



CNT2U Octobre 2023

L'anatomie essentielle dans les traumatismes du bassin

Pr. Mehdi Boudissa
CHU Grenoble Alpes

Conflits d'intérêts

- Aucun conflits d'intérêts en relation avec cette présentation

Objectifs

Approfondir les connaissances anatomiques pour mieux appréhender

Physiopathologie

Bilan diagnostic

Les traitements

Plan

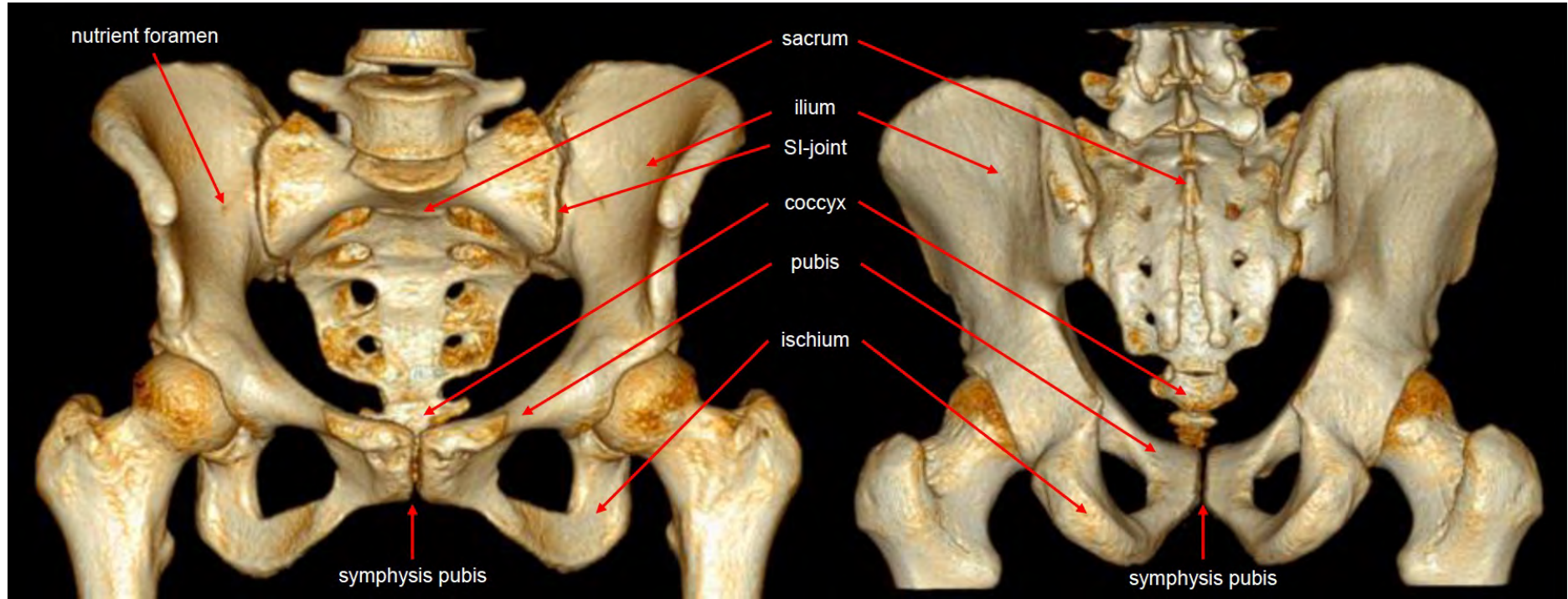
- Ostéologie
- Ligaments
- Nerfs
- Vaisseaux
- « Vrai » pelvis : Uro-gynéco-dig

Physiopathologie

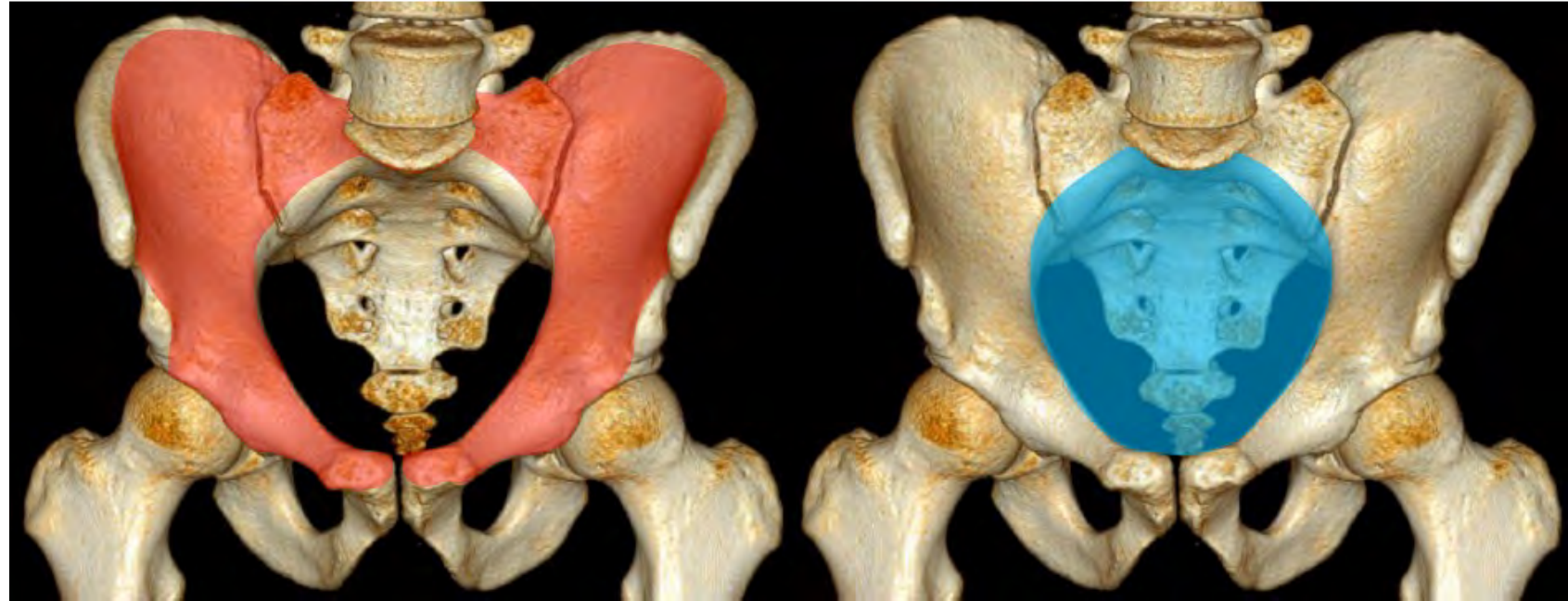
Bilan diagnostic

Les traitements

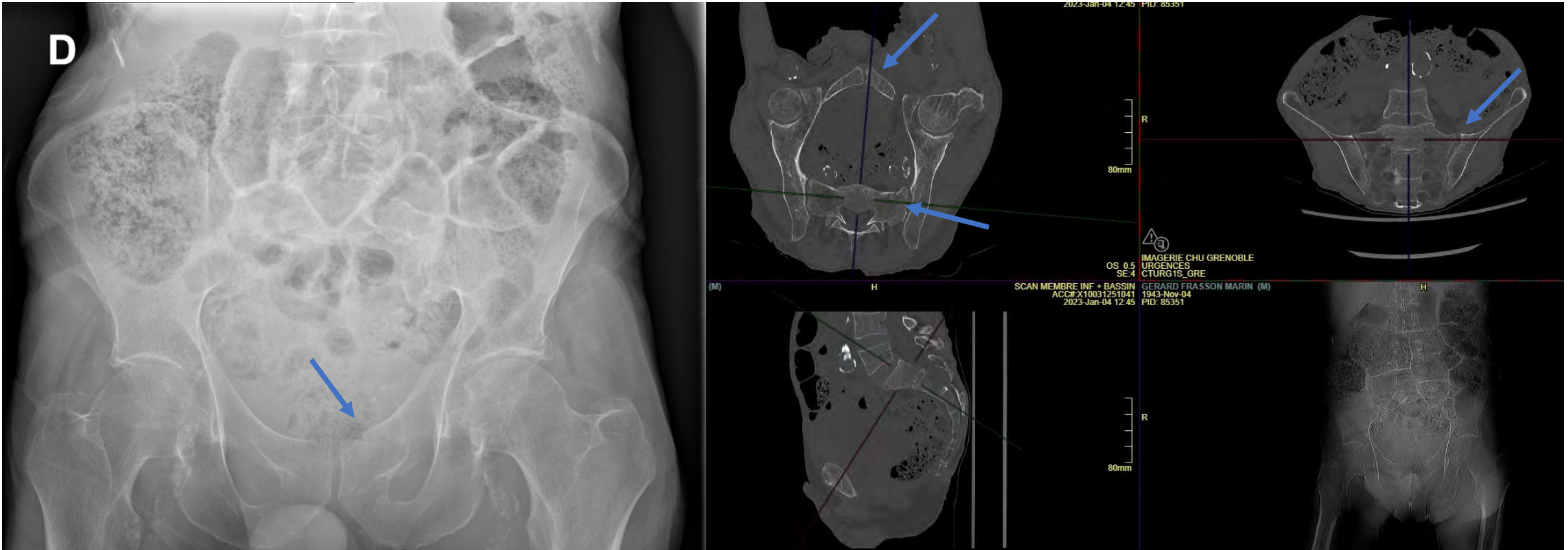
Ostéologie



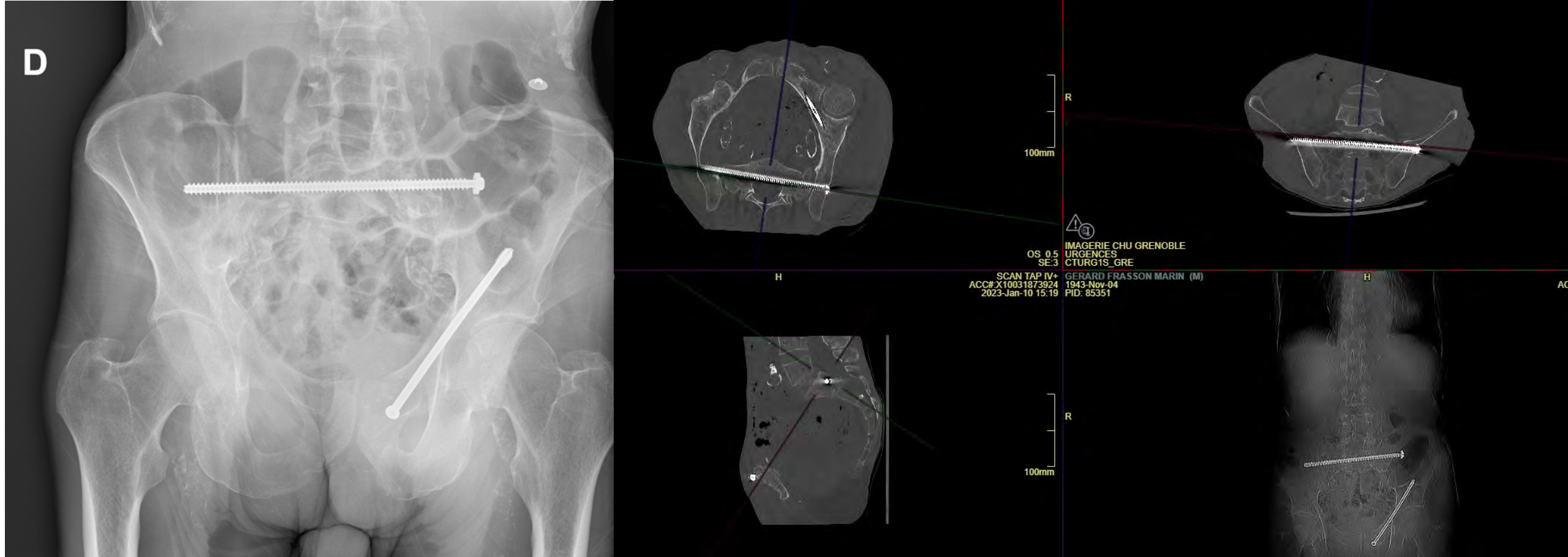
Ostéologie



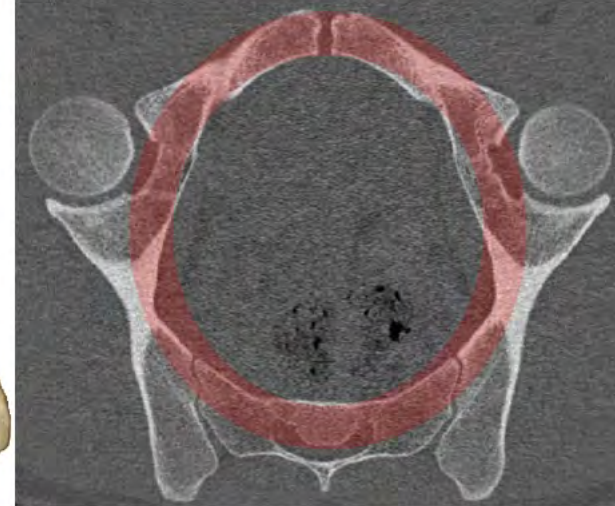
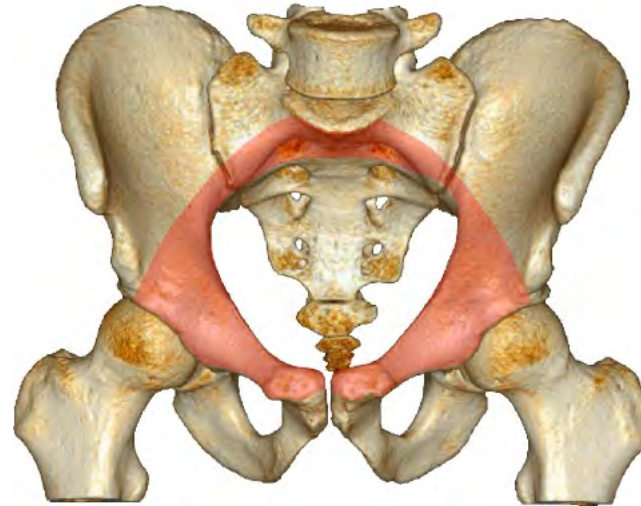
Lésion antérieure = lésion postérieure



