CONGRESSO NAZIONALE
DELLA SOCIETÀ
ITALIANA DELL'ANCA

Società Italiana dell'Anca

COMPLICANZE: PREVENZIONE E TRATTAMENTO NELLA CHIRURGIA DELL'ANCA *DALL'ARTROSCOPIA ALLA PROTESI*

Con il Patrocinio

Monza, 23-24 Novembre 2017
Presidente Onorario: Paolo Cherubino
Presidente: Giovanni Zatti

MAIN SESSION TOPIC 6
FRATTURE PERIPROTESICHE
Moderatori: **Claudio Castelli** *(Bergamo)*, **Vincenzo Salini** *(Chieti)*

IL PROBLEMA E LA PREVENZIONE
Biagio Moretti *(Bari)*

LE FRATTURE ACETABOLARI
Guido Grappiolo *(Rozzano)*

LE FRATTURE FEMORALI
Patrizio Caldora *(Arezzo)*

UNIVERSITÀ
DEGLI STUDI DI BARI
ALDO MORO

UU.OO. ORTOPEDIA E TRAUMATOLOGIA
Direttore: Prof. B. Moretti

B. Moretti

FRATTURE PERIPROTESICHE DI ANCA

■ HIP

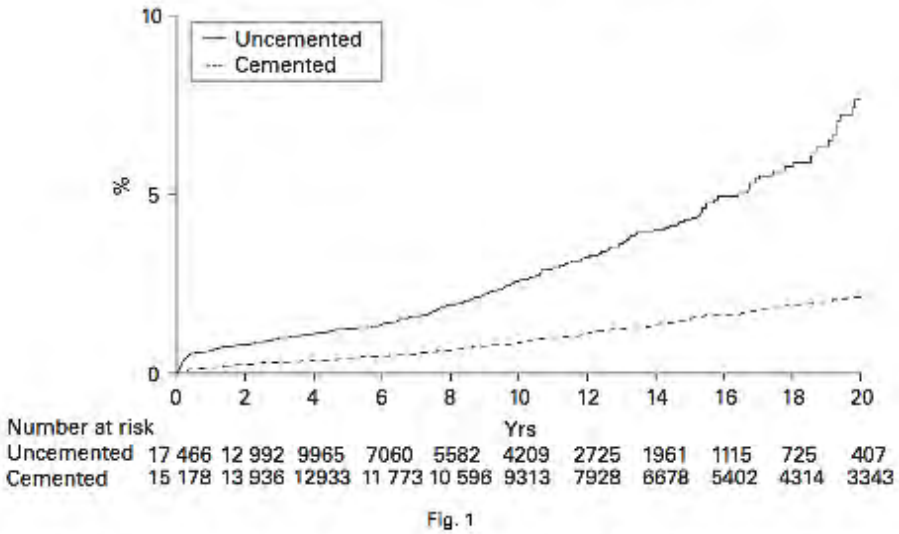
Epidemiology of periprosthetic fracture of the femur in 32 644 primary total hip arthroplasties

A 40-YEAR EXPERIENCE

2016

M. P. Abdel,
C. D. Watts,
M. T. Houdek,
D. G. Lewallen,
D. J. Berry

From Mayo Clinic, Minnesota, United States



Number at risk											
Uncemented	17 466	12 992	9965	7060	5582	4209	2725	1961	1115	725	407
Cemented	15 178	13 936	12933	11 773	10 596	9313	7928	6678	5402	4314	3343

Fig. 1

The 20-year cumulative probability of post-operative periprosthetic femoral fracture based on stem fixation

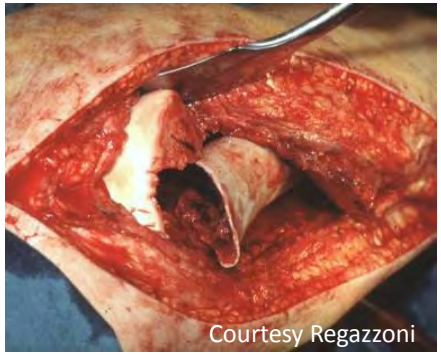
FRATTURE IN CONTINUO AUMENTO

- aumento della vita media
- incremento della richiesta di protesizzazione
- pazienti ad elevata richiesta funzionale
- (aumento del tasso di revisioni protesiche)

CRITICITA'

- **Pazienti ++ geriatrici**
- **Scarsa qualità dell'osso**
- **Modesta quantità di osso per una sintesi stabile**

CONDIZIONI MECCANICHE E BIOLOGICHE SFAVOREVOLI

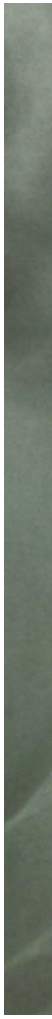


- **Precaria vascolarizzazione endostale a causa del pregresso alesaggio**
- **Presenza di una componente protesica nel canale femorale o nell'acetabolo**
- **Ev. presenza di cemento**

FRATTURE PERIPROTESICHE DI ANCA

FEMORE

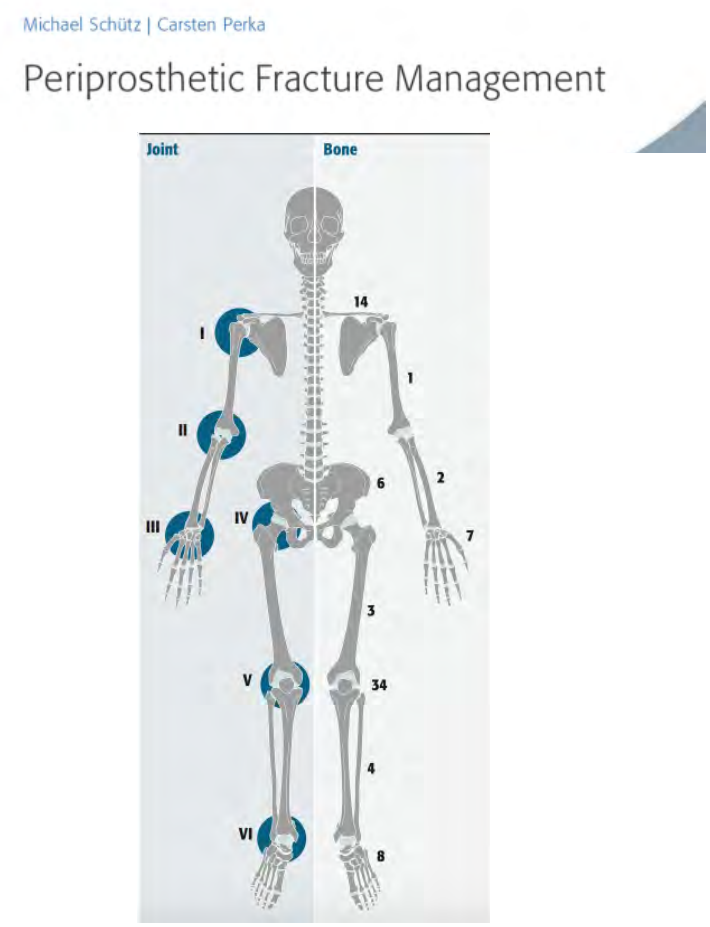
ACETABOLO



FRATTURE PERI-PROTESICHE DI ANCA

AOTRAUMA Thieme

Davos 2013



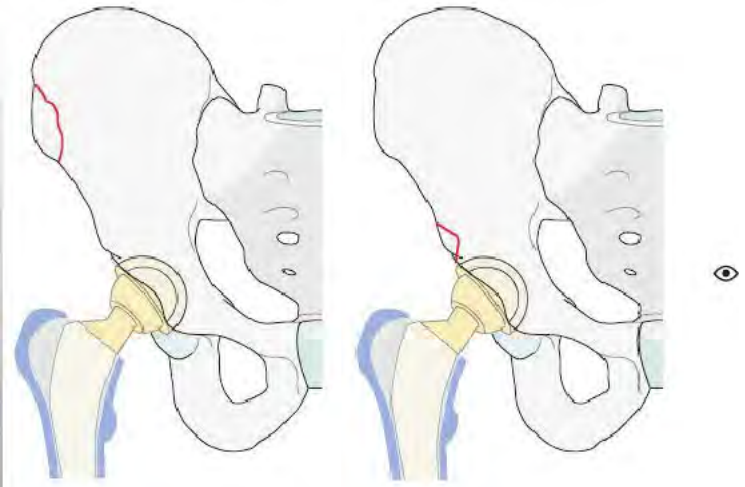
Unified Classification System (UCS)

- *Distretto anatomico descritto secondo le normali classificazioni AO (Es. Distretto 3= Femore)*

- *Articolazione indicata con numeri romani*
  - *I Spalla*
  - *II Gomito*
  - *III Polso*
  - *IV Anca*
  - *V Ginocchio*
  - *VI Caviglia*
- *Tipologia Frattura indicata con*
  - *A Apofisaria/Extrarticolare*
  - *B Letto dell'impianto o attorno*
  - *C Distante delli'impianto*
  - *D Tra due impianti*
  - *E Entrambi i distretti ossei della protesi*
  - *F In rapporto con una hemiarthroplasty*

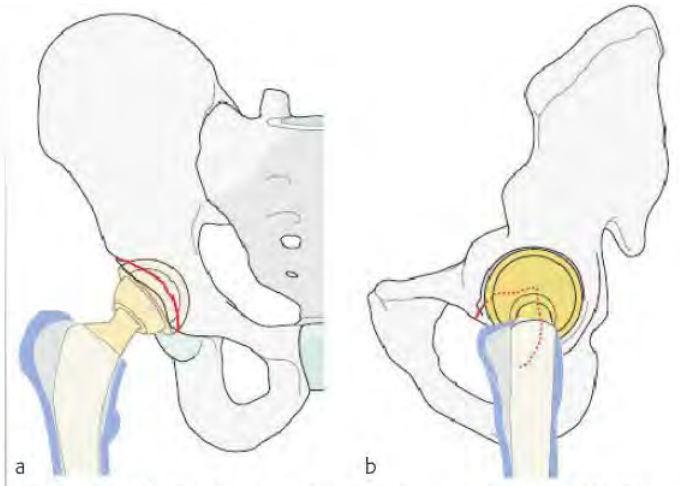
FRATTURE PERIPROTESICHE DI ACETABOLO

IV-6

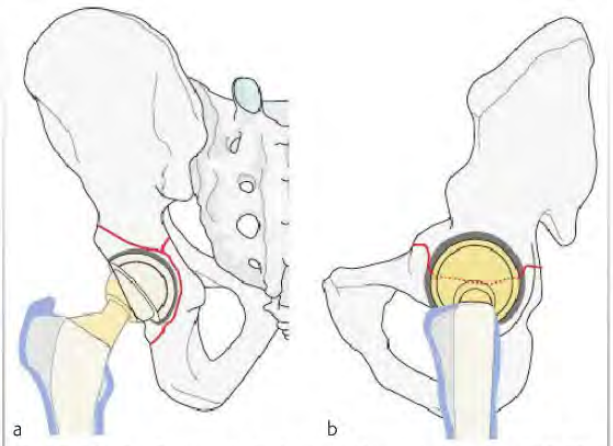


Periprosthetic fracture of anterior superior (•) and inferior (b) spine type **IV.6-A1**.

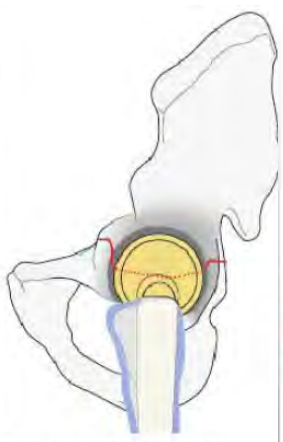
4.2-42 Periprosthetic fracture of ischial tuberosity type IV.6-A2.



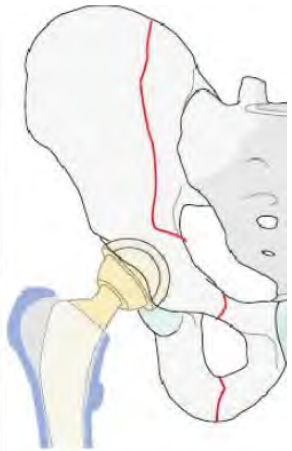
4.2-43a–b Periprosthetic fracture of acetabulum type IV.6-B1.
a Rim.
b Floor.



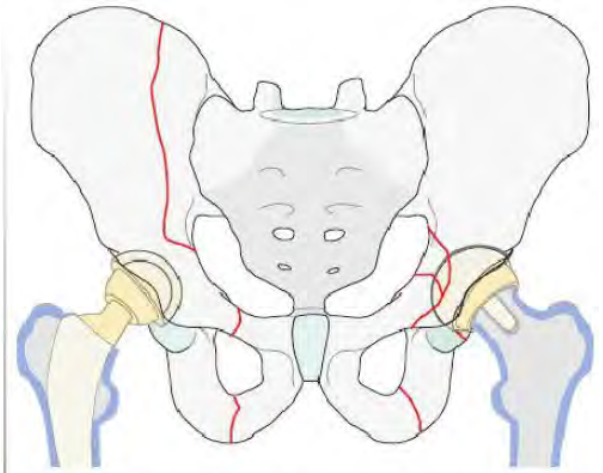
4.2-44a–b Periprosthetic fracture of acetabulum type IV.6-B2.
a AP view.
b Lateral view.



4.2-46 Periprosthetic fracture of acetabulum/pelvic discontinuity type IV.6-B3.



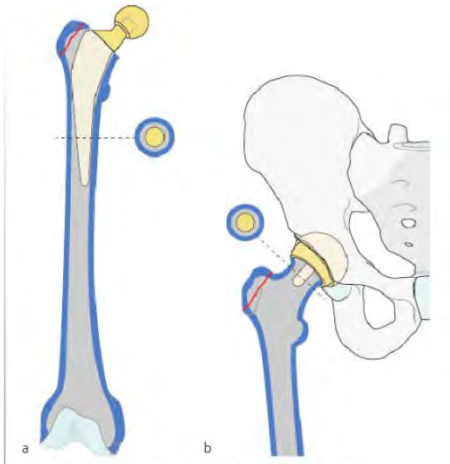
4.2-51 Periprosthetic fracture type IV.6-C.



