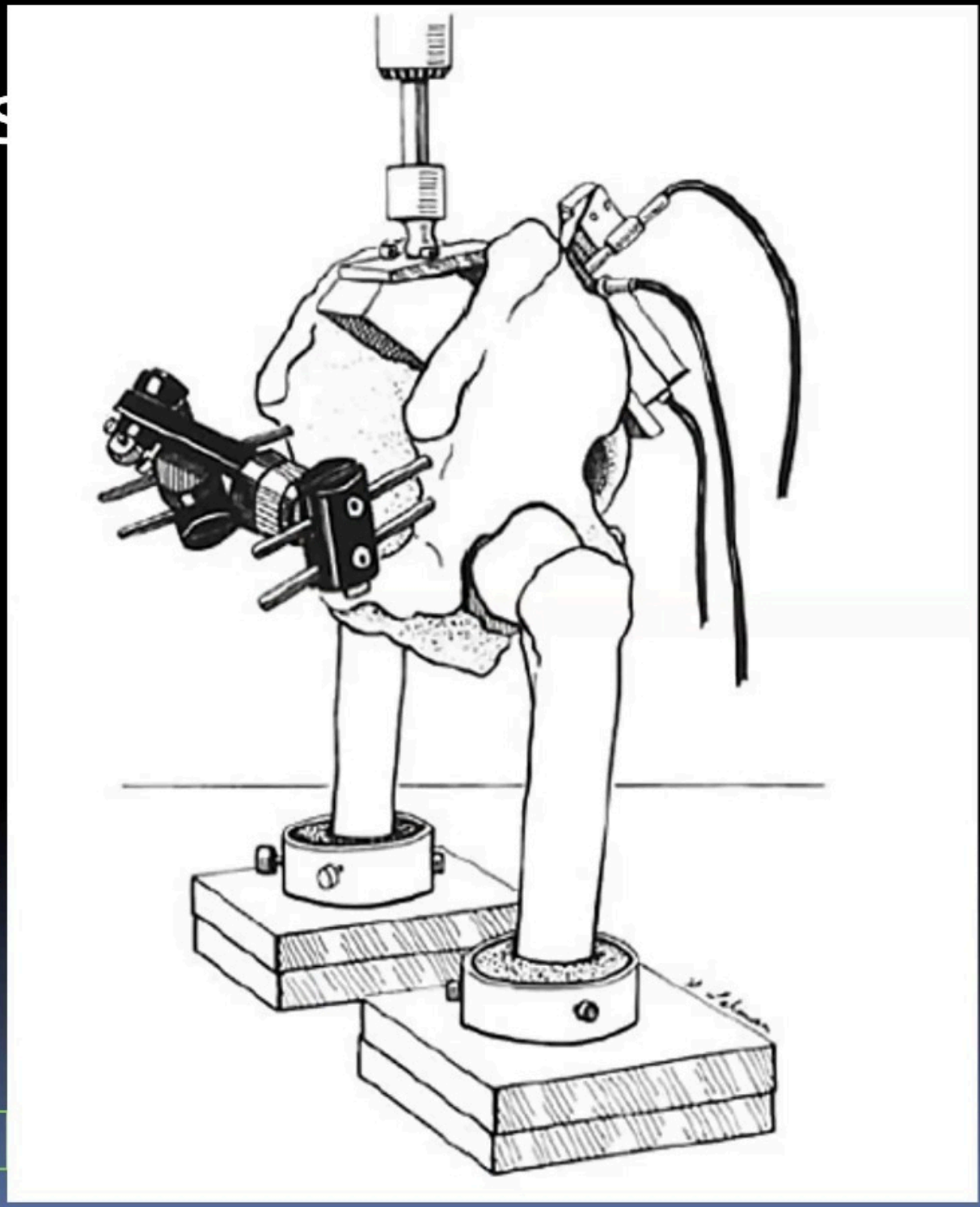


Physical Exam

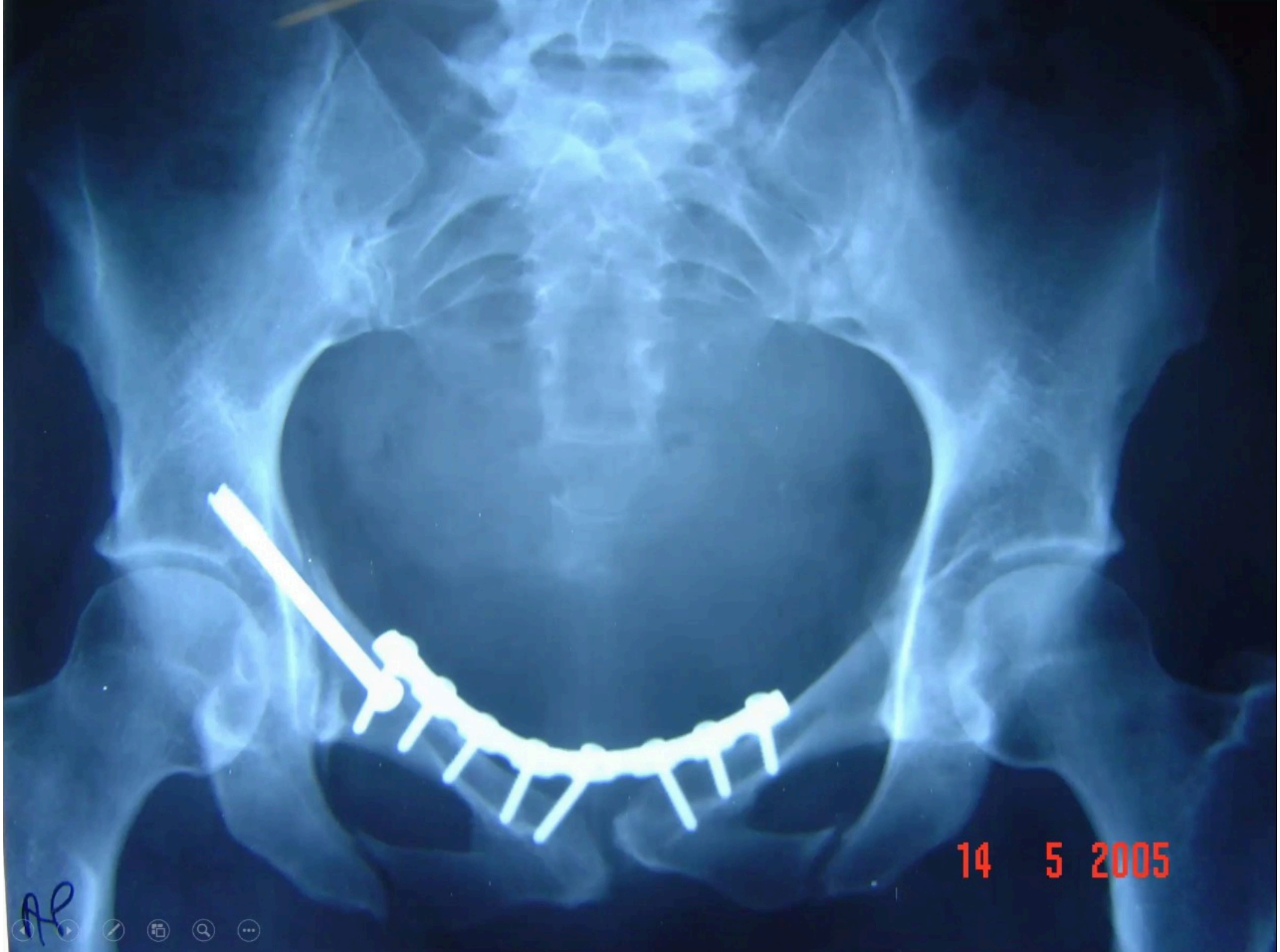
- Degloving injuries
- Limb shortening
- Limb rotation
- Open wounds
- Swelling & hematoma