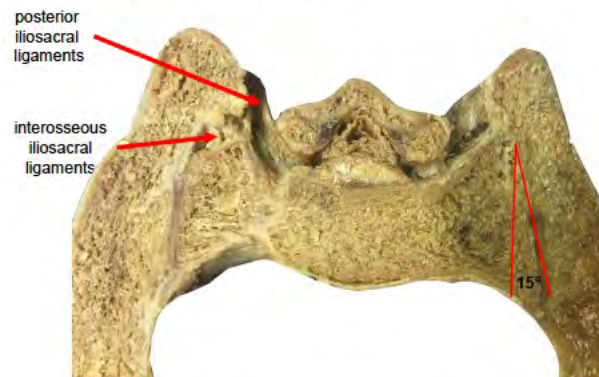
Lésion antérieure = lésion postérieure



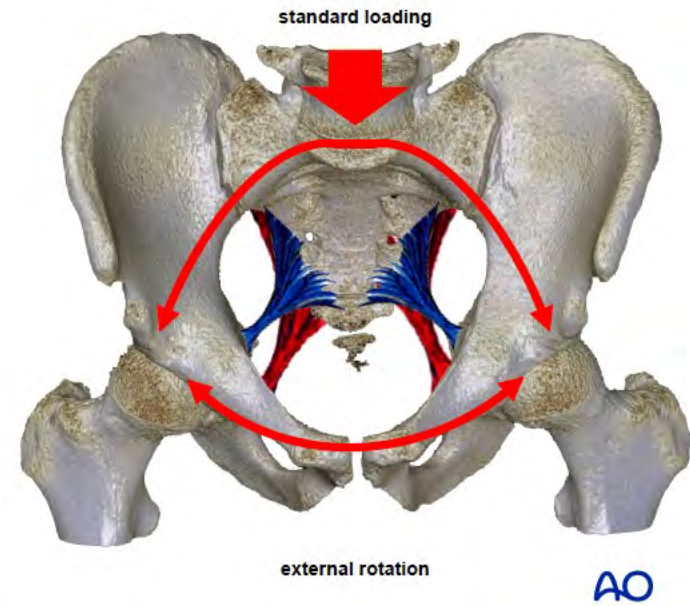
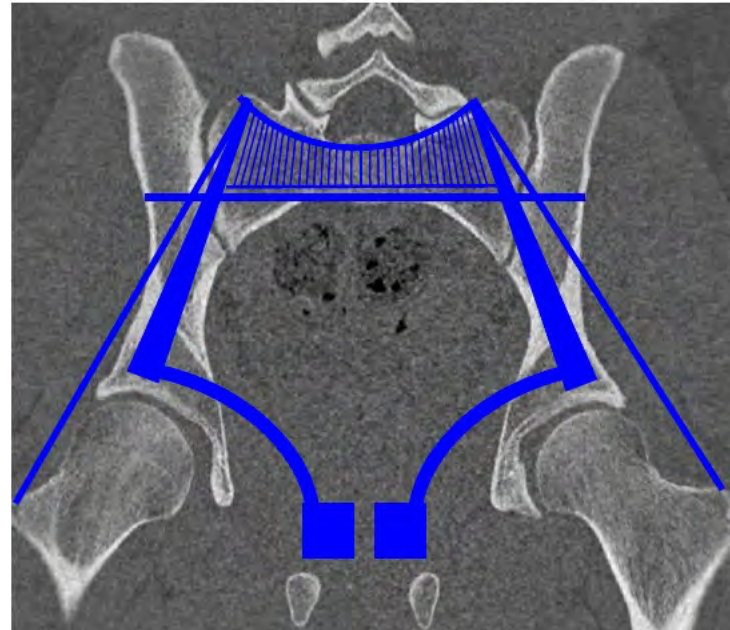
Ostéologie



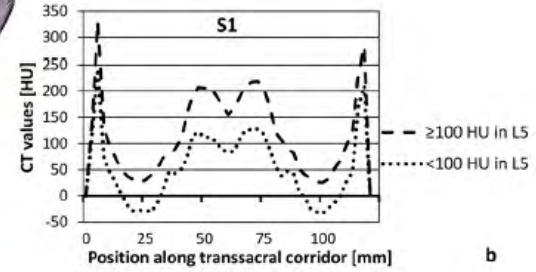
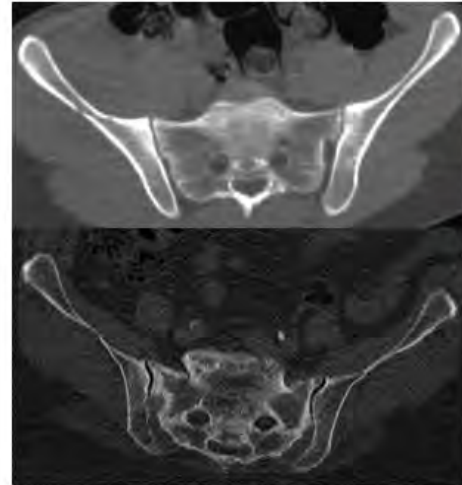
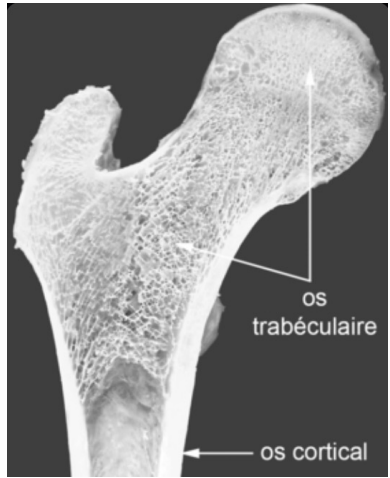
- PSIS = pillars of the bridge;
- interosseous sacroiliac ligaments act as suspension bars
- sacrum = true bridge



Ostéologie



Ostéologie



weak area in the foraminal zone

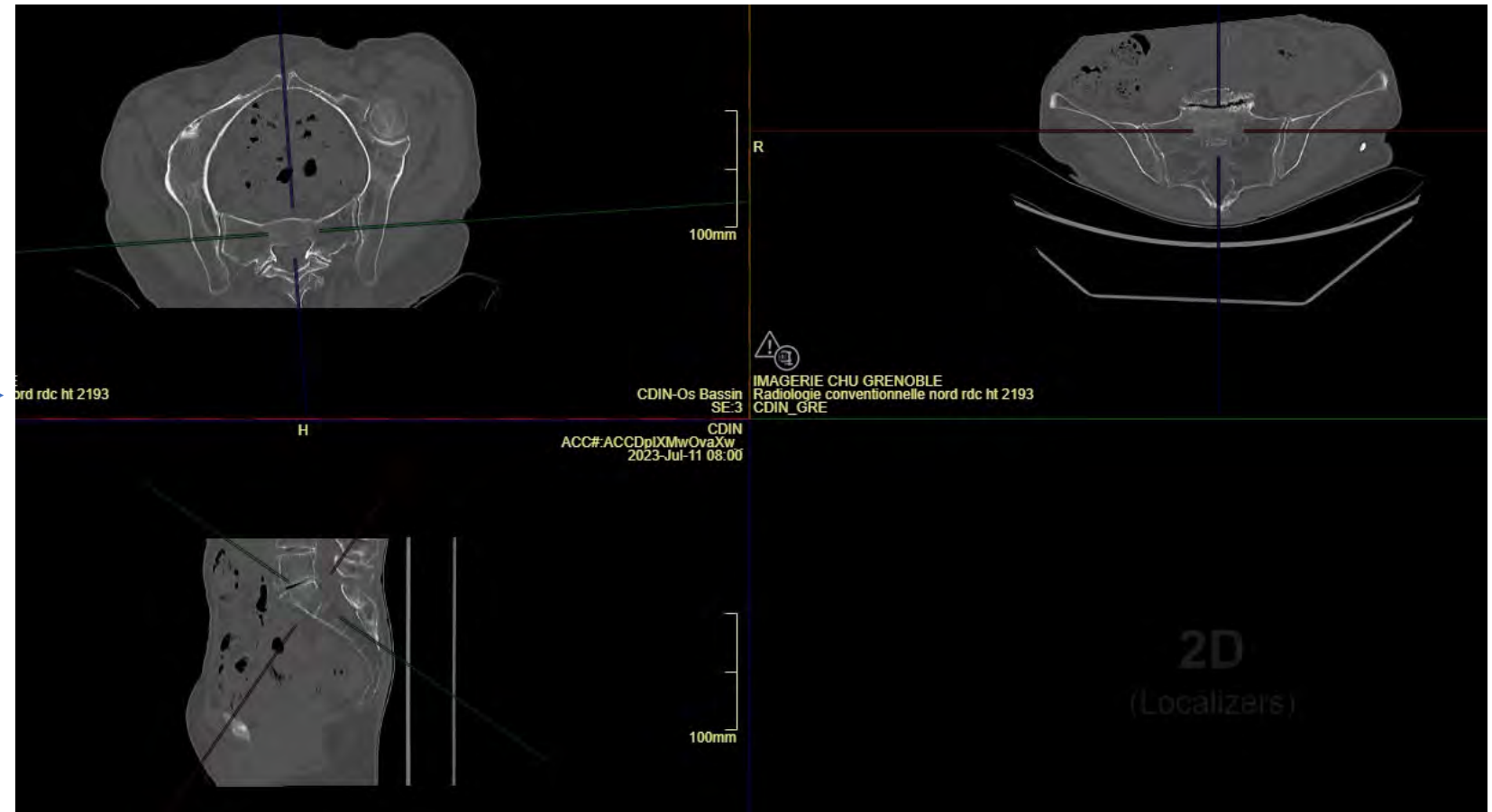


Dr Daniel Wagner

Fractures de fragilités pelviennes

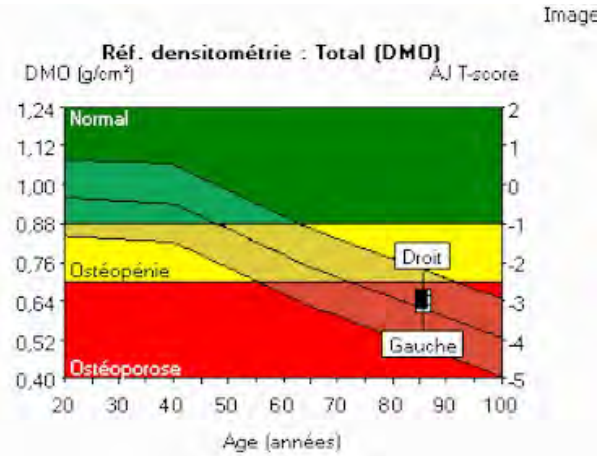
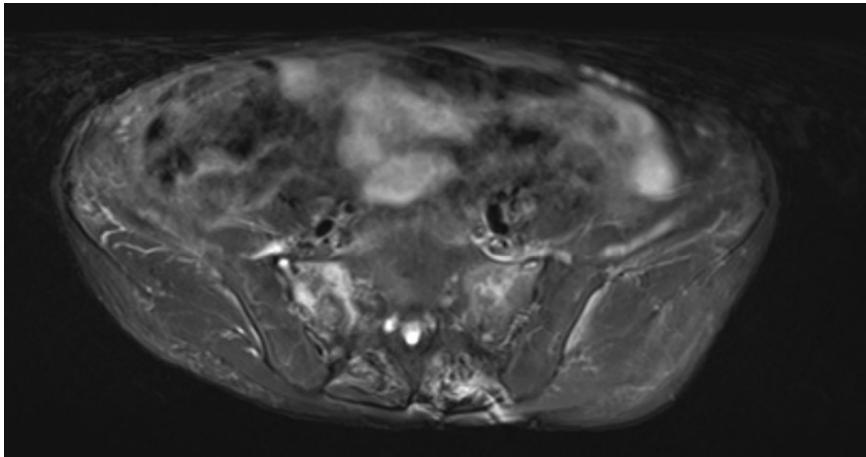