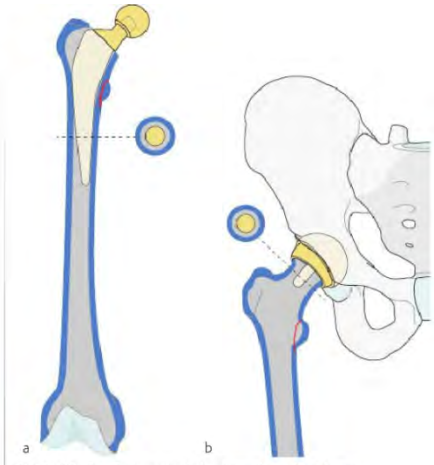
4.2-53 Periprosthetic fractures of pelvis type IV.6-D.

FRATTURE PERIPROTESICHE DI FEMORE

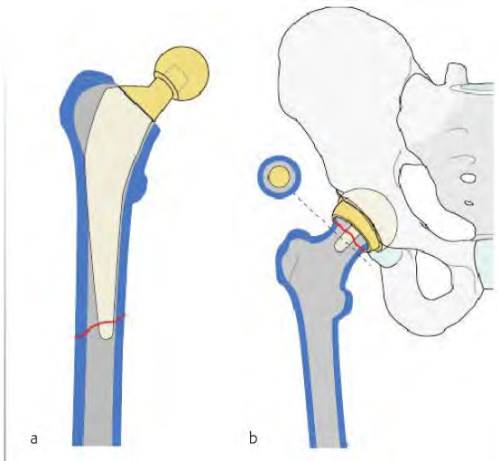
IV-3



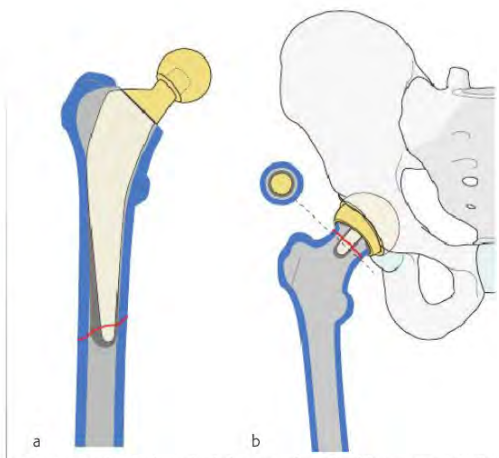
4.2-56a–b Periprosthetic fracture of proximal femur, type IV.3-A1 greater tuberosity.
a After THA.
b After surface replacement.



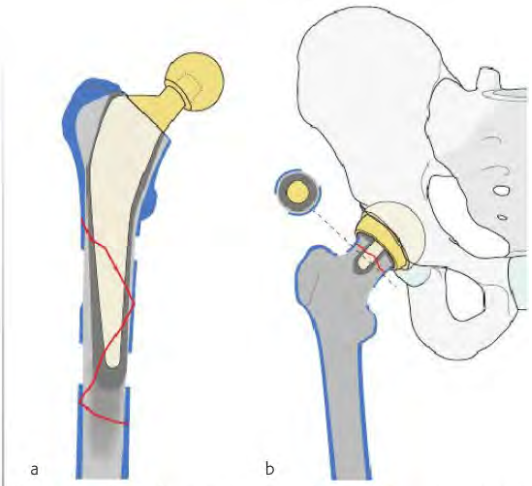
4.2-57a–b Periprosthetic fracture of proximal femur type IV.3-A2 lesser tuberosity.
a After THA.
b After surface replacement.



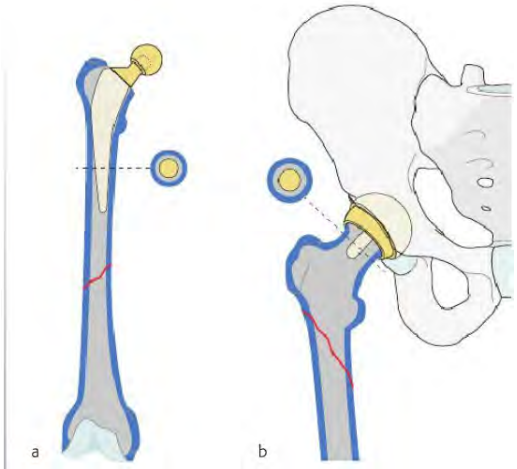
4.2-59a–b Periprosthetic fracture of proximal femur type IV.3-B1.
a After THA.
b After surface replacement.



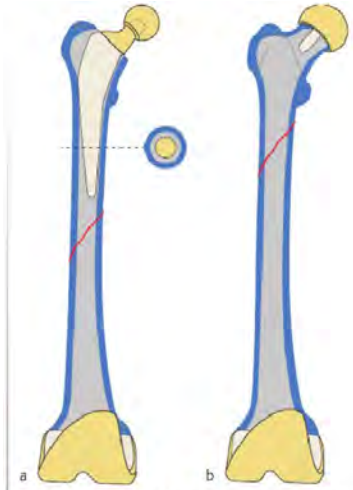
4.2-60a–b Periprosthetic fracture of proximal femur type IV.3-B2.
a After THA.
b After surface replacement.



4.2-61a–b Periprosthetic fracture of proximal femur type IV.3-B3.
a After THA.
b After surface replacement.



4.2-63a–b Periprosthetic fracture of proximal femur type IV.3-C.
a After THA.
b After surface replacement.



4.2-65a–b Intercalary periprosthetic fracture of proximal femur type IV.3-D.
a THA and TKA.

4.2-8 Type E fracture involving both sides of a hip replacement, with a periprosthetic fracture of the acetabulum and femur. Separate analyses reveal a type B3 fracture of the acetabulum and B2 fracture of the femur.

FRATTURE PERIPROTESICHE DI ANCA

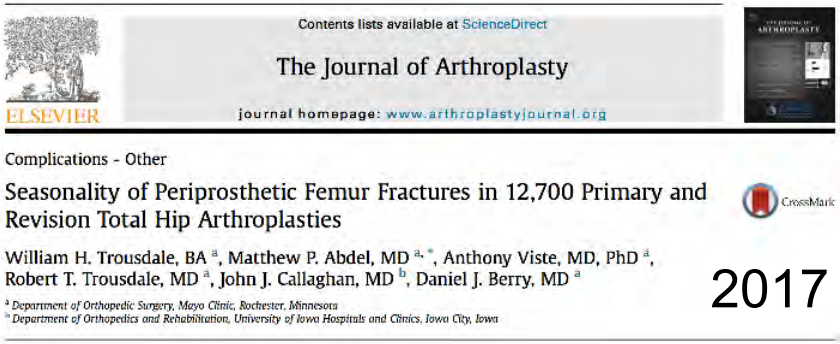
Timing

In relazione all'intervento di sostituzione protesica

INTRA-OPERATORIE → *Durante l'impianto*

POST-OPERATORIE → *PRECOCI: entro 6 mesi dall'intervento*

TARDIVE: dopo 6 mesi dall'intervent



Contents lists available at ScienceDirect

The Journal of Arthroplasty

journal homepage: www.arthroplastyjournal.org

ELSEVIER

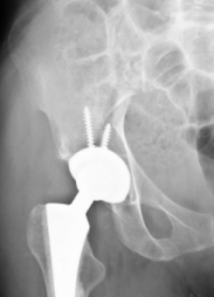
Complications - Other

Seasonality of Periprosthetic Femur Fractures in 12,700 Primary and Revision Total Hip Arthroplasties

William H. Trousdale, BA [a], Matthew P. Abdel, MD [a,*], Anthony Viste, MD, PhD [a], Robert T. Trousdale, MD [a], John J. Callaghan, MD [b], Daniel J. Berry, MD [a]

[a] Department of Orthopedic Surgery, Mayo Clinic, Rochester, Minnesota
[b] Department of Orthopedics and Rehabilitation, University of Iowa Hospitals and Clinics, Iowa City, Iowa

2017



FRATTURE PERIPROTESICHE DI ACETABOLO

EPIDEMIOLOGIA: fratture rare

J Bone Joint Surg Am. 1996 Aug;78(8):1206-13.

Periprosthetic fracture of the acetabulum after total hip arthroplasty.

Peterson CA[1], Lewallen DG.

INTRA-OPERATORIE:

CEMENTATE ***0.02%*** ***(32 : 1625)***

NON CEMENTATE ***0.06%*** ***(1 : 1490)***

PRIMO IMPIANTO ***1.07%*** ***(25 : 1625)***

REVISIONE ***1.62%*** ***(5 : 308)***

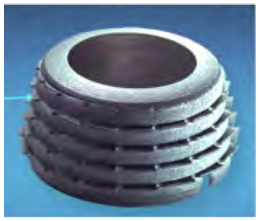
POST-OPERATORIE:

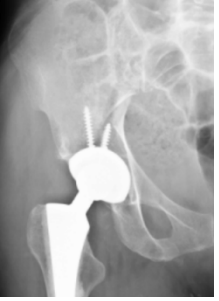
CEMENTATE ***57%***

NON CEMENTATE ***43%***

PRIMO IMPIANTO ***0.9%*** ***(31 : 3105)***

REVISIONE ***3.8%*** ***(12 : 308)***





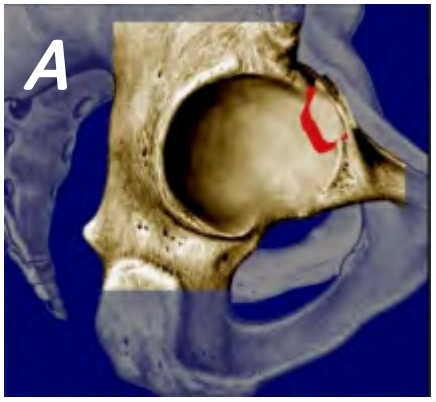
FRATTURE PERIPROTESICHE DI ACETABOLO

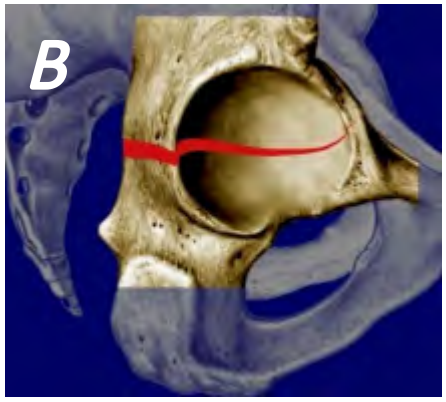
CLASSIFICAZIONE

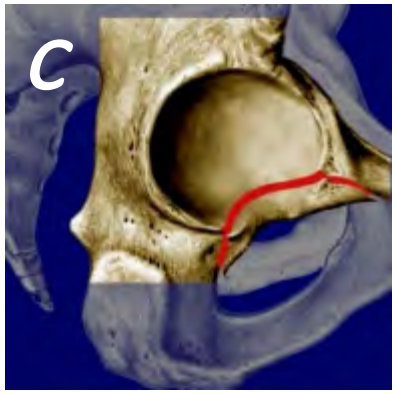
FRATTURE INTRA-OPERATORIE

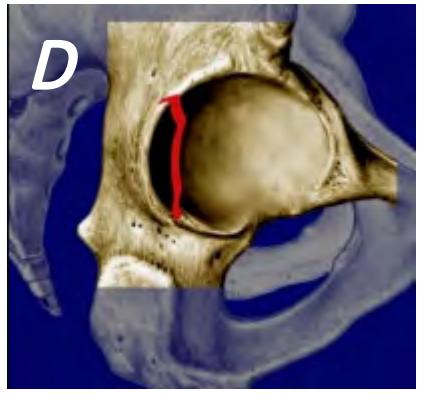
(CALLAGAN J.J. 1995)

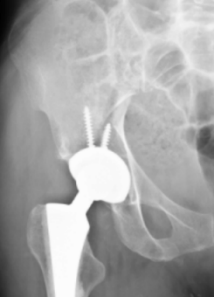
- *A PARETE ANTERIORE*
- *B TRASVERSA*
- *C PAVIMENTO INFERIORE*
- *D PARETE O COLONNA POSTERIORE*











FRATTURE PERIPROTESICHE DI ACETABOLO

CLASSIFICAZIONE

FRATTURE POST-OPERATORIE

Periprosthetic Fracture of the Acetabulum after Total Hip Arthroplasty

CHARLES A. PETERSON II and DAVID G. LEWALLEN
J Bone Joint Surg Am. 1996;78:1206-13.