AIIS Frames

- AIIS: Biomechanically equivalent (superior?)
- Patients can sit



Kim et al, CORR, 1999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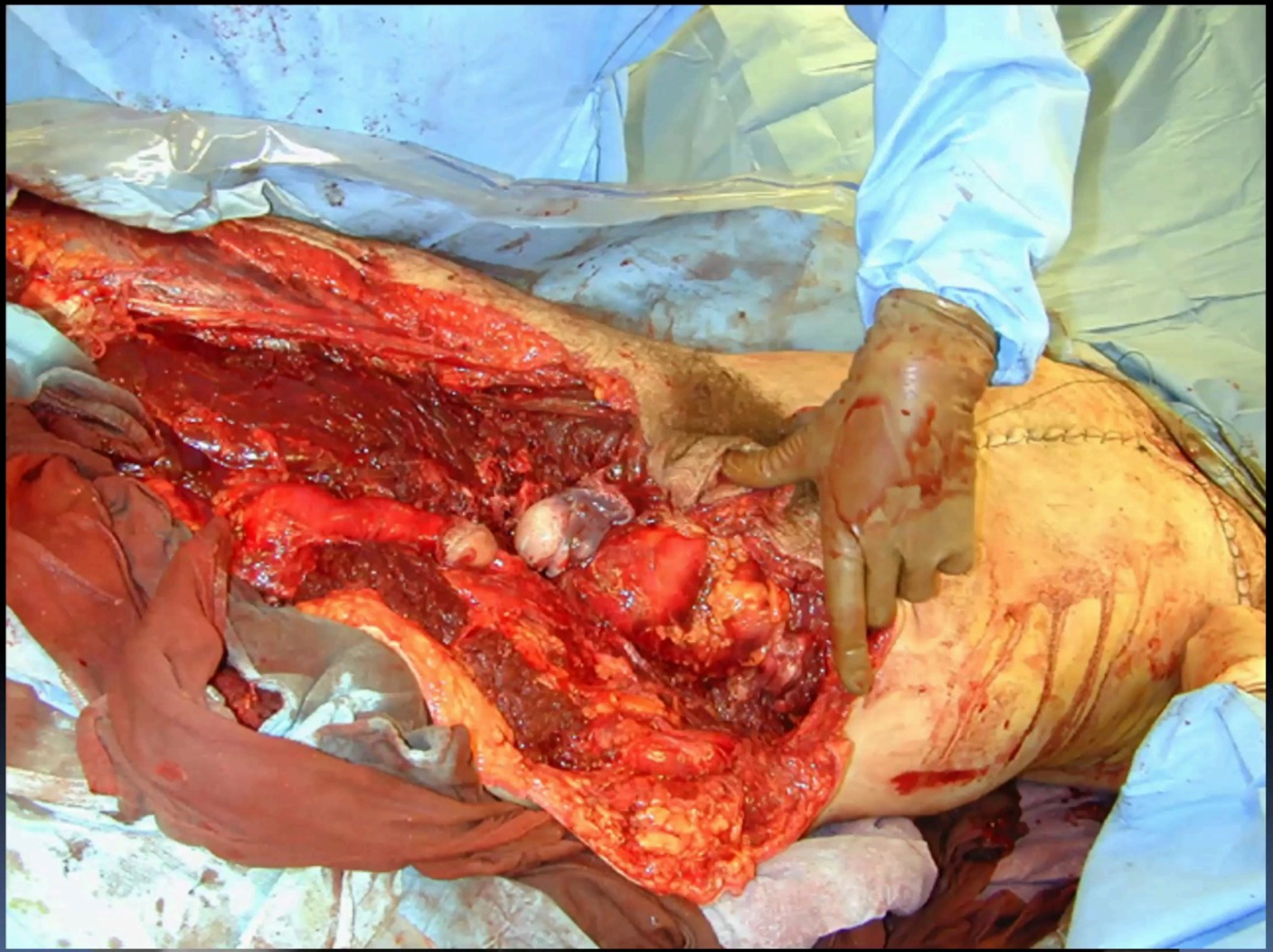

Other modes

- Angiographic embolisation
- Pneumatic antishock garments
- Direct surgical control of haemorrage

Hemorrhage Control

- Pelvic Containment
  - *Sheet*
  - *Pelvic Binder*
  - *External Fixation*
- Angiography
- Laparotomy

Significant P#

- Significant resources and expertise required
- Early transfer to an appropriate facility

THANK you