11/07/2023



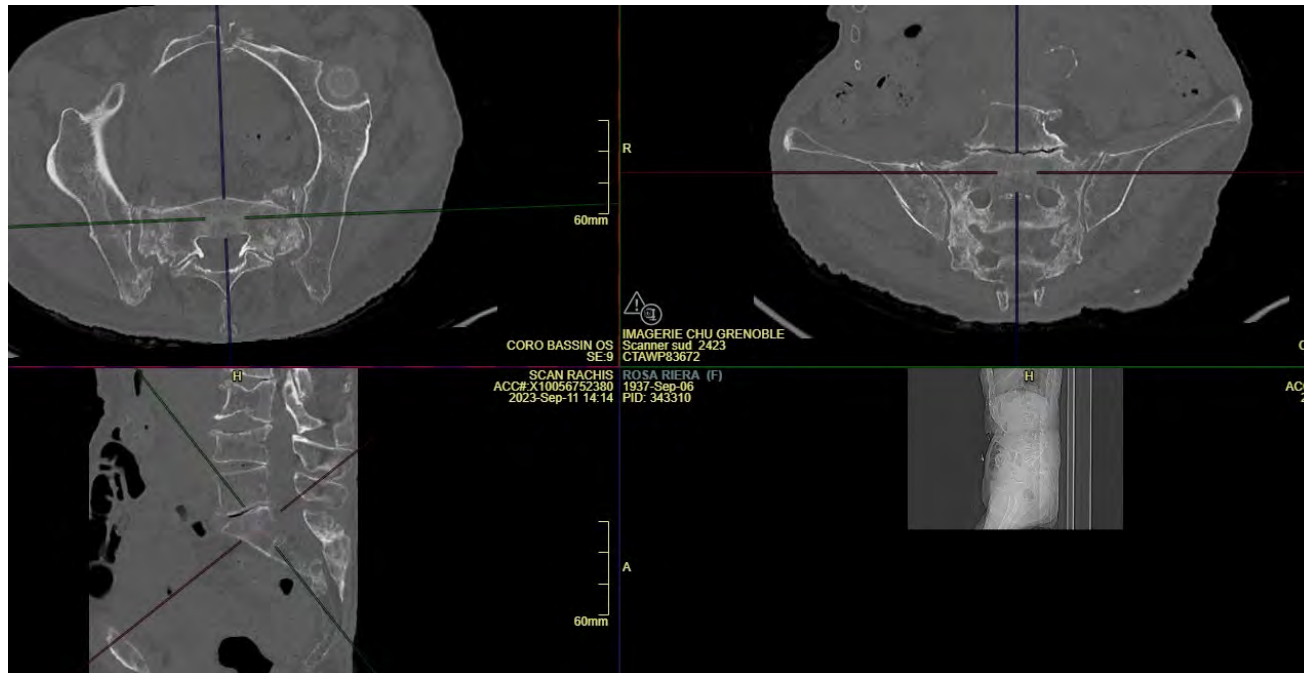
11/07/2023

Fractures de fragilités pelviennes



28/07/2023

Fractures de fragilités pelviennes

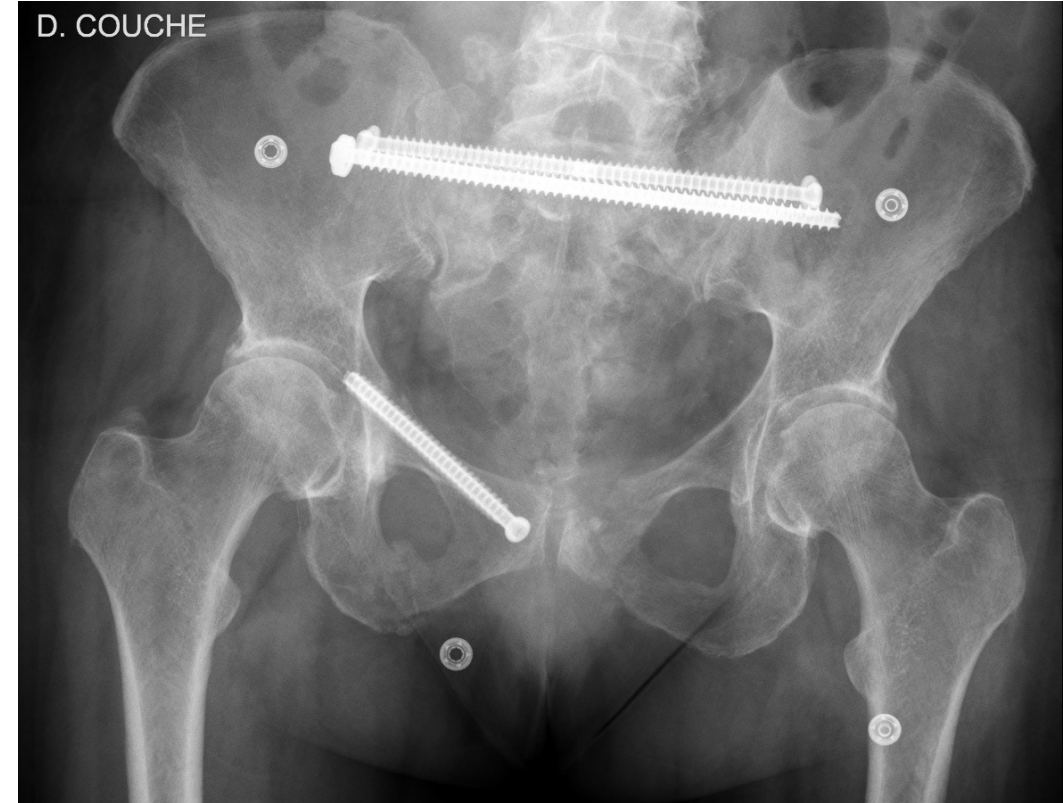


11/09/2023



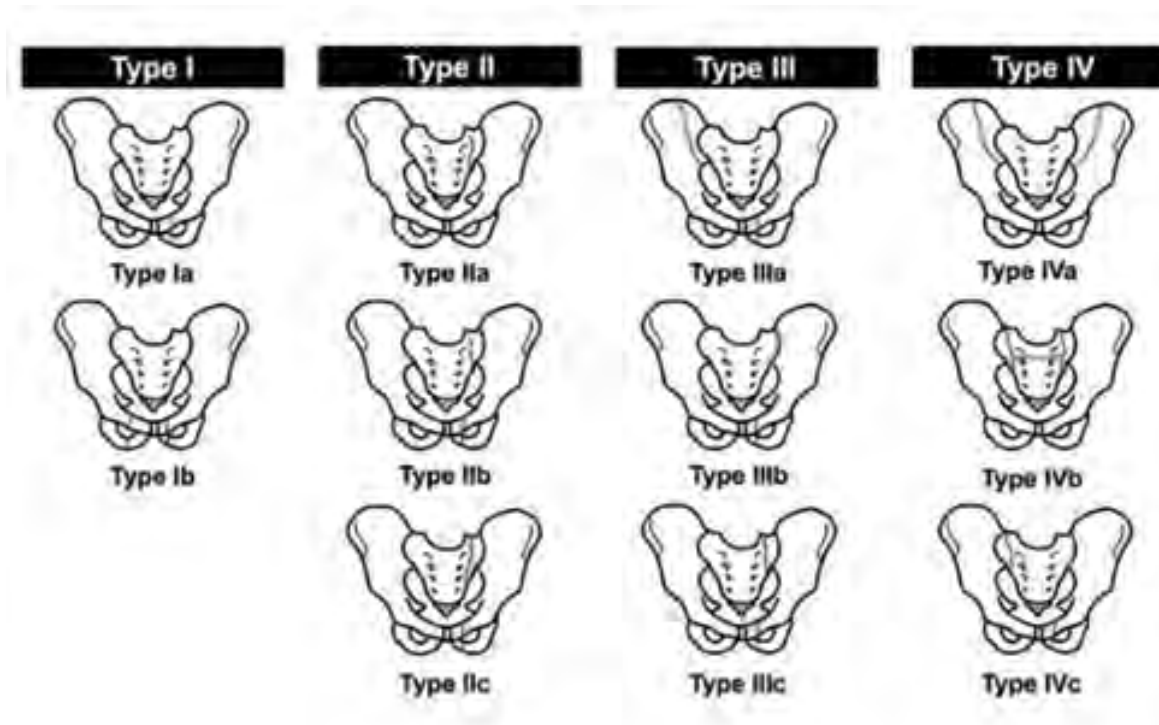
28/09/2023

Fractures de fragilités pelviennes



Fractures de fragilités pelviennes

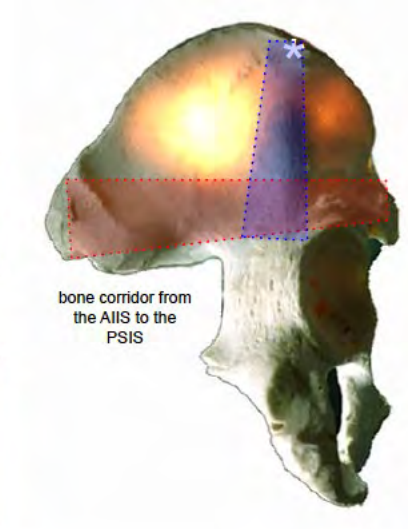
Classification de Rommens



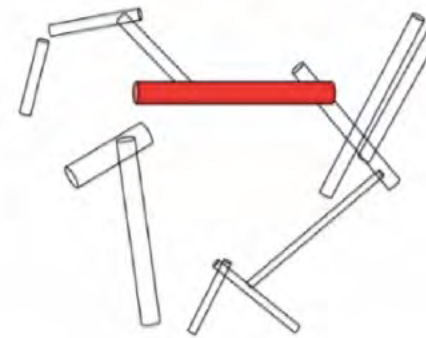
Instabilité = progression fracturaire



Ostéologie



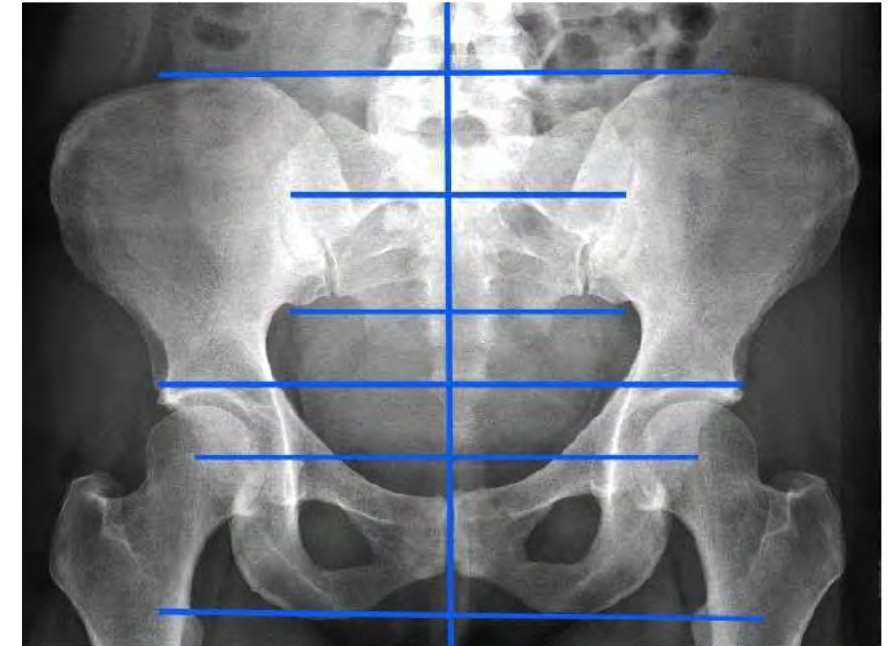
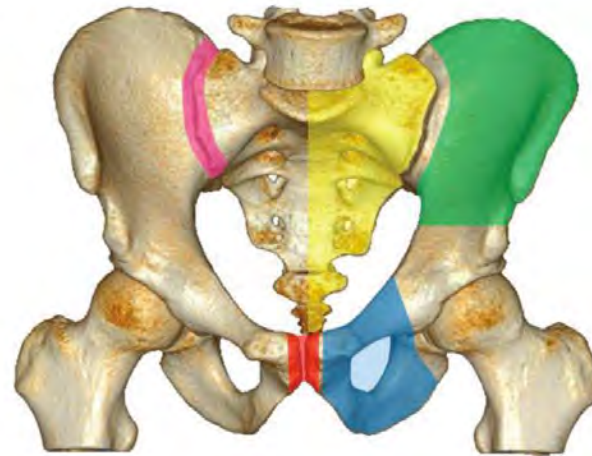
Osseus Fixation Pathways (OFP)



Ostéologie

- analyse pelvic regions according to Letournel

- symphyseal (red)
- pubic (blue)
- iliac (green)
- iliosacral (pink)
- sacral (yellow)

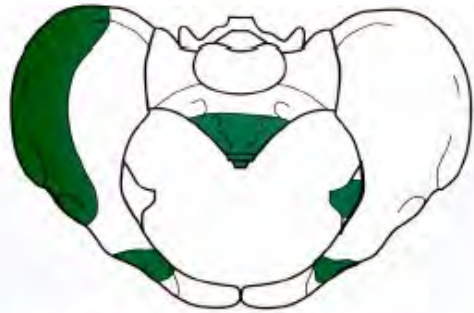


Ostéologie

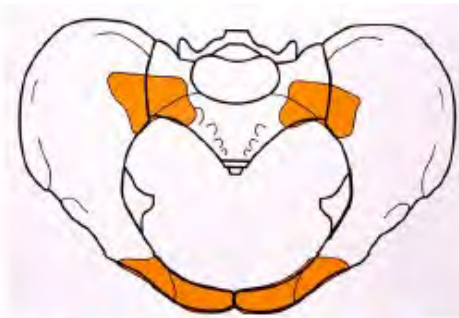
Tile Classification

OSTEOLIGAMENTOUS classification

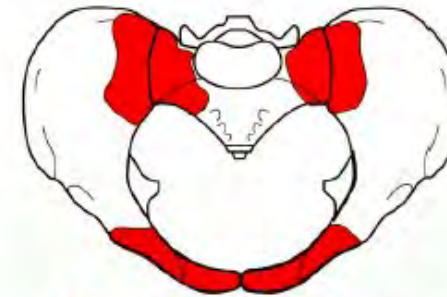
NO pelvic ring involvement posterior pelvis partially stable posterior pelvis fully unstable