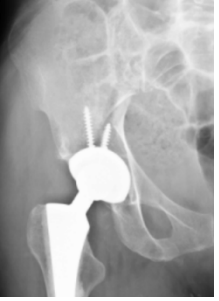
PETERSON II. 1996

TIPO 1 ***FRATTURA CON ACETABOLO STABILE*** ***(clinico e radiografi***

TIPO 2 ***FRATTURA CON ACETABOLO INSTABILE***

- ***disgiunzione pelvica (pz con grave osteolisi)***

- ***frattura trasversa***



FRATTURE PERIPROTESICHE DI ACETABOLO

CLASSIFICAZIONE

FRATTURE POST-OPERATORIE

Periprosthetic Fracture of the Acetabulum after Total Hip Arthroplasty

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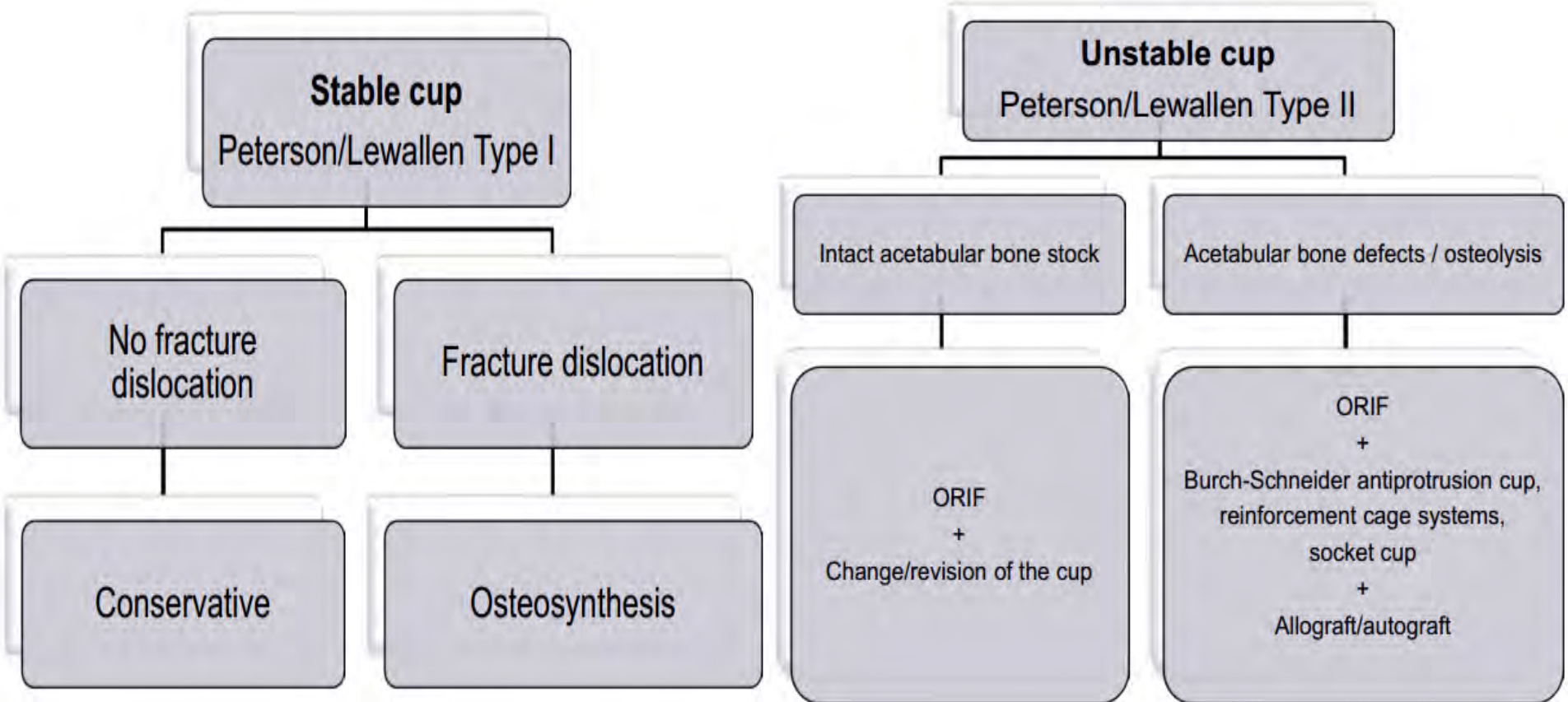
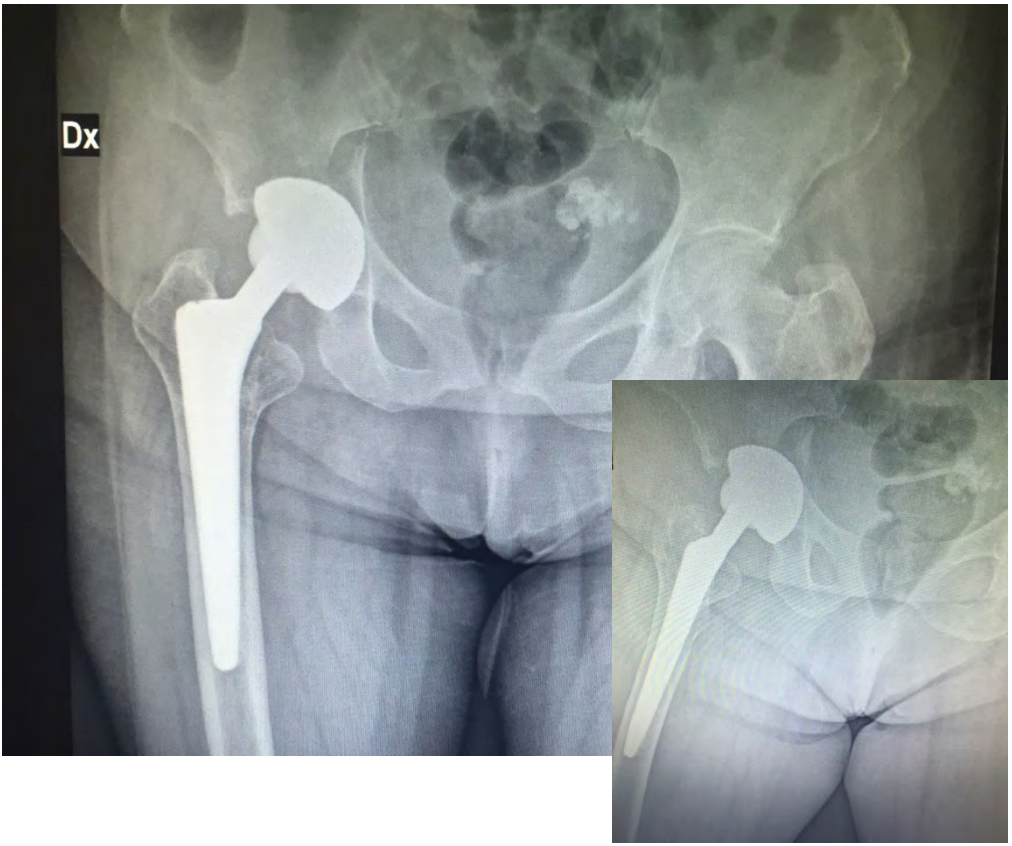
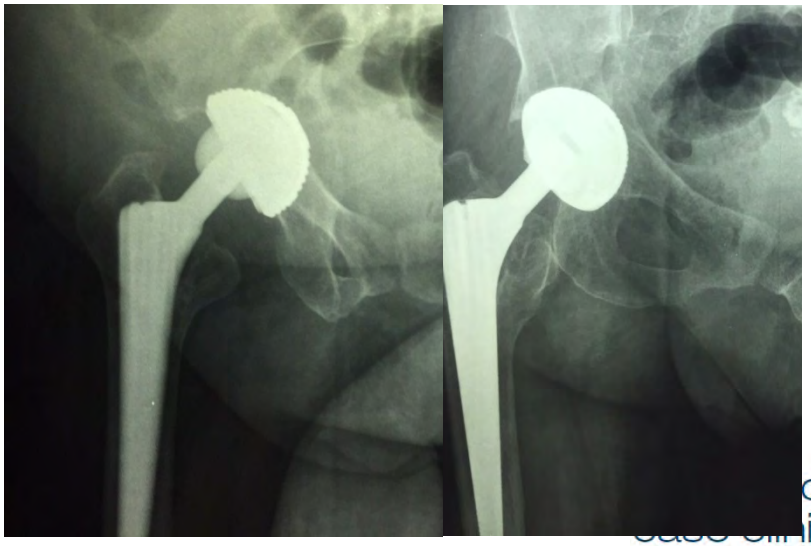


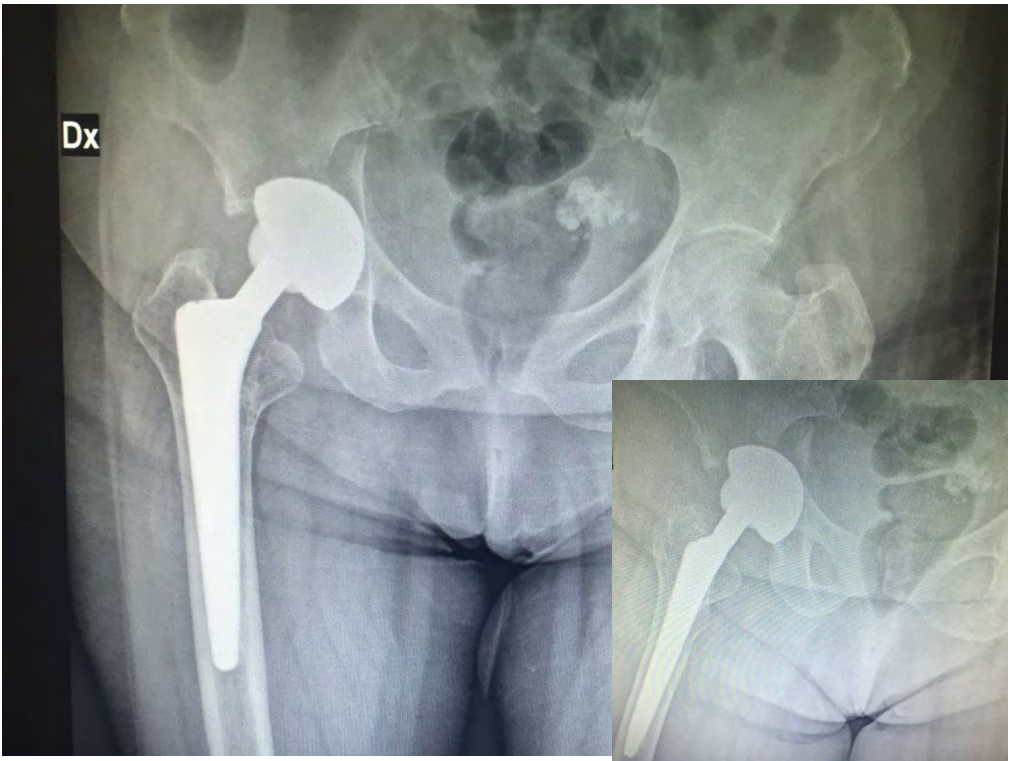




Antonio Panella[1] *(foto)*
Giuseppe Solarino[1]
Paola Damato[1]
Raffaele Pascarella[2]
Angela Notarnicola[1]
Biagio Moretti[1]

Giornale Italiano di Ortopedia e Traumatologia
2016;42:292-295

di cotile su protesi d'anca:
ico



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Biagio Moretti[1]

Giornale Italiano di Ortopedia e Traumatologia
2016;42:292-295

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FRATTURE PERIPROTESICHE DI FEMORE

EPIDEMIOLOGIA

INTRA-OPERATORIE:

CEMENTATE ***0.2%***
(35 : 15178)

NON CEMENTATE ***1.7%***
(529 : 17466)

POST-OPERATORIE:

CEMENTATE ***1.46%*** ***(222:15178)***

NON CEMENTATE ***1.91%***
(529 : 17466)

INCIDENZA:

PRIMO IMPIANTO ***0.9%***

REVISIONE ***4.2%***

■ HIP

Epidemiology of periprosthetic fracture of the femur in 32 644 primary total hip arthroplasties

A 40-YEAR EXPERIENCE

2016

M. P. Abdel,
C. D. Watts,
M. T. Houdek,
D. G. Lewallen,
D. J. Berry

From Mayo Clinic, Minnesota, United States

FRATTURE PERIPROTESICHE DI FEMORE

CLASSIFICAZIONE

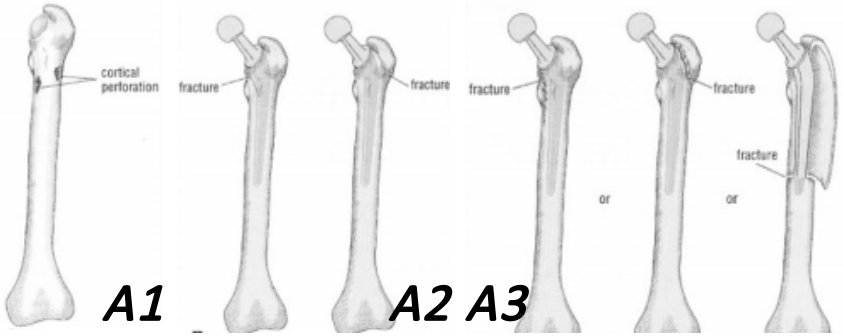
FRATTURE INTRA-OPERATORIE

DUNCAN & MASRI (VANCOUVER CLASSIFICATION)

Prende in considerazione 3 parametri: localizzazione, pattern di frattura, stabilità

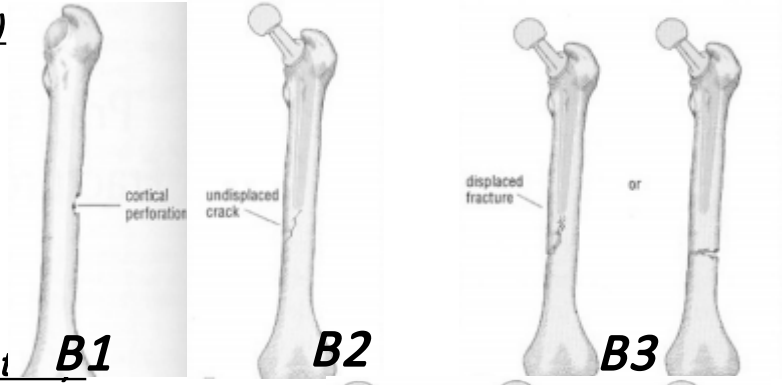
TYPE A — *Fr. METAFISARIE (non coinvolgono la diafisi)*

- A_1 *Semplice perforazione corticale*
- A_2 *Linea di frattura composta*
- A_3 *Frattura instabile o scomposta*



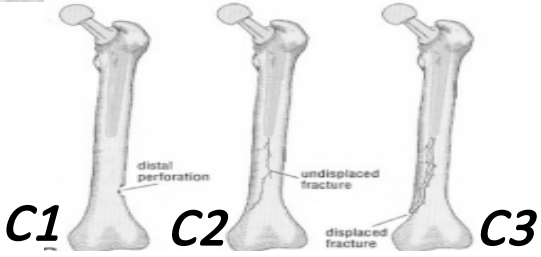
TYPE B — *Fr. DIFISARIE (non si estendono nella diafisi distale)*

- B_1 *Semplice perforazione corticale*
- B_2 *Linea di frattura composta*
- B_3 *Frattura instabile o scomposta*



TYPE C — *Fr. DISTALI (possono estendersi fino alla metafisi dist*

- C_1 *Semplice perforazione corticale*
- C_2 *Linea di frattura composta*
- C_3 *Frattura instabile o scomposta*



FRATTURE PERIPROTESICHE DI FEMORE

CLASSIFICAZIONE DI VANCOUVER

FRATTURE POST-OPERATORIE

Instr Course Lect. 1995;44:293-304.

Fractures of the femur after hip replacement.