A-type injury



B-type injury



C-type injury



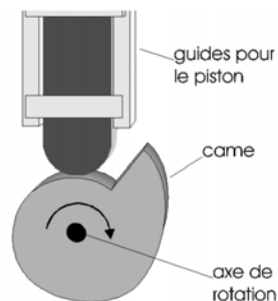
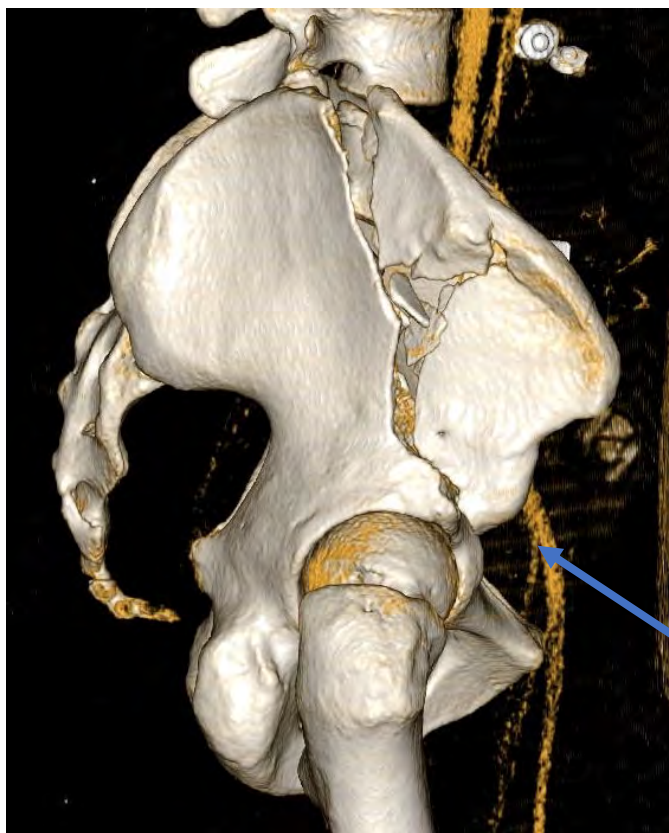
A-type injury

Stable mais pas pour autant moins grave...





Stable mais pas pour autant moins handicapant...



Reevaluation of the surgical indications for anterior inferior iliac spine avulsion fractures in an acute setting – A narrative review of the current literature

Michele Reboli^a, Alessandro Aprato^b, Jacopo Vittori^a, Matteo Olivero^a, Francesco Bosco^{a,*}, Alessandro Massè^a

^a Orthopaedic and Traumatology Department, Orthopaedic and Trauma Center, University of Turin, Italy
^b University of Turin, Italy

Table 1
AIIS classification, according to Hetsroni et al.³⁷

| AIIS type | 3D Morphology | Hip flexion | Internal rotation at 90° of hip flexion |
|-----------|--|-------------|---|
| | | mean ± SD | mean ± SD |
| I | Smooth ilium wall between AIIS most caudal part and antero-superior acetabular rim | 120° ± 12 | 21° ± 10 |
| II | AIIS prominence extends to the level of the acetabular rim | 107° ± 10 | 11° ± 9 |
| III | AIIS prominence extends distally to the acetabular rim | 93° ± 20 | 8° ± 9 |



Stable mais pas pour autant moins handicapant...

Review > [Eur Spine J.](#) 2022 Jan;31(1):176-189. doi: 10.1007/s00586-021-07041-6.

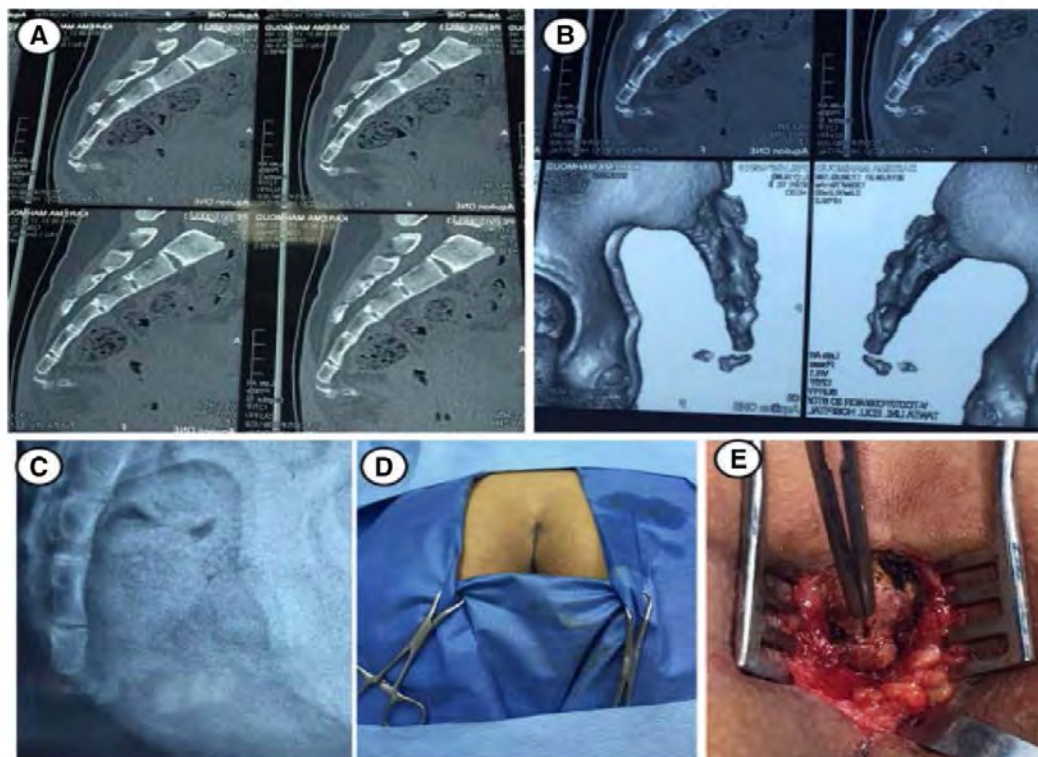
Epub 2021 Oct 25.

Coccygectomy for refractory coccygodynia: a systematic review and meta-analysis

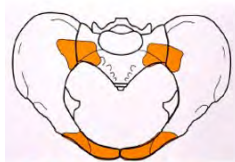
Navraj S Sagoo¹, Ali S Haider², Paolo Palmisciano³, Christopher Vannabouathong¹, Roberto Gonzalez¹, Andrew L Chen⁴, Nidhish Lokesh¹, Neha Sharma⁵, Kylan Larsen¹, Ravinderjit Singh¹, Neha Mulpuri¹, Kevin Rezzadeh⁶, Christie Caldwell¹, Lori A Tappen¹, Kevin Gill¹, Shaleen Vira⁷

Affiliations + expand

PMID: 34694498 DOI: 10.1007/s00586-021-07041-6



Ligaments



B-type injury

1^{er} verrou : symphyse

1^{er} verrou : symphyse pubienne

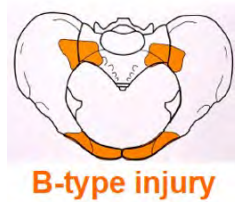
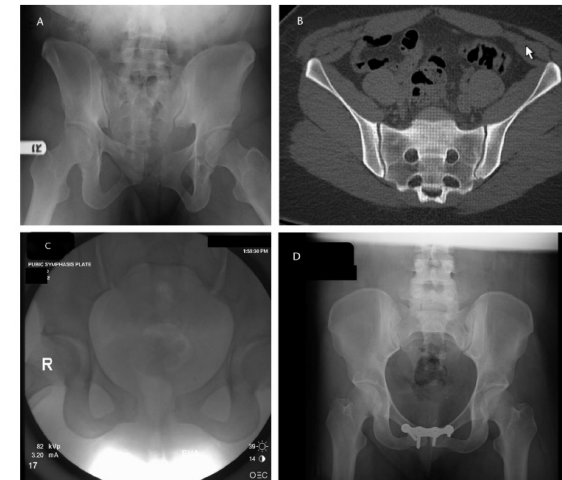


| Ligament | Stiffness k (N/mm) | N |
|--------------------------|--------------------|-----|
| Sacroiliac ligament ring | 5000 | 525 |
| Sacrospinous | 1500 | 12 |
| Sacrotuberous | 1500 | 56 |
| Iliolumbar | 1000 | 50 |
| Inguinal | 250 | 9 |
| Superior pubic | 500 | 10 |
| Arcuate pubic | 500 | 15 |

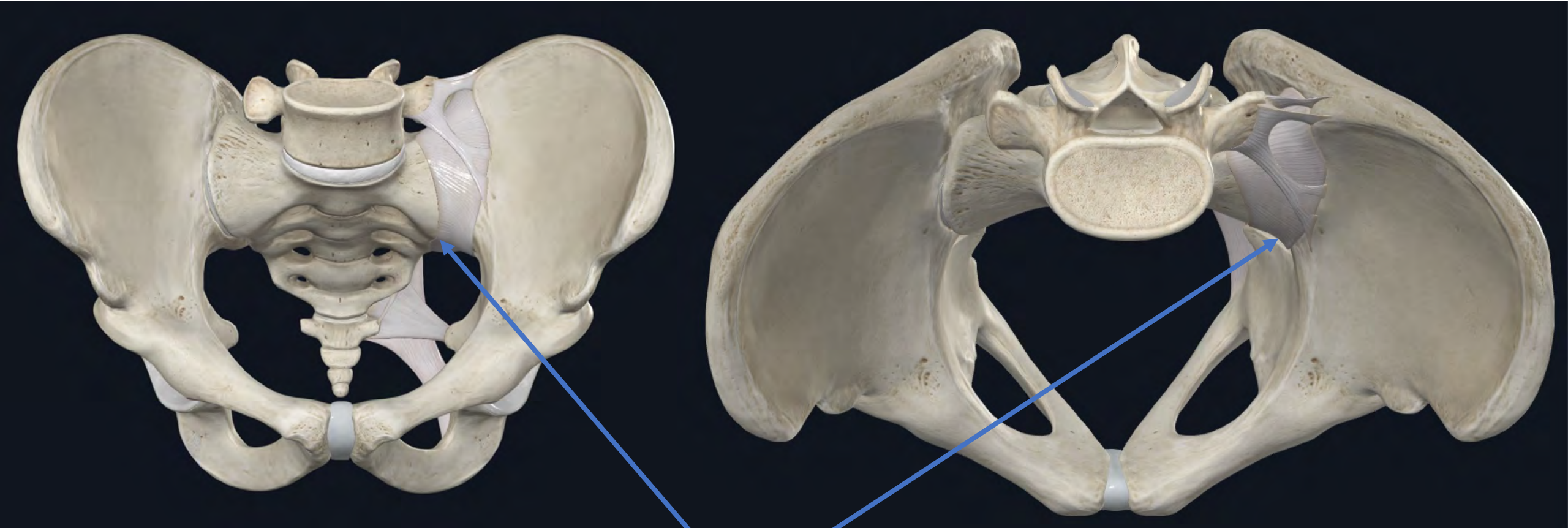
ORIGINAL ARTICLE

Examination Under Anesthetic for Occult Pelvic Ring Instability

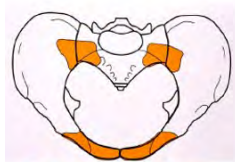
H. Claude Sagi, MD,*† Franco M. Coniglione, DO,‡ and Jason H. Stanford, MD§