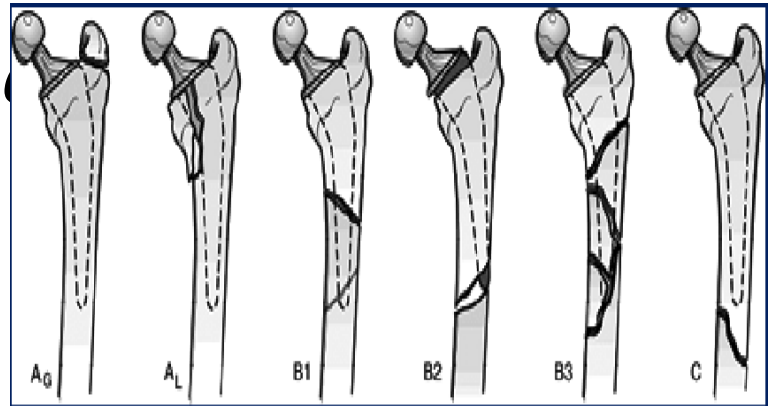
C.P. Duncan

B.A.Masri

Department of Orthopaedics, University of British Columbia, Vancouver, Canada

VALUTA 3 PARAMETRI

- *Localizzazione della frattura*
- *Stabilità dell'impianto*
-



FRATTURE PERIPROTESICHE DI FEMORE

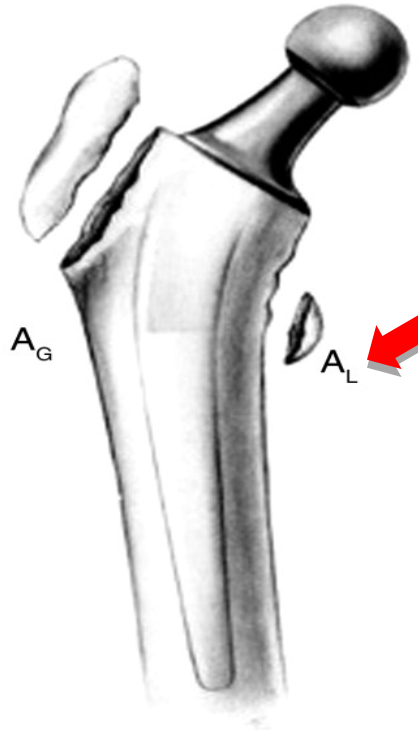
CLASSIFICAZIONE

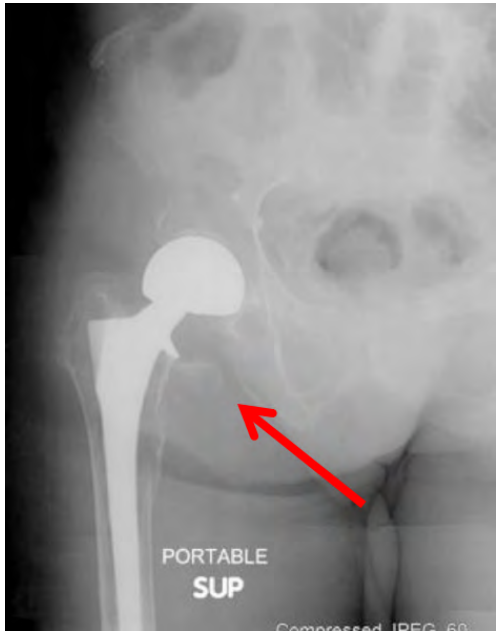
FRATTURE POST-OPERATORIE

TIPO A: *fratture della regione trocanterica, non estese alla diafisi*

***AG**: grande trocantere*

***AL**: piccolo trocantere*





FRATTURE PERIPROTESICHE DI FEMORE

CLASSIFICAZIONE

FRATTURE POST-OPERATORIE

TIPO B: *fr. diafisarie che si estendono intorno allo stelo o subito al di sotto di esso*

B1: stelo stabile

B2: stelo mobilizzato

B3: stelo mobilizzato con perdita di massa ossea

B1

B2

B3

FRATTURE PERIPROTESICHE DI FEMORE

CLASSIFICAZIONE

FRATTURE POST-OPERATORIE

TIPO B: *fr. diafisarie che si estendono intorno allo stelo o subito al di sotto di esso*

B1: stelo stabile

B1

NON TUTTE LE B1 SONO UGUALI !!

- *Osteoporosi*
- *Rima di frattura*
- *Potenziale di guarigione*

FRATTURE PERIPROTESICHE DI FEMORE

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- *Osteoporosi*
- *Rima di frattura*
- *Potenziale di guarigione*

FRATTURE PERIPROTESICHE DI FEMORE

CLASSIFICAZIONE

FRATTURE POST-OPERATORIE

TIPO B: *fr. diafisarie che si estendono intorno allo stelo o subito al di sotto di esso*

B2: stelo mobilizzato

Periprosthetic Femoral Fractures

Classification and Demographics of 1049 Periprosthetic Femoral Fractures from the Swedish National Hip Arthroplasty Register

The Journal of Arthroplasty Vol. 20 No. 7 2005

Hans Lindahl, MD, Henrik Malchau, MD, PhD,
Peter Herberts, MD, PhD, and Göran Garellick, MD, PhD

***75%* dei casi la *mobilizzazione è precedente* alla frattura**

FRATTURE PERIPROTESICHE DI FEMORE

CLASSIFICAZIONE

FRATTURE POST-OPERATORIE

TIPO B: *fr. diafisarie che si estendono intorno allo stelo o subito al di sotto di essa*

B2: stelo mobilizzato

B2

The Pseudo A_{LT} Periprosthetic Fracture: It's Really a B2

Hip Arthroplasty: Avoiding Pitfalls & Managing Problems
SEPTEMBER 2011 | Volume 34 • Number 9

ANDREW P. VAN HOUWELINGEN, MD, FRCSC; CLIVE P. DUNCAN, MB, MSc, FRCSC

NEW B2

A_{LT} *+ CALCAR*

Mobilizzazione dello stelo

FRATTURE PERIPROTESICHE DI FEMORE

CLASSIFICAZIONE

FRATTURE POST-OPERATORIE

TIPO B: *fr. diafisarie che si estendono intorno allo stelo o subito al di sotto di esso*

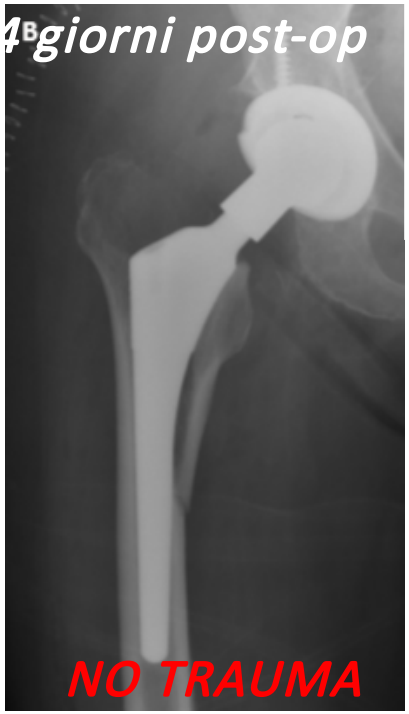
B2: stelo mobilizzato

B2

Dan Med J 61/2 | February 2014 | DANISH MEDICAL JOURNAL

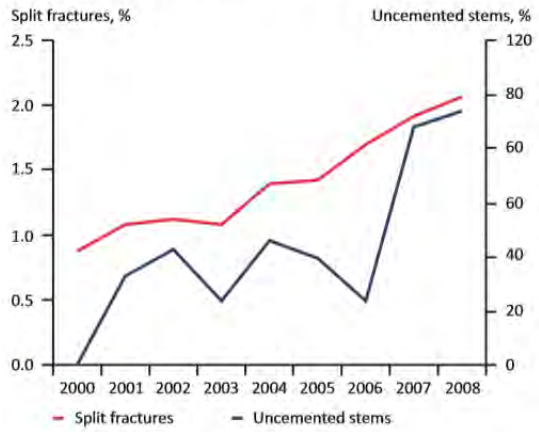
Increased risk for early periprosthetic fractures after uncemented total hip replacement

Søren Solgaard & Anne Grete Kjersgaard



FRATTURA B2 «PRECOCE» O TARDIVA A2?

Incidence of femoral split fracture and percentage of uncemented femoral component over the period.



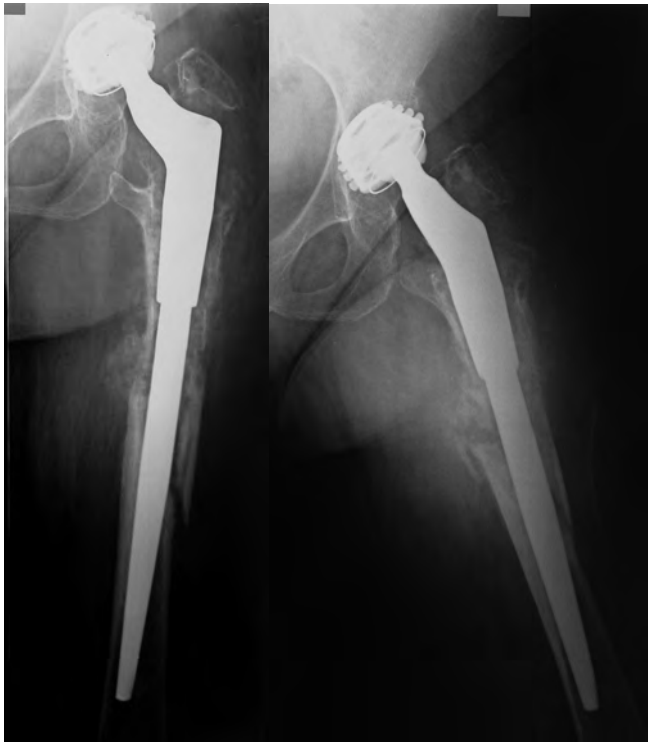
FRATTURE PERIPROTESICHE DI FEMORE

CLASSIFICAZIONE

FRATTURE POST-OPERATORIE

TIPO B: *fr. diafisarie che si estendono intorno allo stelo o subito al di sotto di esso*

B3: stelo mobilizzato con perdita di massa ossea

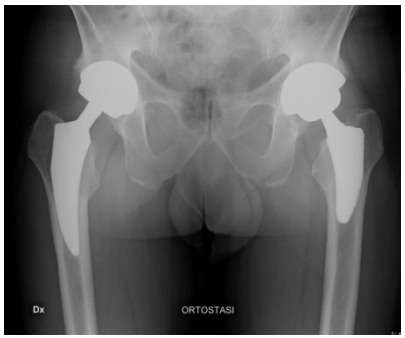


FRATTURE PERIPROTESICHE DI FEMORE

CLASSIFICAZIONE

FRATTURE POST-OPERATORIE

TIPO C: ***Fratture distali allo stelo, con stelo stabile***



Diverranno più frequenti per maggior "disponibilità" di osso

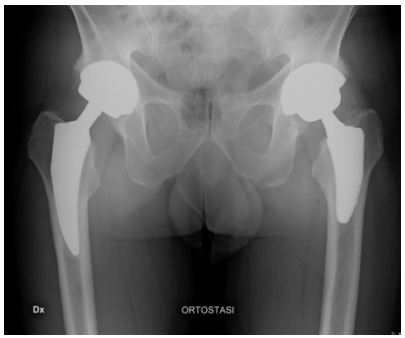
Da considerarsi come fratture di femore “normali”

FRATTURE PERIPROTESICHE DI FEMORE

CLASSIFICAZIONE

FRATTURE POST-OPERATORIE

TIPO C: ***Fratture distali allo stelo, con stelo stabile***



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FRATTURE PERIPROTESICHE DI FEMORE

CLASSIFICAZIONE

FRATTURE POST-OPERATORIE

TIPO C: ***Fratture distali allo stelo, con stelo stabile***

Injury, Int. J. Care Injured 45 (2014) 362–368

Contents lists available at ScienceDirect

Injury

journal homepage: www.elsevier.com/locate/injury

Interprosthetic femoral fractures—A challenge of treatment. A systematic review of the literature

G. Solarino, G. Vicenti *, L. Moretti, A. Abate, A. Spinarelli, B. Moretti

Trattamento fratture periprotesiche ed interprotesiche di femore

Antonio Capone, Giuseppe Marongiu, Marco Planta

FRATTURE PERIPROTESICHE DI FEMORE

CLASSIFICAZIONE DI VANCOUVER: VALIDAZIONE

THE JOURNAL OF BONE & JOINT SURGERY (BJ)

European validation of the Vancouver classification of peri-prosthetic proximal femoral fractures

J Bone Joint Surg [Br]
2008;90-B:1576-9.
Received 3 January 2008;
Accepted after revision 14 July 2008

F. Rayan,
M. Dodd,
F. S. Haddad

From University College London Hospital, London, England

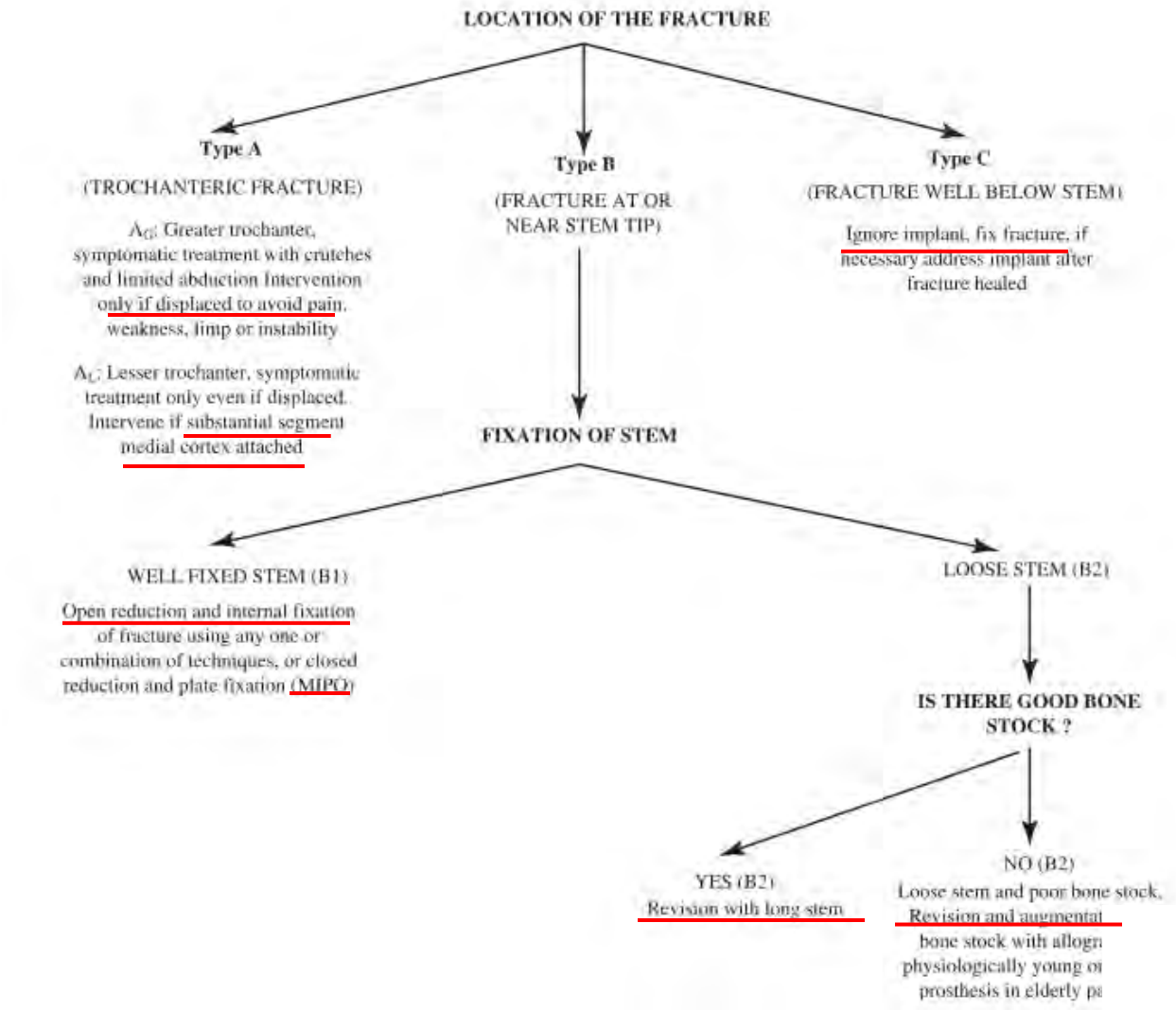
- *Analisi di 30 Rx*
- *6 Specialisti/6 Aspiranti/6 Studenti*

I 3 gruppi erano d'accordo nel 77% delle fratture, pertanto tale classificazione è oggettiva, semplice e riproducibile

FRATTURE PERIPROTESICHE DI FEMORE

CLASSIFICAZIONE DI VANCOUVER:

VANTAGGI



FRATTURE PERIPROTESICHE DI FEMORE

CLASSIFICAZIONE DI VANCOUVER: LIMITI

DIFFICILE DISTINGUERE LE B1 DALLE B2

Corten et al. hanno dimostrato come il 20 % degli steli che venivano classificati stabili radiograficamente, risultavano instabili in sede intraoperatoria (monitoraggio Rx e confronto con Rx precedenti!!!) Br.Bone Joint Surg 2009;91-B:1424-30

THE JOURNAL OF BONE & JOINT SURGERY [BRITISH]

Risk factors for failure after treatment of a periprosthetic fracture of the femur

H. Lindahl,
H. Malchau,
A. Odén,
G. Garellick

From the University of Gotëborg, Gotëborg, Sweden

J Bone Joint Surg [Br] 2006;88-B:26-30.
Received 1 August 2005; Accepted after revision 14 September 2005

H. Lindahl, MD,

Periprosthetic fracture of the femur is an uncommon complication after total hip replacement, but appears to be increasing. We undertook a nationwide observational study to determine the risk factors for failure after treatment of these fractures, examining patient- and implant-related factors, the classification of the fractures and the outcome.

Between 1979 and 2000, 1049 periprosthetic fractures of the femur were reported to the Swedish National Hip Arthroplasty Register. Of these, 245 had a further operation after failure of their initial management. Data were collected from the Register and hospital records. The material was analysed by the use of Poisson regression models.

It was found that the risk of failure of treatment was reduced for Vancouver type B2 injuries (p = 0.0053) if revision of the implant was undertaken (p = 0.0033) or revision and open reduction and internal fixation (p = 0.0039) were performed. Fractures classified as Vancouver type B1 had a significantly higher risk of failure (p = 0.0001). The strongest negative factor was the use of a single plate for fixation (p = 0.001). The most common reasons for failure in this group were loosening of the femoral prosthesis, nonunion and re-fracture.

It is probable that many fractures classified as Vancouver type B1 (n = 304), were in reality type B2 fractures with a loose stem which were not recognised. Plate fixation was inadequate in these cases. The difficulty in separating type B1 from type B2 fractures suggests that the prosthesis should be considered as loose until proven otherwise.

Table IV. Factors associated with a significantly increased risk of failure

	β*	95% confidence interval	p value
Other treatment than revision	0.7741	0.52 to 1.02	0.0001
Vancouver classification type B1	0.5253	0.27 to 0.78	0.0001
Initial treatment			
Plate fixation	0.7373	0.47 to 1.00	0.0001
Cerclage	0.5601	0.08 to 1.04	0.0225

Caso #1

- Donna, 83 anni
- Trasferimento da altro ospedale il giorno dopo il trauma
- Frattura peri-protesica femore sinistro (endoprotesi cementata anca sin 11 anni fa)

Caso #2

- Maschio, 39 anni
- In trattamento con farmaci antiepilettici
- Artroprotesi anca TMT+CLS (ce-ce)

Caso #1

- Donna, 83 anni
- Trasferimento da altro ospedale il giorno dopo il trauma
- Frattura peri-protesica femore sinistro (endoprotesi cementata anca sin 11 anni fa)

Caso #2

- Maschio, 39 anni
- In trattamento con farmaci antiepilettici
- Artroprotesi anca TMT+CLS (ce-ce)
- Dopo 4 settimane….

Caso #1

- Donna, 83 anni
- Trasferimento da altro ospedale il giorno dopo il trauma
- Frattura peri-protesica femore sinistro (endoprotesi cementata anca sin 11 anni fa)

Caso #2

- Maschio, 39 anni
- In trattamento con farmaci antiepilettici
- Artroprotesi anca TMT+CLS (ce-ce)

Vancouver B1 o B2 o B3?

Caso #1

- Donna, 83 anni
- Trasferimento da altro ospedale il giorno dopo il trauma
- Frattura peri-protesica femore sinistro (endoprotesi cementata anca sin 11 anni fa)

Caso #2

- Maschio, 39 anni
- In trattamento con farmaci antiepilettici
- Artroprotesi anca TMT+CLS (ce-ce)

Trattate da… Vancouver B1!

■ HIP

Bone Joint J 2017;99-B(4 Supple B):17–25.

A systematic review of Vancouver B2 and B3 periprosthetic femoral fractures

T. Khan,
D. Grindlay,
B. J. Ollivere,
B. E. Scammell,
A. R. J. Manktelow,
R. G. Pearson

Of 343 Vancouver B2 fractures, the treatment in 298 (86.8%) involved revision arthroplasty and 45 (12.6%) were treated with internal fixation alone.

A total of 37 patients (12.4%) treated with revision arthroplasty and six (13.3%) treated by internal fixation only underwent further re-operation.

Of 167 Vancouver B3 fractures, the treatment in 160 (95.8%) involved revision arthroplasty and eight (4.8%) were treated with internal fixation without revision.

A total of 23 patients (14.4%) treated with revision arthroplasty and two (28.6%) treated only with internal fixation required re-operation.

Original Article Clinics in Orthopedic Surgery 2014;6:138-145 • http://dx.doi.org/10.4055/cios.2014.6.2.138

Treatment Results of a Periprosthetic Femoral Fracture Case Series: Treatment Method for Vancouver Type B2 Fractures Can Be Customized

Takahiro Niikura, MD, Sang Yang Lee, MD, Yoshitada Sakai, MD,
Kotaro Nishida, MD, Ryosuke Kuroda, MD, Masahiro Kurosaka, MD

BACKGROUND: …treatment algorithm based on the **Vancouver classification lacks consideration of patient physiology and surgeon's experience** (judgment), which are also important for deciding treatment options.

RESULTS: …four cases of type B2 fractures with a loose stem, in which revision arthroplasty is recommended according to the Vancouver classification, were treated by other options. Of these, three were treated by osteosynthesis and one was treated conservatively.

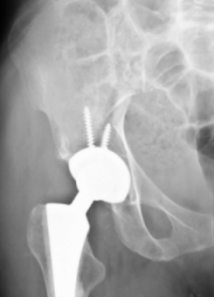
Interpretazione "critica" delle classificazioni ma…

- ***Quale chirurgo?***
  (esperienza, learning curve)

- ***Quale paziente?***
  (comorbilità, aspettative)

Interpretazione "critica" delle classificazioni ma…

… la PREVENZIONE???

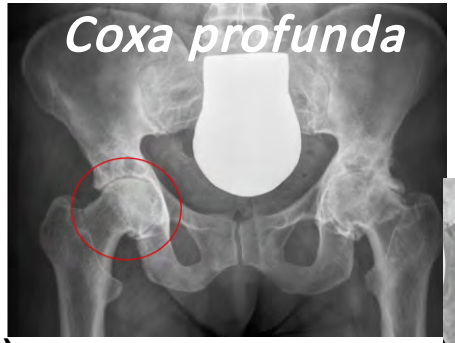


FRATTURE PERIPROTESICHE DI ACETABOLO

PATOGENESI

FRATTURE INTRA-OPERATORIE

- ***SCARSA QUALITÀ DELL'OSSO***
  (AR, osteoporosi)



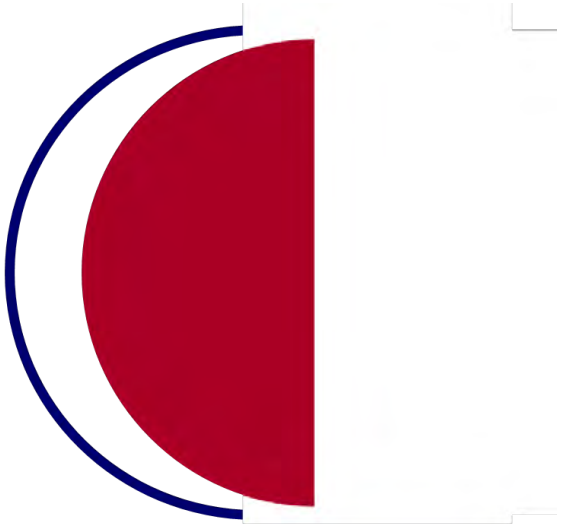
- ***CONDIZIONI ANATOMICHE***
  (OA concentrica, vite cefalica di chiodo)

- ***TECNICA CHIRURGICA***

- **under-reaming > 4mm → 50% di fratture acetabolari vs under-reaming < 2mm → 12%**
- **excessive reaming**
- **reaming asimmetrico**

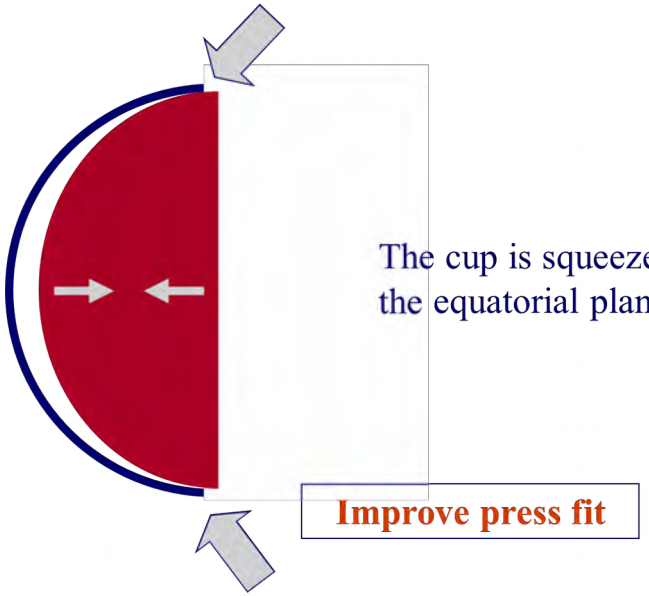
- ***ECCESSIVA FORZA DI IMPIANTO***
- ***CARATTERISTICHE dell'IMPIANTO: maggior incidenza con cotili non cementati***

(emisferico o ellittico?)