Ligaments

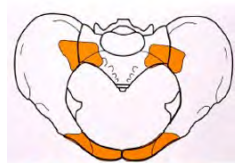
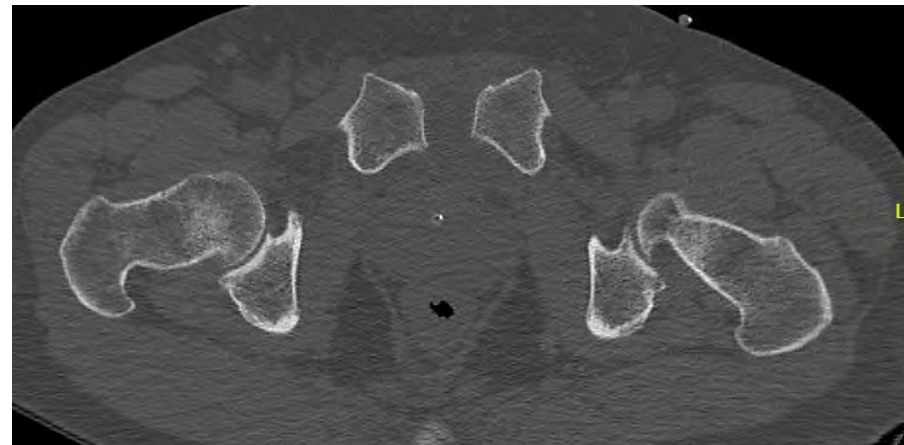
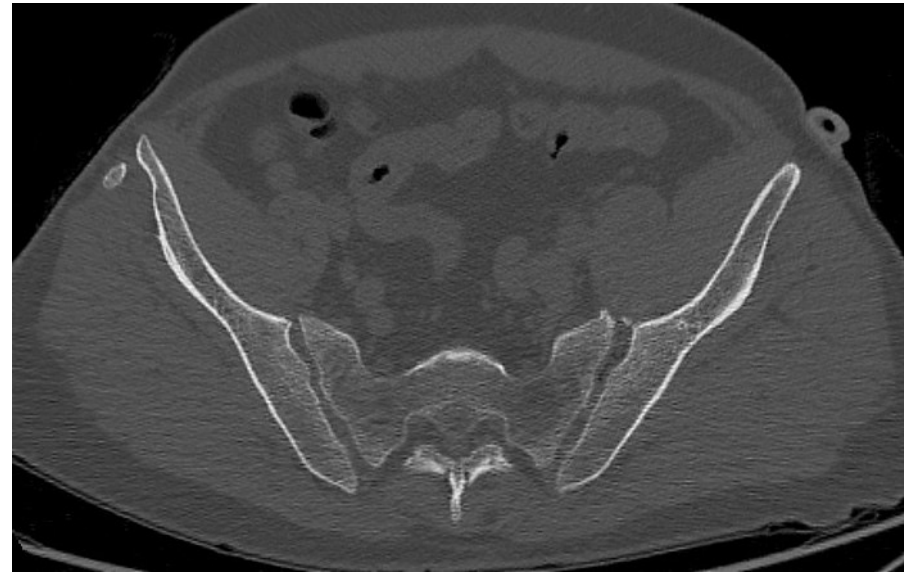


2^{ème} verrou: ligament sacro-iliaque antérieur



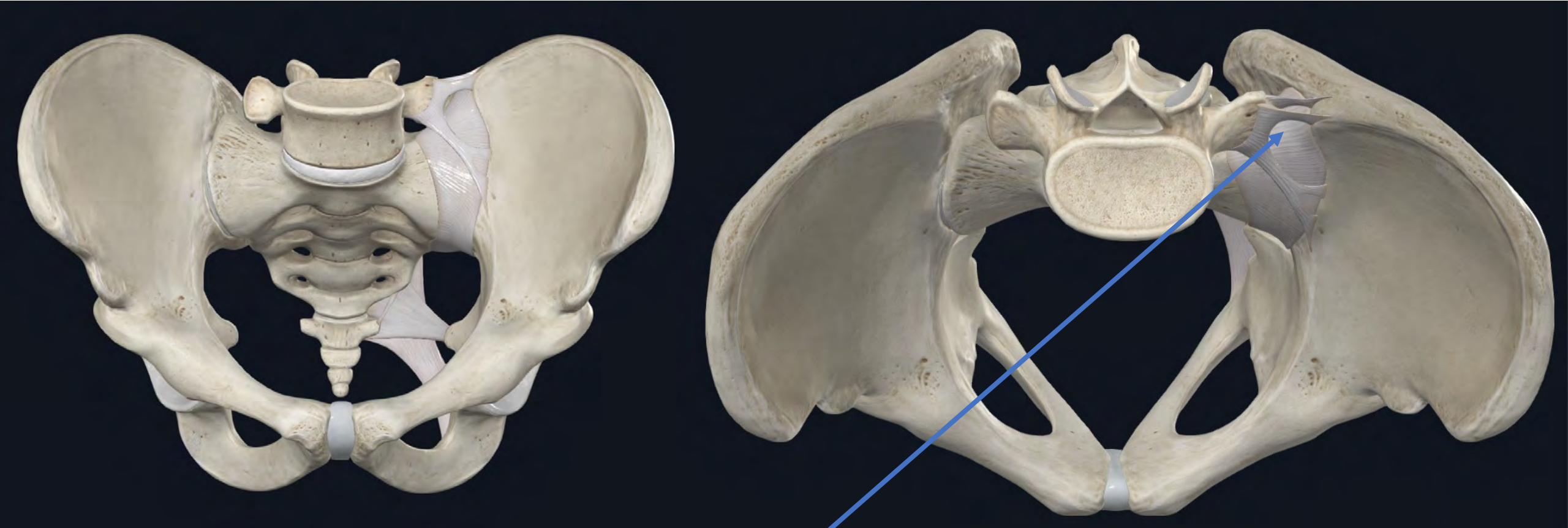
B-type injury

2^{ème} verrou: ligament sacro-iliaque antérieur



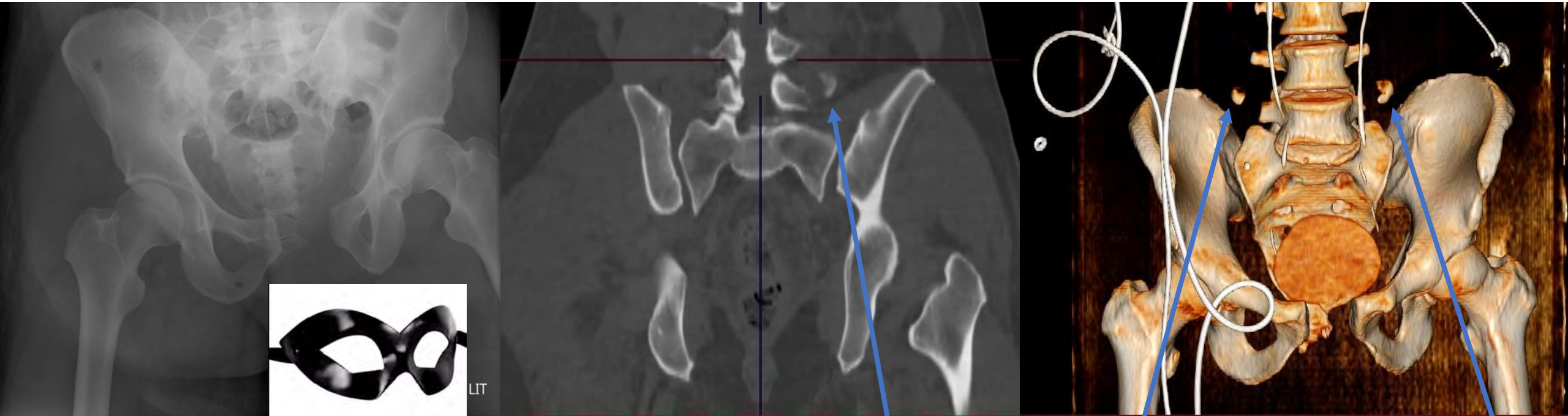
B-type injury

Ligaments



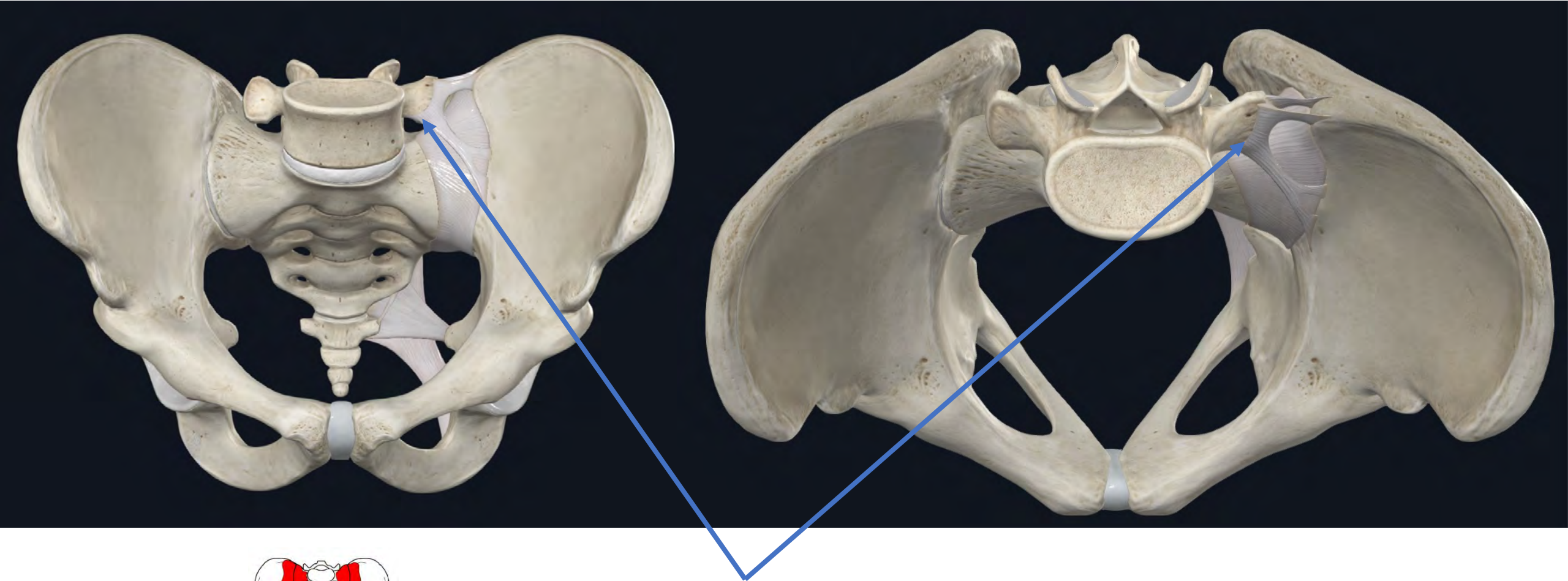
3ème verrou: ligament sacro-iliaque postérieur

3^{ème} verrou: ligament sacro-iliaque postérieur



C-type injury

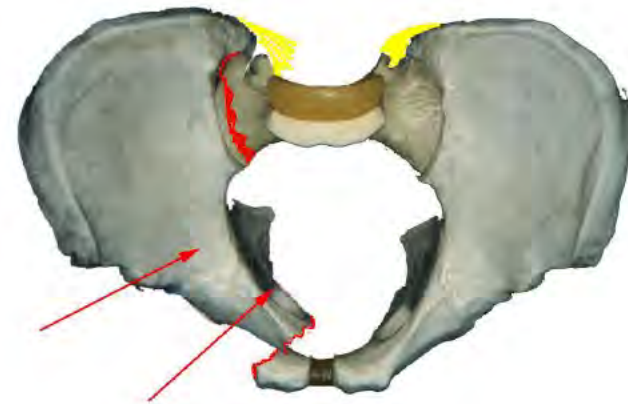
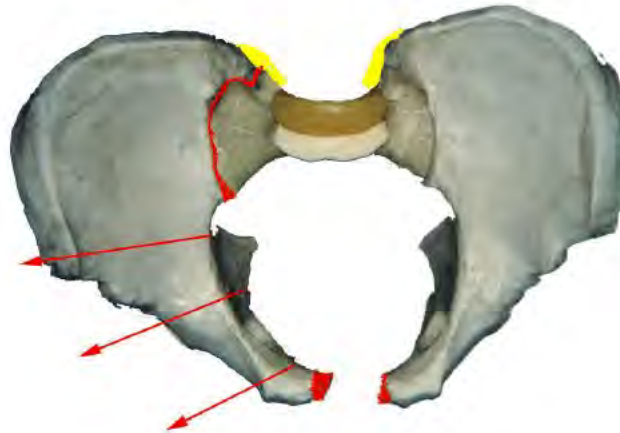
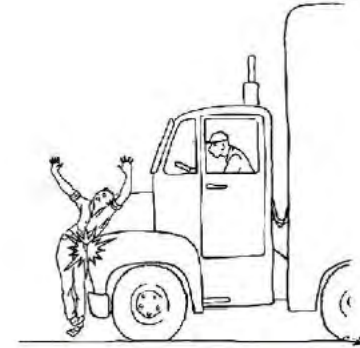
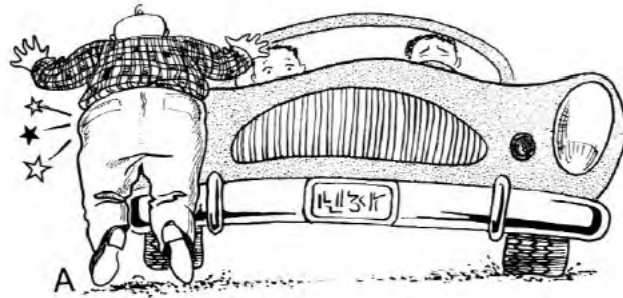
Ligaments



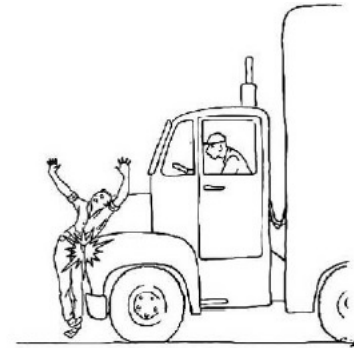
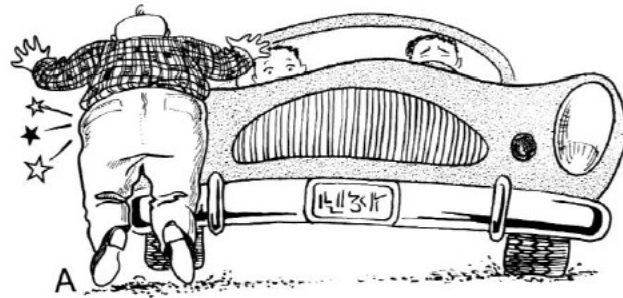
C-type injury