Not only the surface matters,
but also the shape:
<u>hemispherical</u>

To improve primary stability



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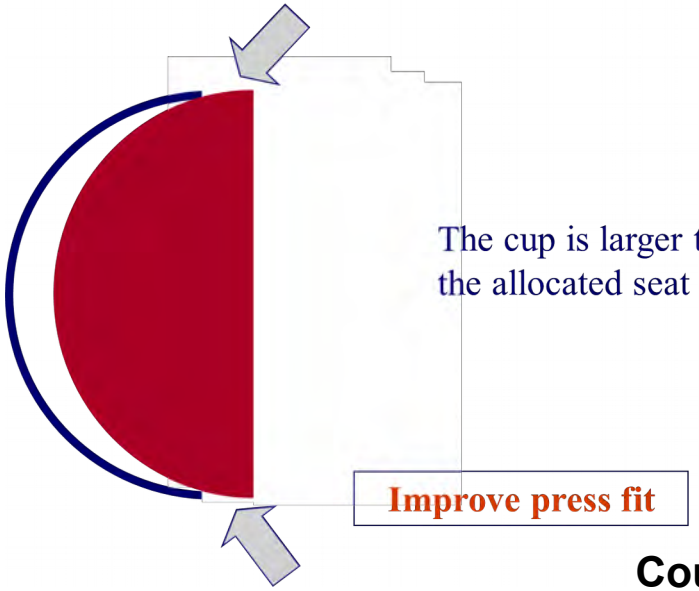
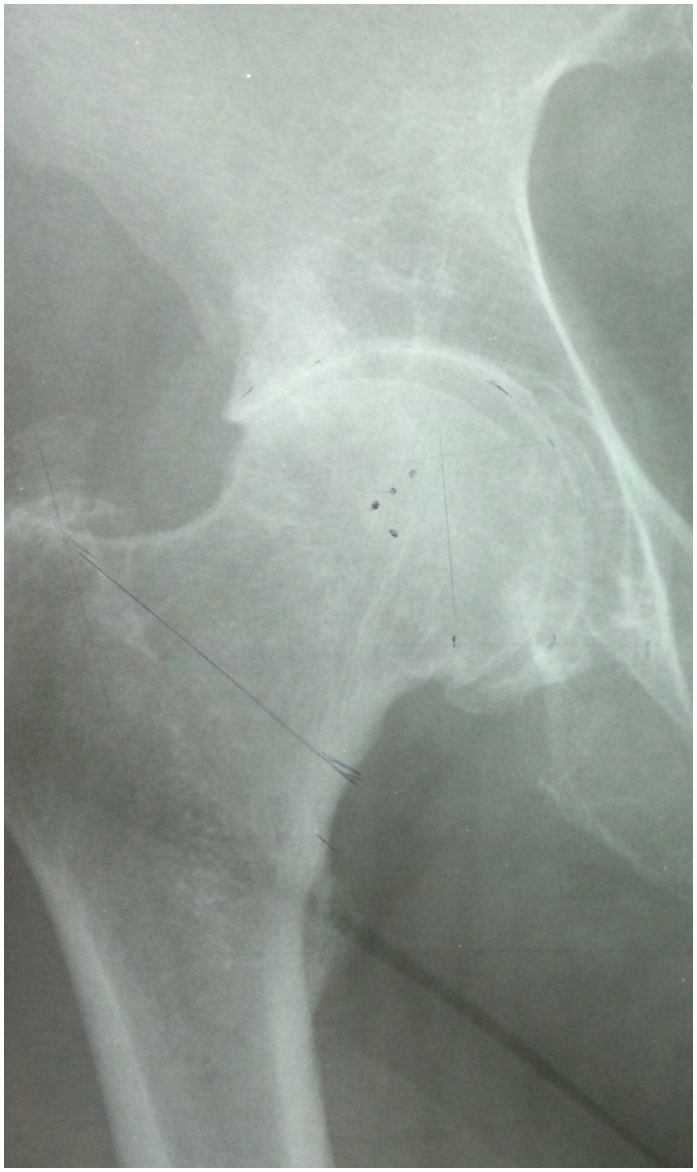
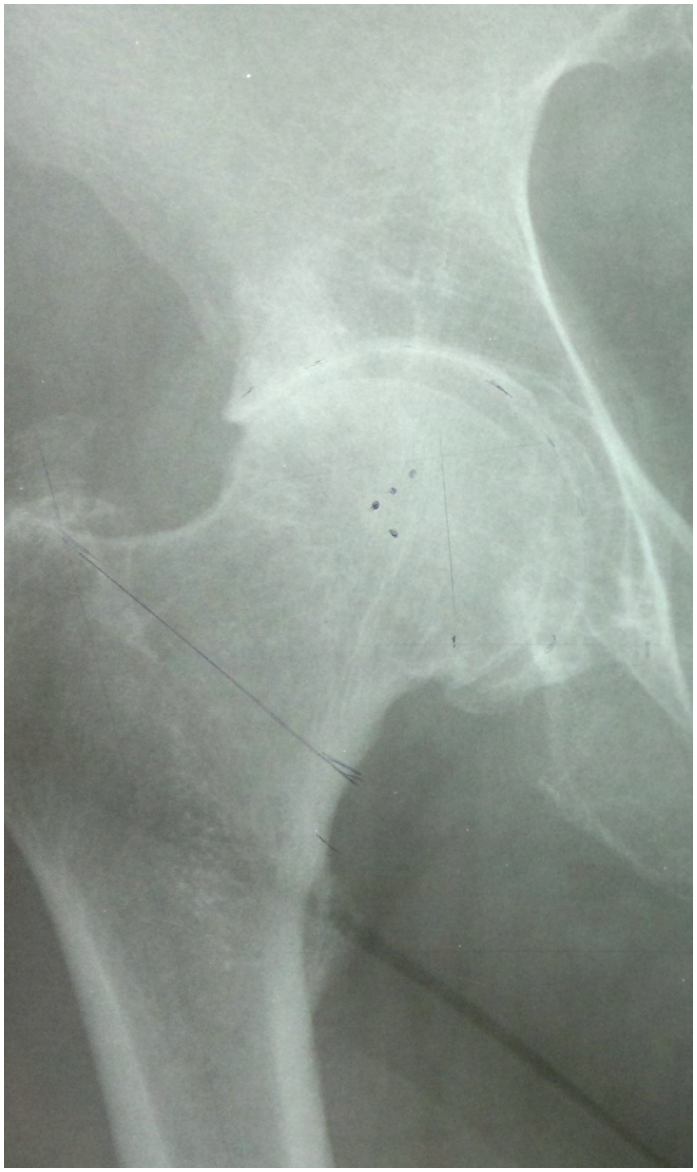
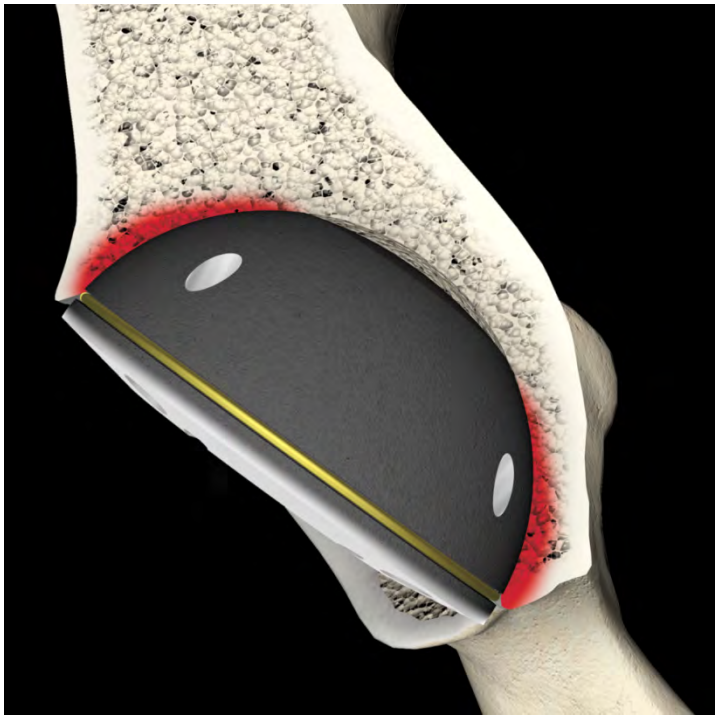
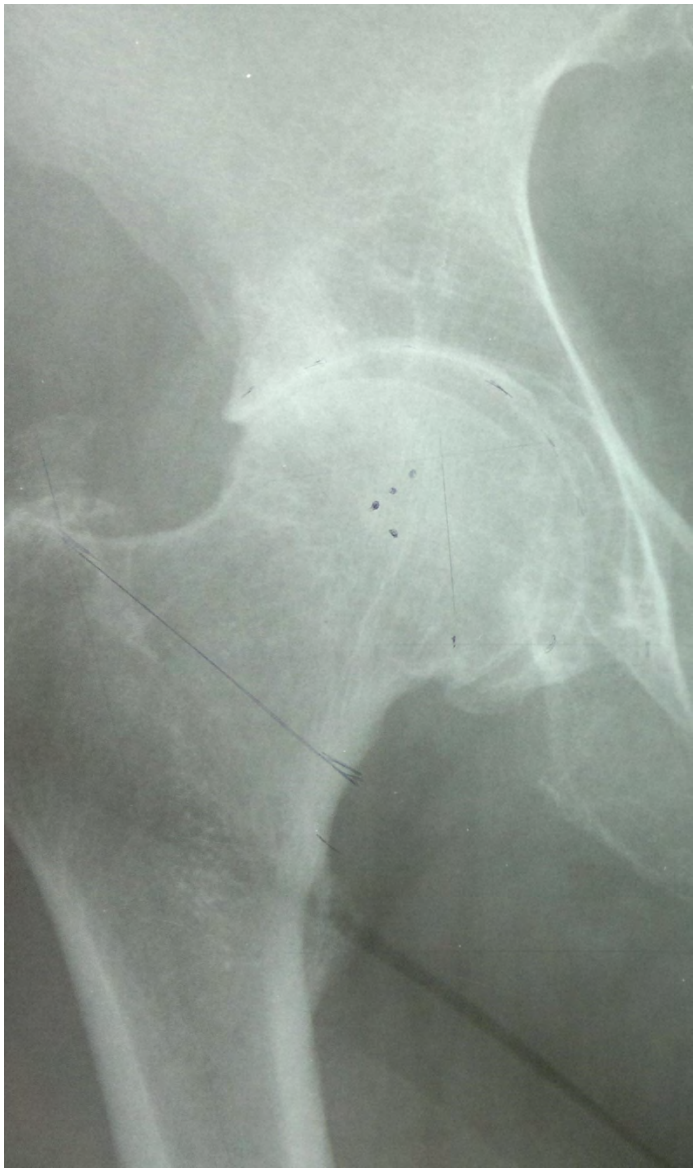


Courtesy of L.Zagra



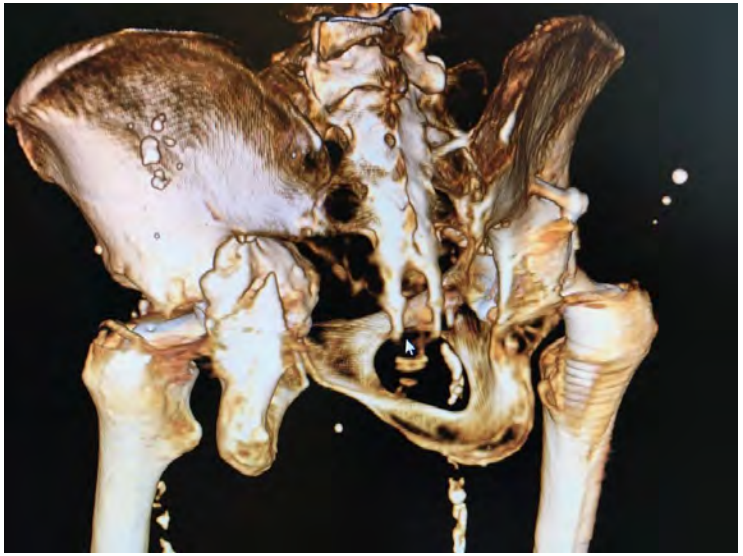


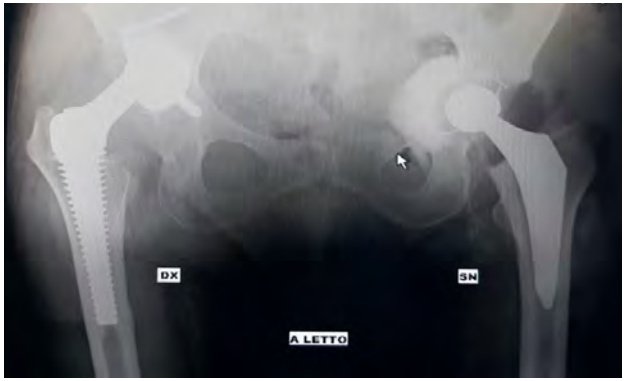




Intra-operative fractures can occur during rasping, reaming or implant impaction, and they must be treated immediately if the component(s) is (are) unstable.

Periprosthetic acetabular fractures. Benazzo F, Int Orthop. 2015




DX
SN
A LETTO

FRATTURE PERIPROTESICHE DI FEMORE

FRATTURE INTRA-OPERATORIE

PATOGENESI E FATTORI DI RISCHIO

CURRENT CONCEPTS REVIEW

Intraoperative Periprosthetic Fractures During Total Hip Arthroplasty

Evaluation and Management

By Darin Davidson, MD, MHSc, Jeffrey Pike, MD, Donald Garbuz, MD, MHSc, FRCSC, Clive P. Duncan, MB, MSc, FRCSC, and Bassam A. Masri, MD, FRCSC

The Journal of Arthroplasty 31 (2016) 2295–2298

Contents lists available at ScienceDirect

The Journal of Arthroplasty

journal homepage: www.arthroplastyjournal.org

Complications - Other

Risk of Periprosthetic Fractures With Direct Anterior Primary Total Hip Arthroplasty

Keith R. Berend, MD [a, b, c, *], Amer J. Mirza, MD [d], Michael J. Morris, MD [a, c], Adolph V. Lombardi Jr, MD, FACS [a, b, c]

TECNICA CHIRURGICA

- *Approccio chirurgico con tecniche mini invasive :*
  % rischio Anteriore > Laterale/Posterolaterale
- *Manovre forzate per la riduzione e la lussazione dell'anca (non ottimale release capsulare)*
- *Punto di ingresso non ottimale*
- *Condizioni chirurgiche che riducono la resistenza dell'osso (osteoporosi/fori delle viti)*
- *Fresat[illegible]e le raspe/[illegible]*
- *Utilizz[illegible] fill (taglie*

Clin Orthop Relat Res (2015) 473:2045–2053
DOI 10.1007/s11999-014-4077-9

Clinical Orthopaedics and Related Research®
A Publication of The Association of Bone and Joint Surgeons®

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SURGICAL TECHNIQUE

Increased Risk of Periprosthetic Femur Fractures Associated With a Unique Cementless Stem Design

Chad D. Watts MD, Matthew P. Abdel MD, David G. Lewallen MD, Daniel J. Berry MD, Arlen D. Hanssen MD

Open Journal of Orthopedics, 2015, 5, 115-119
Published Online May 2015 in SciRes. http://www.scirp.org/journal/ojo
http://dx.doi.org/10.4236/ojo.2015.55015