Lésion sentinelle: ligament ilio-lombaire

Ostéo-ligaments



Ostéo-ligaments



Ostéo-ligaments

Young-Burgess Classification

APC, external hemipelvic rotation = true pelvis volume ↑

- APC 1 no radiographic or clinical posterior instability (symphysis <2.5cm)
- APC 2 symphyseal dislocation + anterior SI joint injury; bleeding risk ↑
- APC 3 complete SI joint disruption



AO

Ostéo-ligaments

Young-Burgess Classification

LC, internal hemipelvic rotation = true pelvis volume ↓

- LC 1 posterior with minor clinical instability
- LC 2 anterior internal (medial) fracture displacement + some external rotation of the posterior Hemipelvis, incl. crescent fractures
- LC 3 ipsilateral (LC 1 or LC 2) + (sometimes) contralateral APC 2 injury



LC 1

LC 2

LC 3

AO

Ostéo-ligaments

Young-Burgess Classification

VS, vertical shear = true pelvis volume ↑

- involving one or both sides, vertically oriented fractures
- consider significant arterial injury

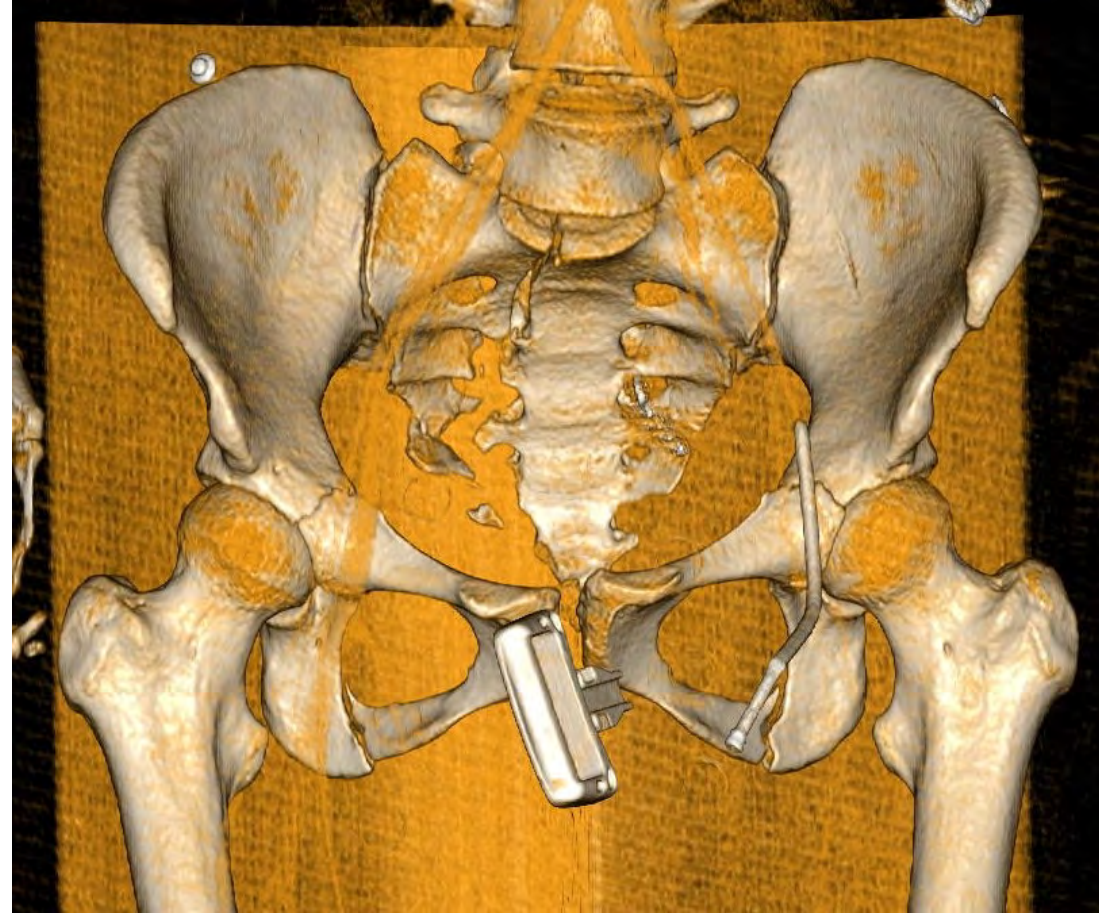
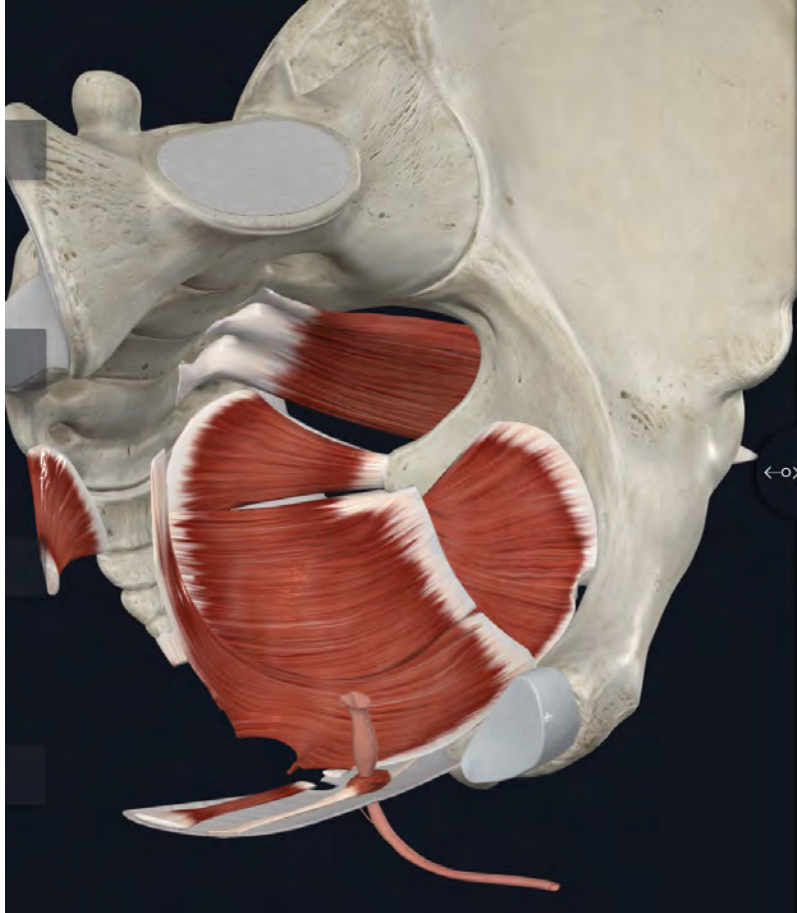
CM, combined mechanism

- at least two relevant, different injury vectors

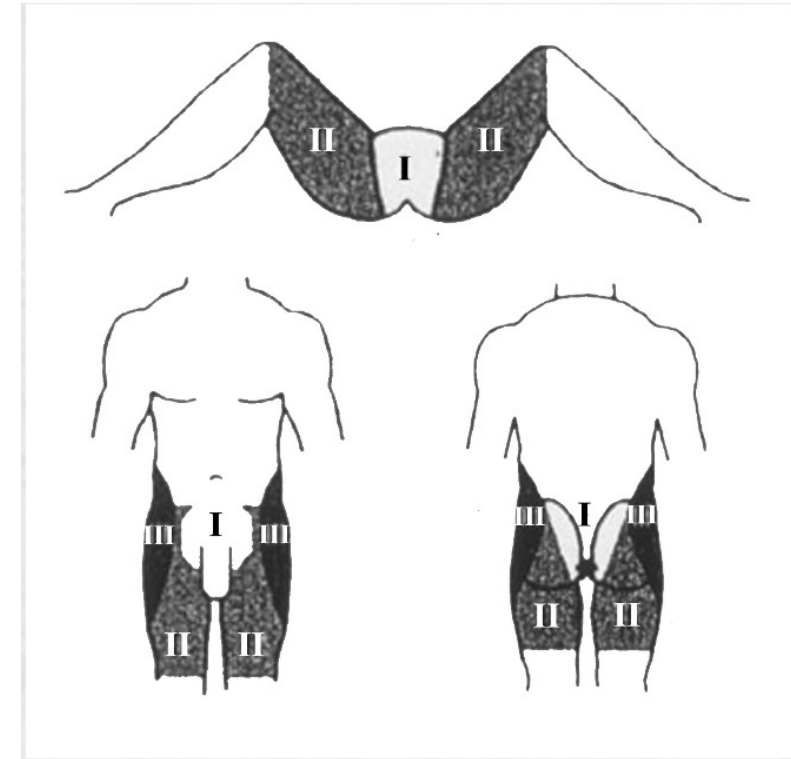


AO

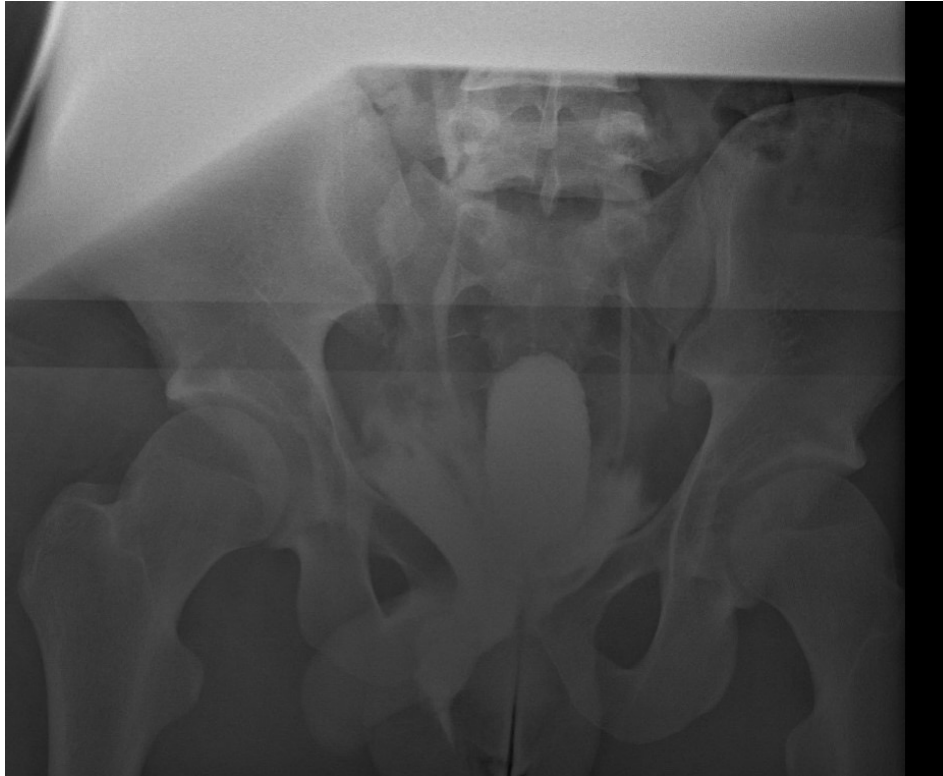
Plancher pelvien



Plancher pelvien



Plancher pelvien



Urologie-digestif

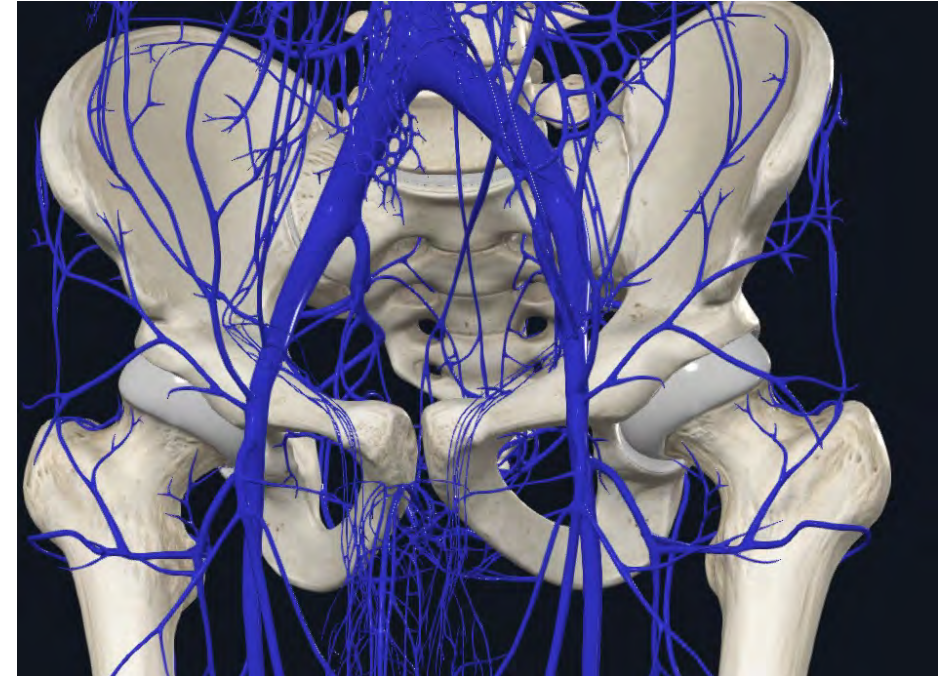
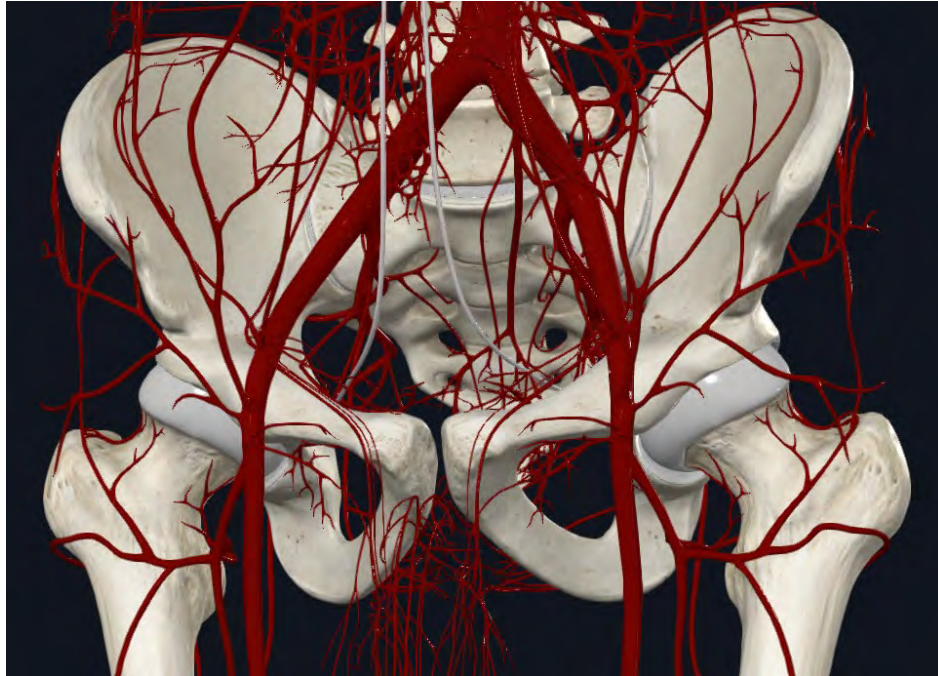


CASE REPORT
Bilateral testicular dislocation with pelvic ring fracture: A case report and literature review
M. Boudissa^{a,b,*}, S. Ruatti^{a,b}, N. Maisse^{a,b}, A. Arvin-Berod^{b,c}, B. Trilling^{b,c}, J.A. Long^{b,c}, M. Blaysat^{a,b}, J. Tonetti^{a,b}

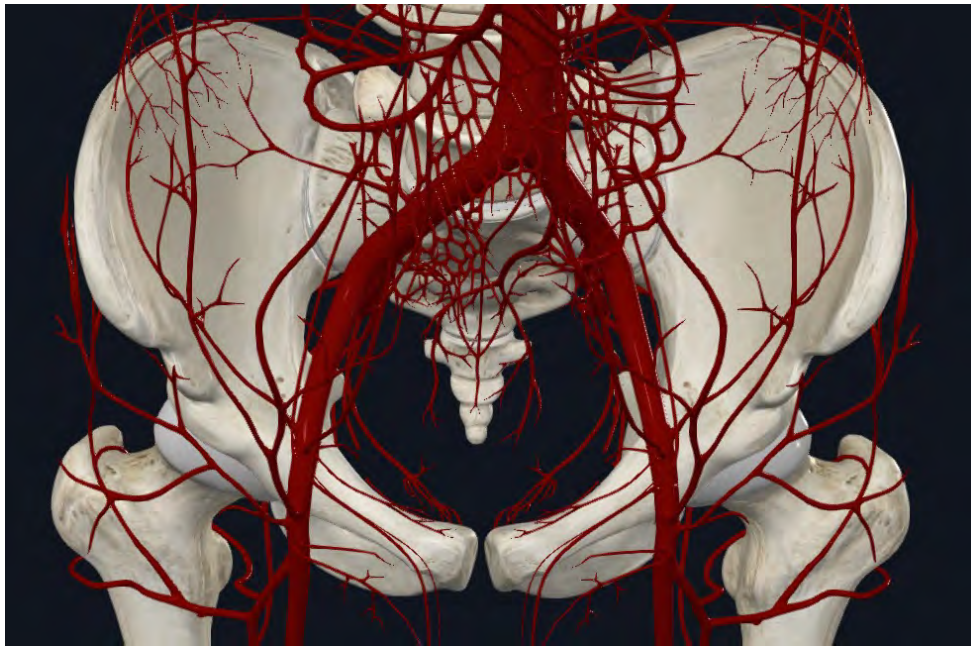
^a Orthopedic and Traumatologic Surgery Department, Grenoble University Hospitals, Northern Hospital, 38700 La Tronche, France
^b Joseph Fourier University, Grenoble, France
^c Urologic Surgery Department, Grenoble University Hospitals, Northern Hospital, 38700 La Tronche, France



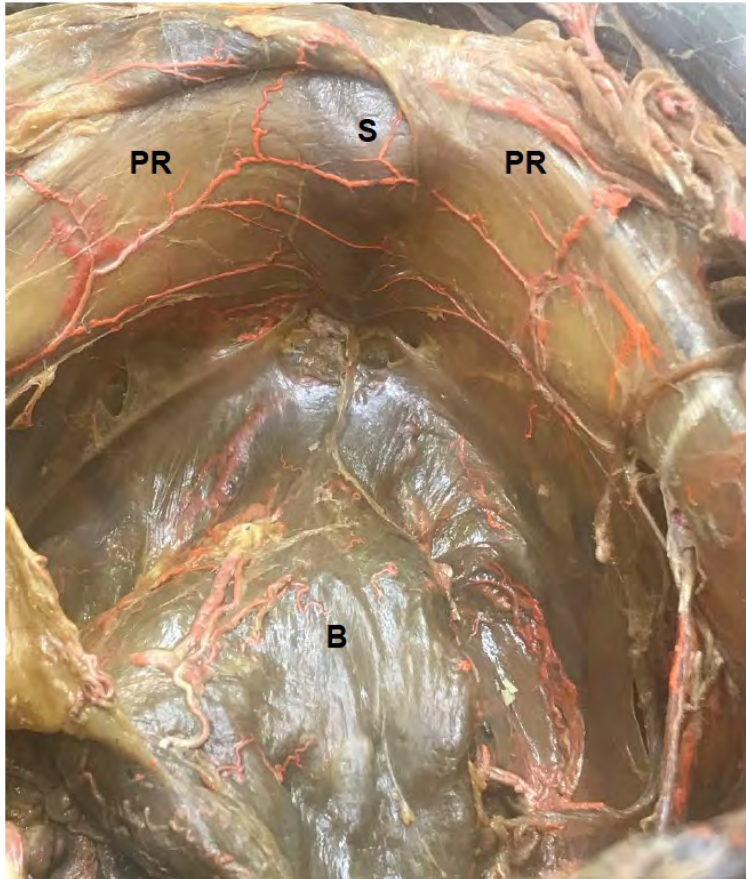
Vascularisation



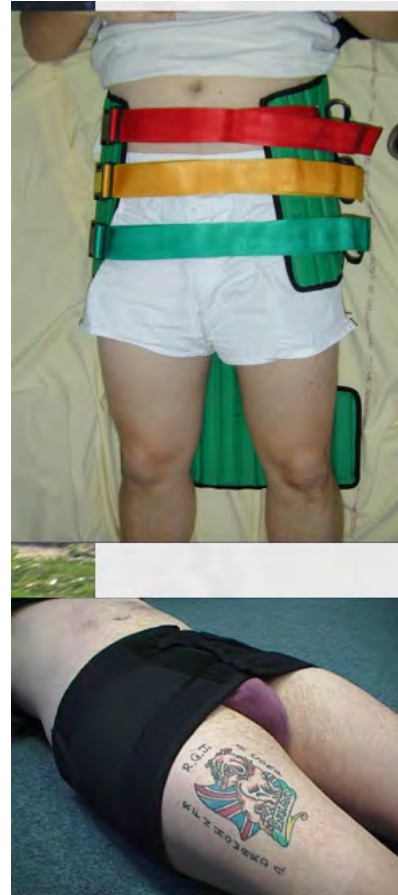
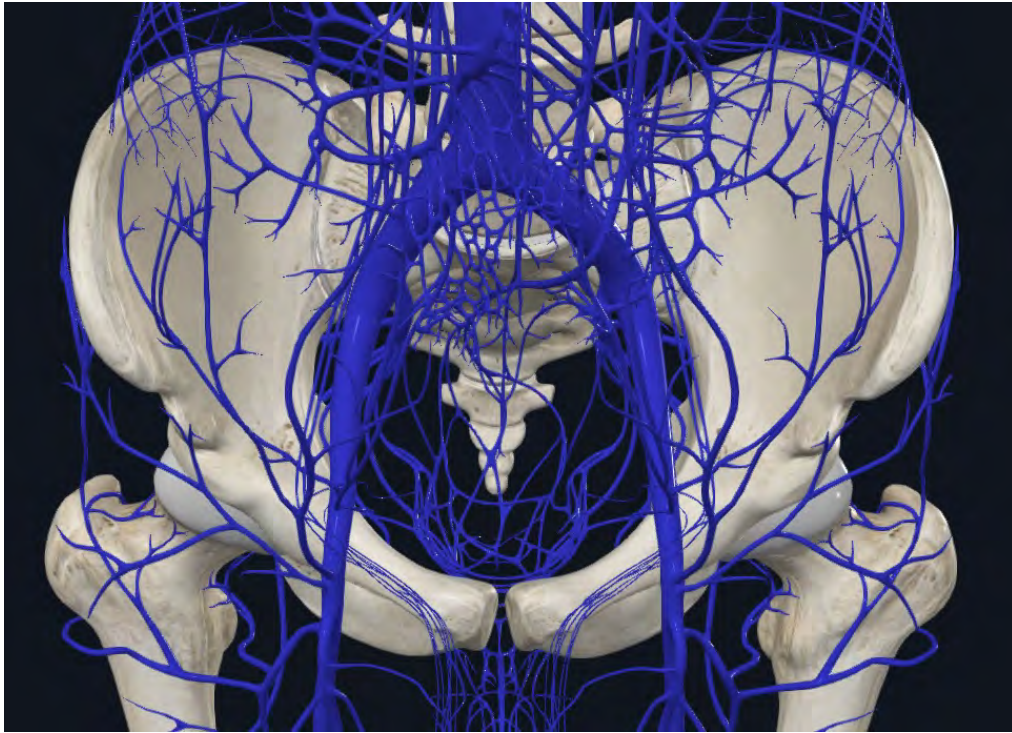
Vascularisation



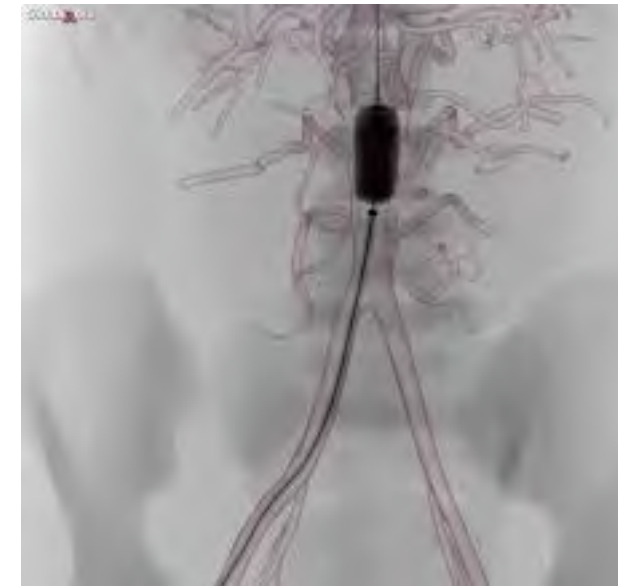
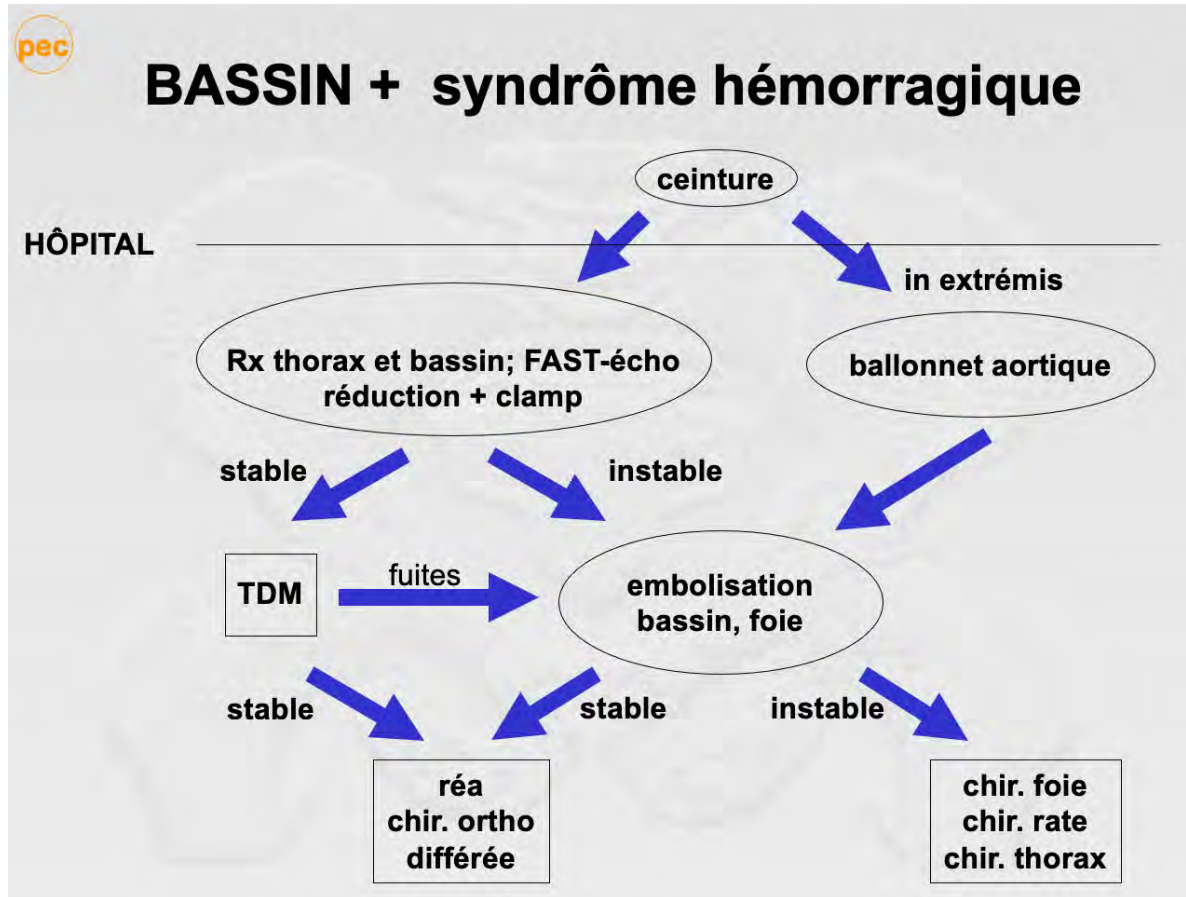
Vascularisation