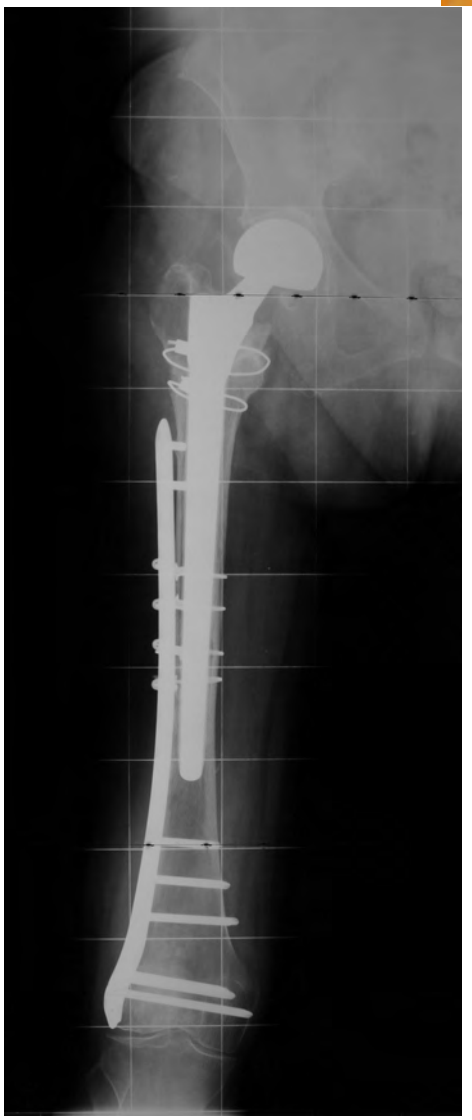
Scientific Research Publishing

Changes in Femoral Stem Geometry Reduce Intraoperative Femoral Fracture Rates in Total Hip Replacement

Tatsuya Sueyoshi, Michael E. Berend, John B. Meding, Robert A. Malinzak, Wesley G. Lackey, Merrill A. Ritter

Center for Hip and Knee Surgery, Joint Replacement Surgeons of Indiana Research Foundation (JRSI), Mooresville, IN, USA
Email: jrsiresearch1@gmail.com

D'Arrigo C, Hip arthroplasty for failed treatment of proximal femoral fractures. Int Orthop. 2010
Enocson A, Hip arthroplasty after failed fixation of trochanteric and subtrochanteric fractures. Acta Orthop. 2012
Archibeck MJ, Total Hip Arthroplasty After Failed Internal Fixation Of Proximal Femoral Fractures, JOA 2013
Pui CM, Increased complication rate following Conversion Total Hip Arthroplasty….: a multi-center study, JOA



D'Arrigo C, Hip arthroplasty for failed treatment of proximal femoral fractures. Int Orthop. 2010
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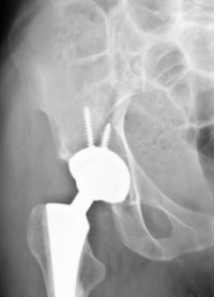

FRATTURE PERIPROTESICHE DI ACETABOLO

PATOGENESI

FRATTURE POST-OPERATORIE

- ***TRAUMA:*** **(alta o bassa energia)**

- ***OSTEOLISI:*** **(maggior fattore predisponente ++ in pazienti che non eseguono controlli periodici)**

- ***DIFETTI OSSEI:*** **in esiti di chirurgia di revisione e\o infezioni periprotesiche**

- ***FRATTURE «ATIPICHE»***

(IATROGENE / DA STRESS)

Marongiu G, Capone A. Atypical periprosthetic acetabular fracture in long-term alendronate therapy. Clin Cases Miner Bone Metab. 2016

Post-operative fractures can be due to major trauma (acute fractures) or minor forces in bone osteolysis; it is possible to plan reconstruction and fixation according to fracture characteristics. Treatment choice depends upon fracture site and implant stability.

Periprosthetic acetabular fractures. Benazzo F, Int Orthop. 2015

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Periprosthetic acetabular fractures. Benazzo F, Int Orthop. 2015

FRATTURE PERIPROTESICHE DI FEMORE

PATOGENESI

FRATTURE POST-OPERATORIE

Risk factors for periprosthetic femoral fracture

John Franklin [a,*], Henrik Malchau [b] Injury, Int. J. Care Injured (2007) 38, 655–660

- *Traumi a bassa energia*
- *Età*
- *Sesso Femminile*
- *Osteoporosi*
- *Diagnosi primaria (AR, frattura femore etc.)*
- *Osteolisi*
- *Mobilizzazione asettica*
- *Revisione*
- *Tipo di impianto*
- ***Prevenzione (controlli clinici e rx-grafici nel tempo)***

Table 1 Risk factors for intraoperative and postoperative periprosthetic femoral fractures.

General factors	*Local factors*
Female sex	Stress risers within cortex
Osteoporosis: primary, secondary	Loose prosthesis
Osteopenia	Localised osteolysis
Rheumatoid arthritis	Cortical perforation
Osteomalacia	Revision arthroplasty
Paget's disease	Cementless femoral component
Osteogenesis imperfecta	
Thalassemia	
Clinical conditions resulting in loss of balance/falls	
Parkinsonism	
Neuropathic arthropathy	
Poliomyelitis	
Myasthenia gravis	
Cerebral palsy	
Seizures	
Ataxia	

CONCLUSIONI

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PERCHÉ È IMPORTANTE CONOSCERE LA CLASSIFICAZIONE DI UNA FRATTURA?

- LINGUAGGIO COMUNE
- PLANNING PRE-OPERATORIO
- (ALGORITMO DI TRATTAMENTO)

CONCLUSIONI

PERCHÉ È IMPORTANTE CONOSCERE LA CLASSIFICAZIONE DI UNA FRATTURA?

- ***LINGUAGGIO COMUNE***
- ***PLANNING PRE-OPERATORIO***
- ***(ALGORITMO DI TRATTAMENTO)***

PERCHÉ È IMPORTANTE CONOSCERE LA PATOGENESI DI UNA FRATTURA?

- ***PREVENZIONE !!***

Grazie
per
l'attenzione

Vi aspettiamo a Bari!

FRATTURE PERIPROTESICHE

Le Fratture Acetabolari

Guido Grappiolo

HUMANITAS
RESEARCH HOSPITAL

Introduction

Periprosthetic fractures of the acetabulum are rare

incidence 0.07 % (uncemented) - 0.2 % (cemented)

represent 3.8 % of hip revisions

General risk factors:

- **poor cup positioning**
- **young and/ or active patients**
- **osteoporosis**
- **bone defects**
- **osteolysis**
- **rheumatic arthritis**

Aetiology

- peri-operative
- traumatic
- osteolysis-related

Peri-operative

Clin Orthop Relat Res
DOI 10.1007/s11999-016-5138-z

Clinical Orthopaedics and Related Research®
A Publication of The Association of Bone and Joint Surgeons®

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CLINICAL RESEARCH

Periprosthetic Occult Fractures of the Acetabulum Occur Frequently During Primary THA

Kazuhiro Hasegawa MD, Tamon Kabata MD, PhD, Yoshitomo Kajino MD, PhD, Daisuke Inoue MD, Hiroyuki Tsuchiya MD, PhD

- 8.4% (41 of 486 hips)
- The superolateral wall was the most frequent location
- peripheral self-locking cups was associated with increased risk

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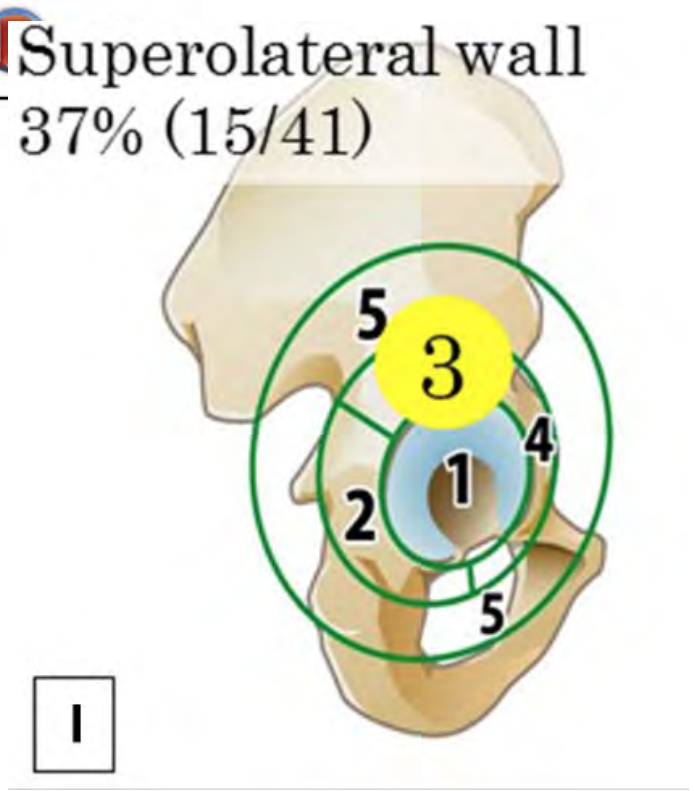
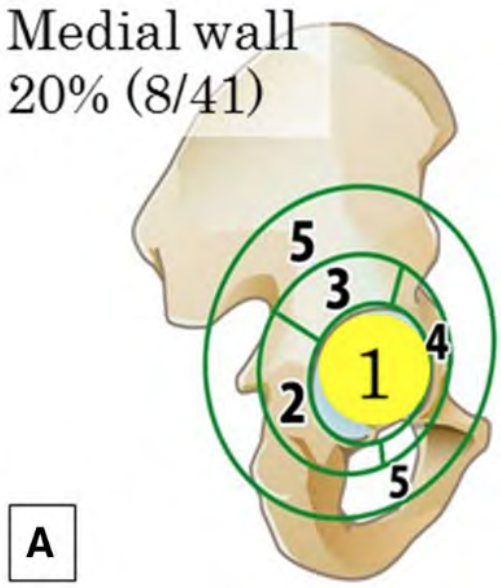


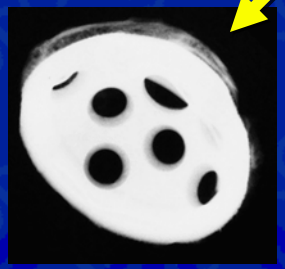
- 8.4% (41 of 486 hips)
- The superolateral wall was the most frequent location
- peripheral self-locking cups was associated with increased risk

Aetiology

- peri-operative

usually occur while impacting an uncemented acetabular hemispherical cup in primary or during revision surgery





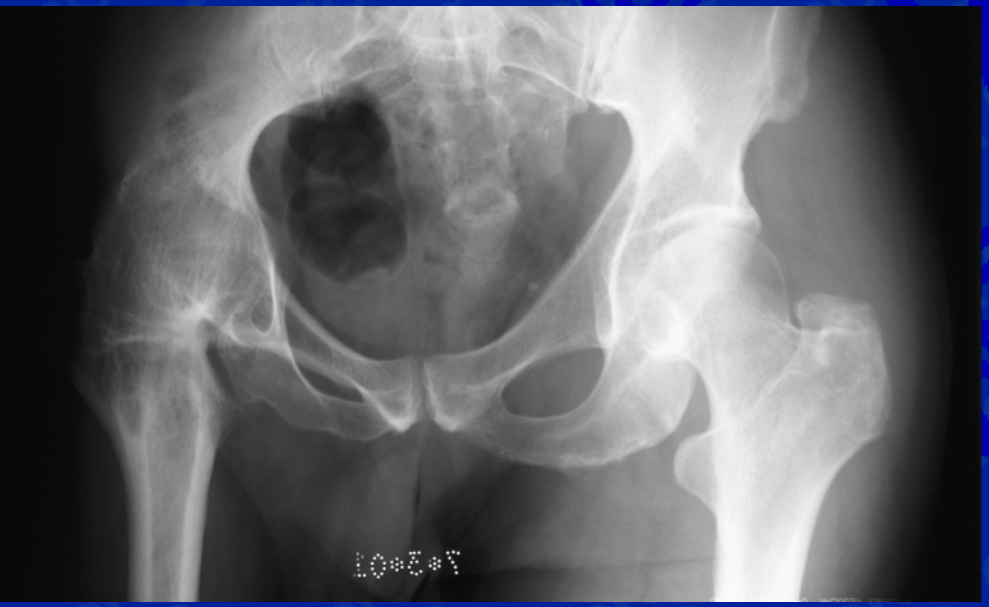
early complications:

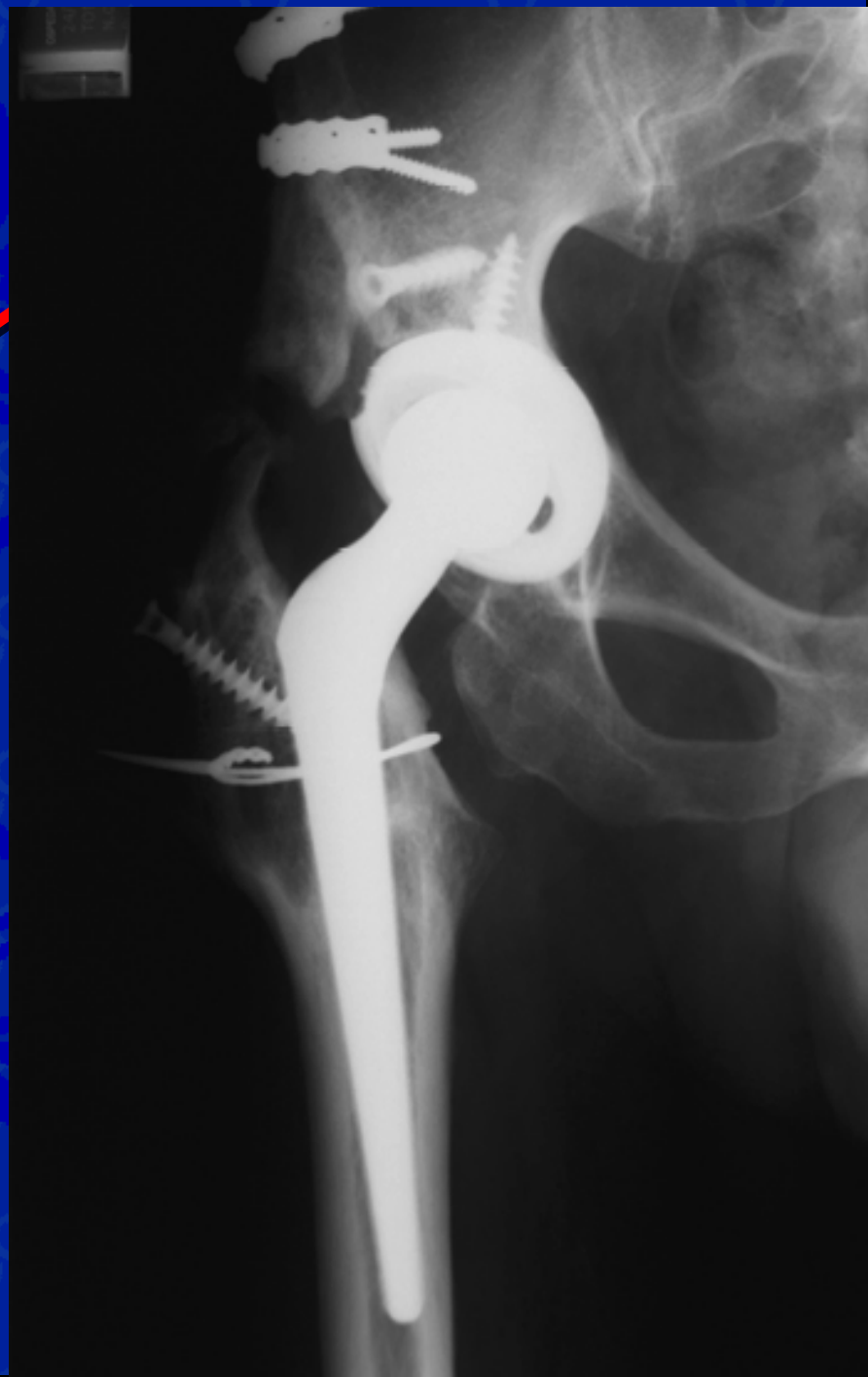
3 dislocations (2 revised for malalignement of the cup in the immediate post-op)