Vascularisation



Vascularisation



Images Pr. Tonetti

Lésions neurologiques des fractures de l'anneau pelvien

Neurological damage in pelvic injuries: a continuous prospective series of 50 pelvic injuries treated with an iliosacral lag screw

J. Tonetti (1), C. Cazal (1), A. Eid (1), A. Badulescu (1), T. Martinez (1), H. Voualliat (1), P. Merloz (1)

Neurologie

lésions neurologiques

phase aiguë 52% , séquelles 21%

nf ischiatique S1
S2-S3
L4-L5 = tronc lombo-sacré (TLS)

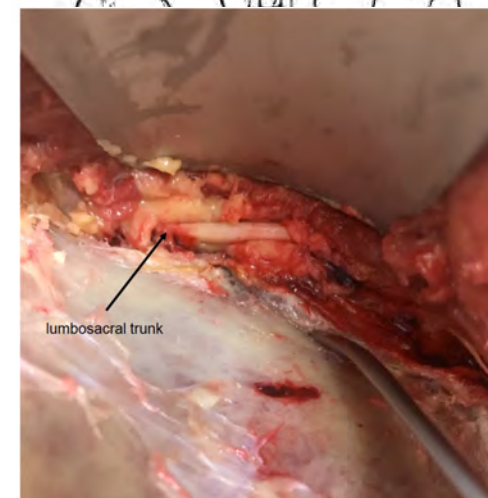
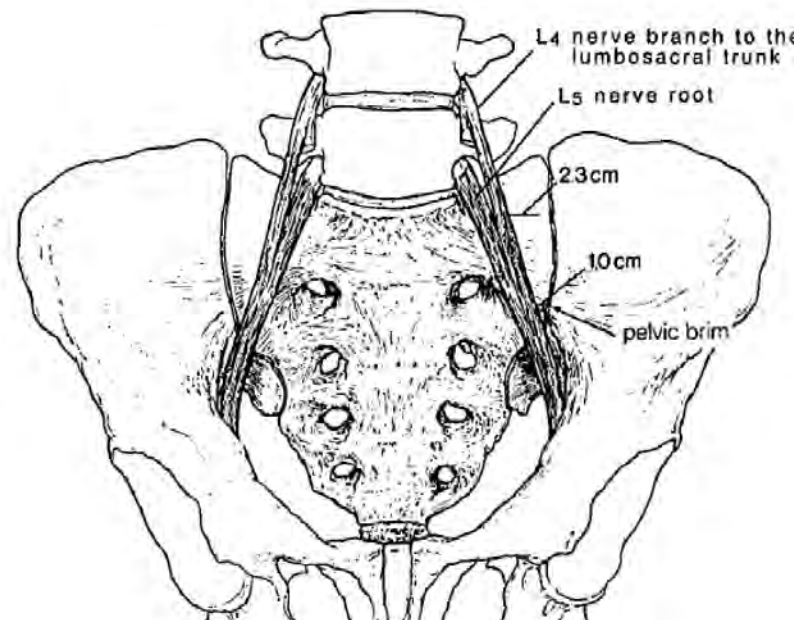
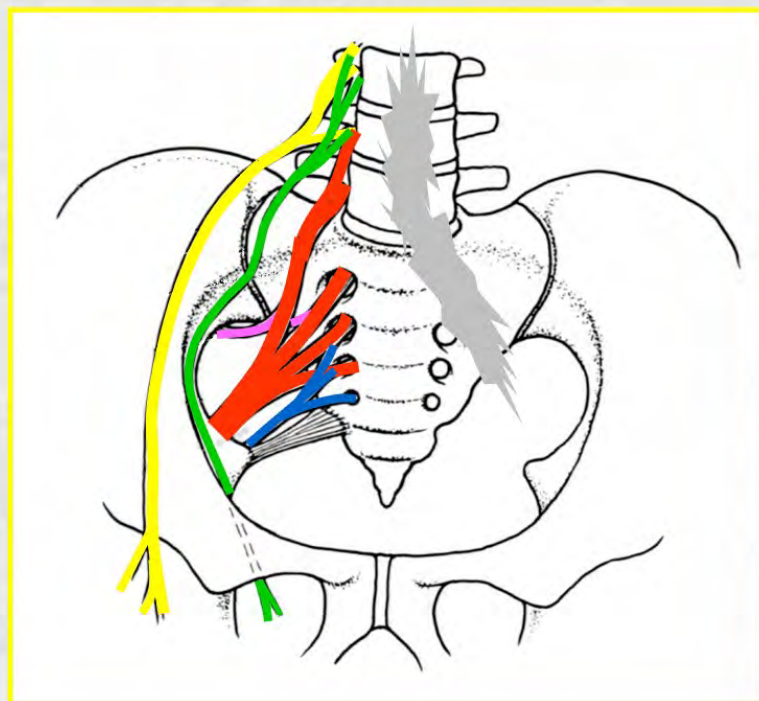
nf glutéal sup. TLS - S1

nf pudental S2 - S3 - S4

nf obturateur L2 - L3 - L4

nf fémoral L2 - L3 - L4

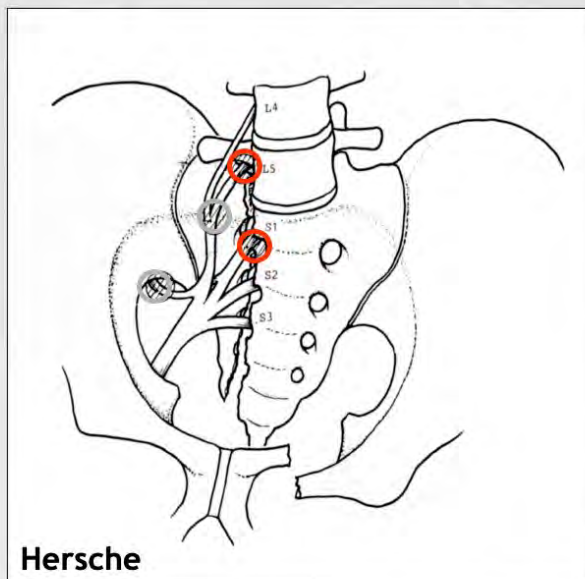
(px hypogastr. présacré)



Images Pr. Tonetti

Neurologie

lésions neurologiques



contusion

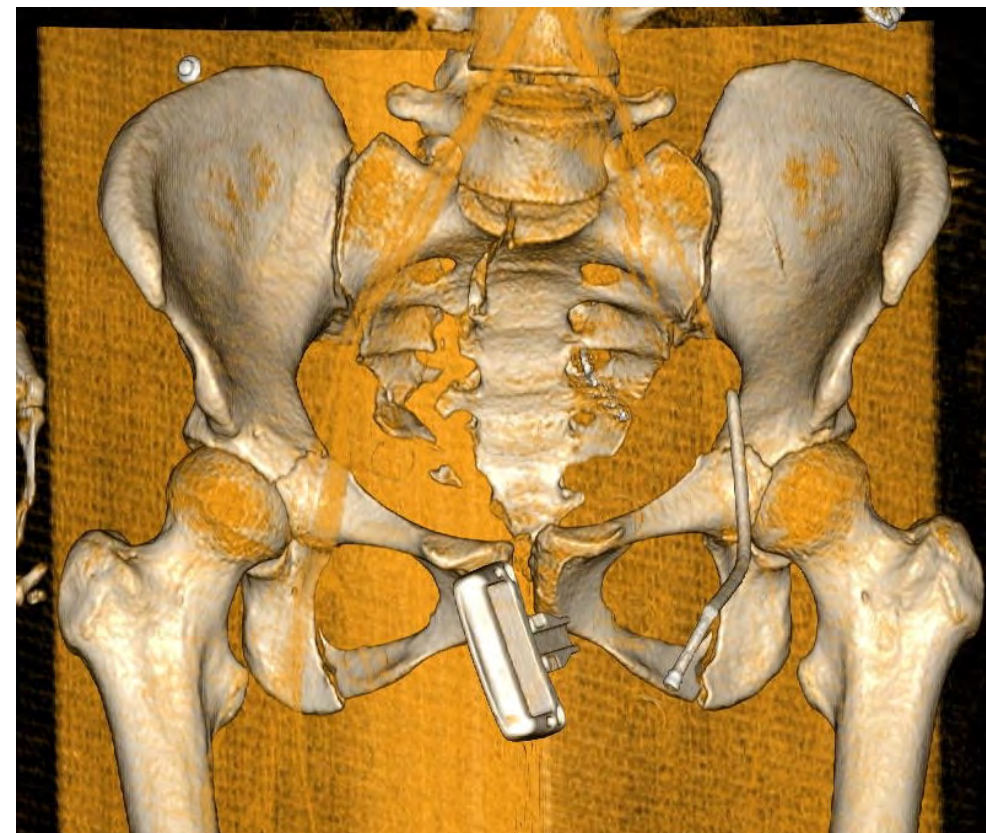
- ← sacrum
- L5, S1, S2, S3
- bon pronostic

étirement

- ← disjonction sacro-iliaque
- TLS, nf glutéal sup.
- peu de récupération

hématome compressif

- nf fémoral, plexus présacré



Images Pr. Tonetti

Neurologie

Service Orthopédie-traumatologie Michallon – CHU Grenoble
FRACTURES DU BASSIN
fiche d'examen neurologique

Date et heure : Examineur :

Lésion antérieure :

Lésion postérieure :

Dt G

| | | | |
|---------------------------|--|--|--|
| nf fémoral L2-L3-L4 | m. quadriceps /5 r ^o rotulien (+, +/-, -) cuisse antérieure (+, +/-, -) | | |
| nf obturateur L2-L3-L4 | mm. adducteurs /5 cuisse médiale (+, +/-, -) | | |
| tc lombo-sacré L4 | m. tibial antérieur /5 r ^o rotulien (+, +/-, -) jambe antérolatérale (+, +/-, -) | | |
| tc lombo-sacré L5 | m. extenseur de l'hallux /5 cheville antérolatérale et dos du pied (+, +/-, -) | | |
| nf ischiatique S1 | m. triceps sural /5 r ^o achilléen (+, +/-, -) talon et plante du pied (+, +/-, -) | | |
| nf ischiatiques S2-S3 | mm. ischio-jambiers /5 cuisse postérieure (+, +/-, -) | | |
| nf glutéal sup. L5-S1 | m. moyen fessier /5 | | |
| Nf pudendal S2-S3-S4 | sphincter anal (oui/non) r ^o bulbo-caverneux et clitorido-anal (oui/non) sensibilité S3 (+, +/-, -) sensibilité S4 péri anale (+, +/-, -) sensibilité S5 péri coccygienne (+, +/-, -) | | |
| pas présacré | dyspareunie (oui/non) éjaculation rétrograde (oui/non) dysurie – incontinence urinaire (oui/non) incontinence anale (oui/non) | | |

Commentaires :



International Orthopaedics (2021) 45:2687–2697
<https://doi.org/10.1007/s00264-021-05153-8>

REVIEW ARTICLE

Epidemiology and aetiology of male and female sexual dysfunctions related to pelvic ring injuries: a systematic review

Giuseppe Rovere¹ · Andrea Perna¹ · Luigi Meccariello² · Domenico De Mauro¹ · Alessandro Smimmo¹ · Luca Proietti¹ · Francesco Falez³ · Giulio Maccauro¹ · Francesco Liuzza¹