1 Ischiatic nerv palsy

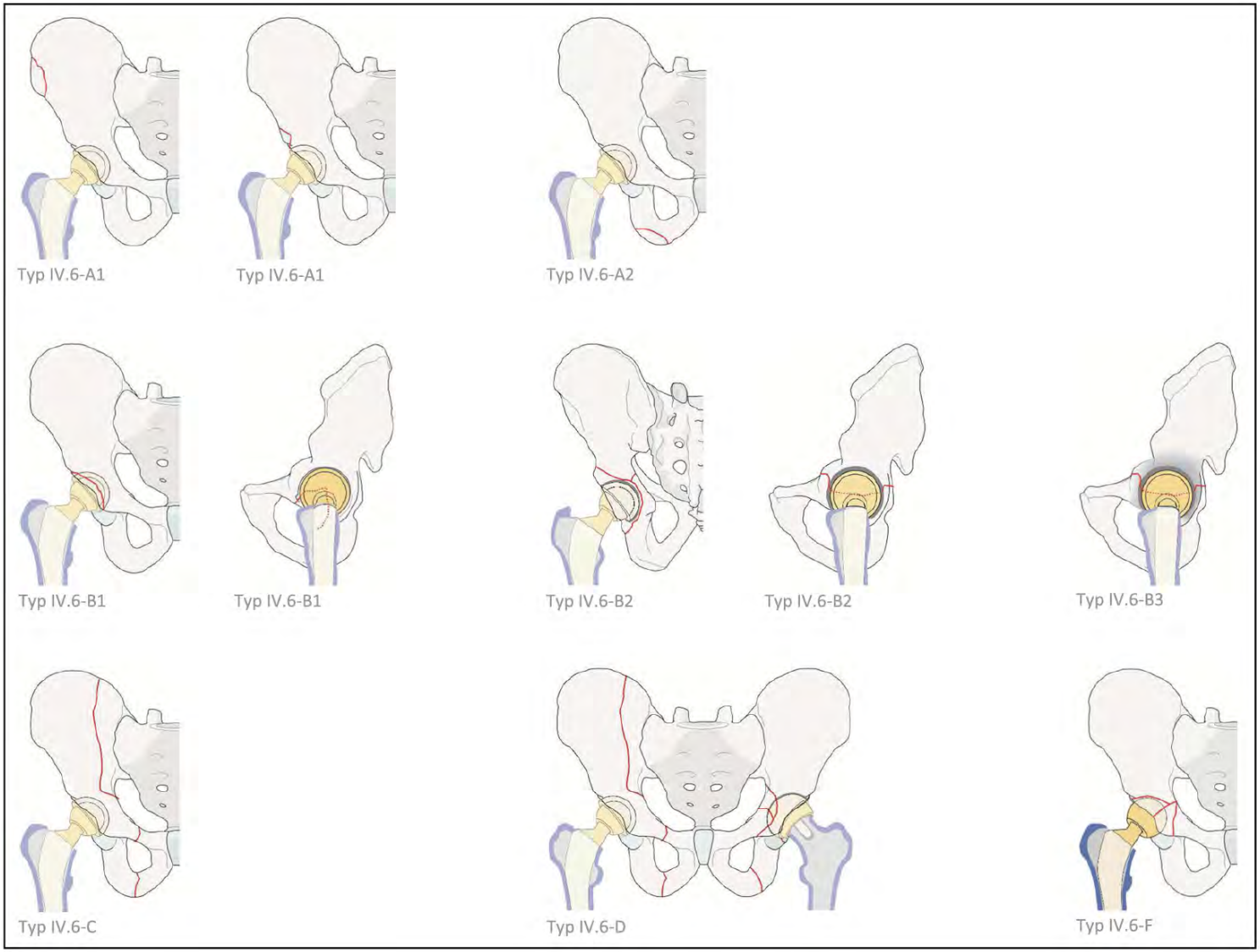
1 iliac fracture

2 TVP





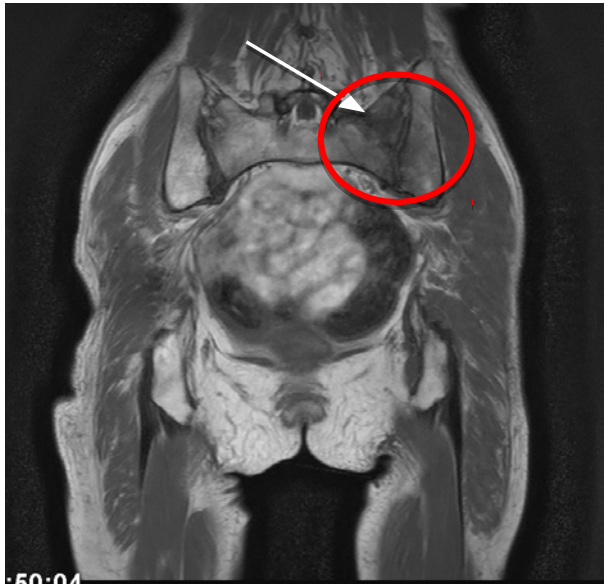
Topografic Classification



Duncan CP, Haddad FS (2014) The Unified Classification System (UCS): improving our understanding of periprosthetic fractures. Bone Joint J 96-b(6):713–716.

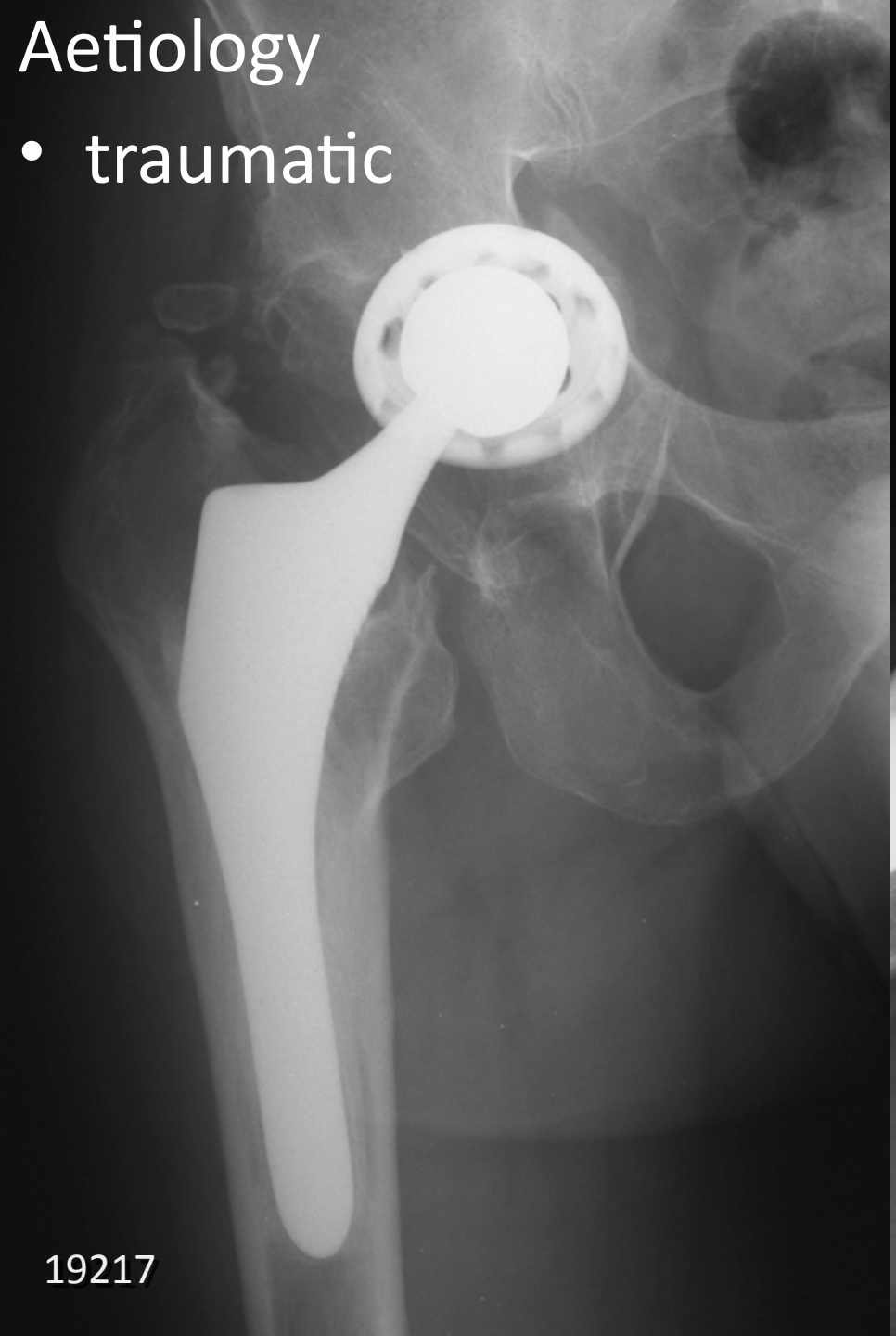
Pain & Insufficiency Fractures

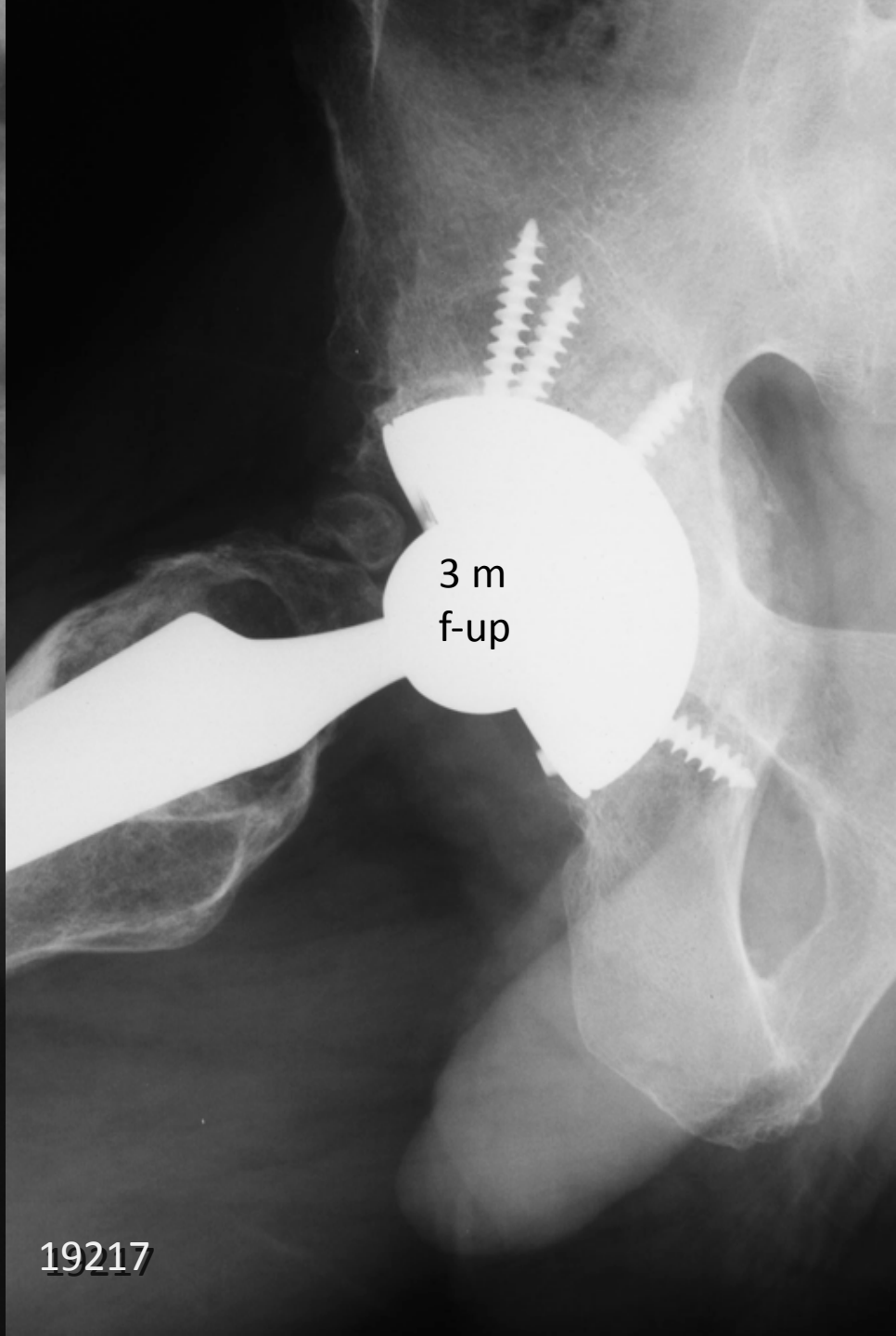
Clinical	71yo Female, ML Taper Stem/Trilogy Cup 2008 (Cup revised for Impingement 2010)
Bloods	ESR 8 CRP 1
Imaging	MRI – Insufficiency fractures to Pubis and Sacrum, No Hip abnormalities



Aetiology

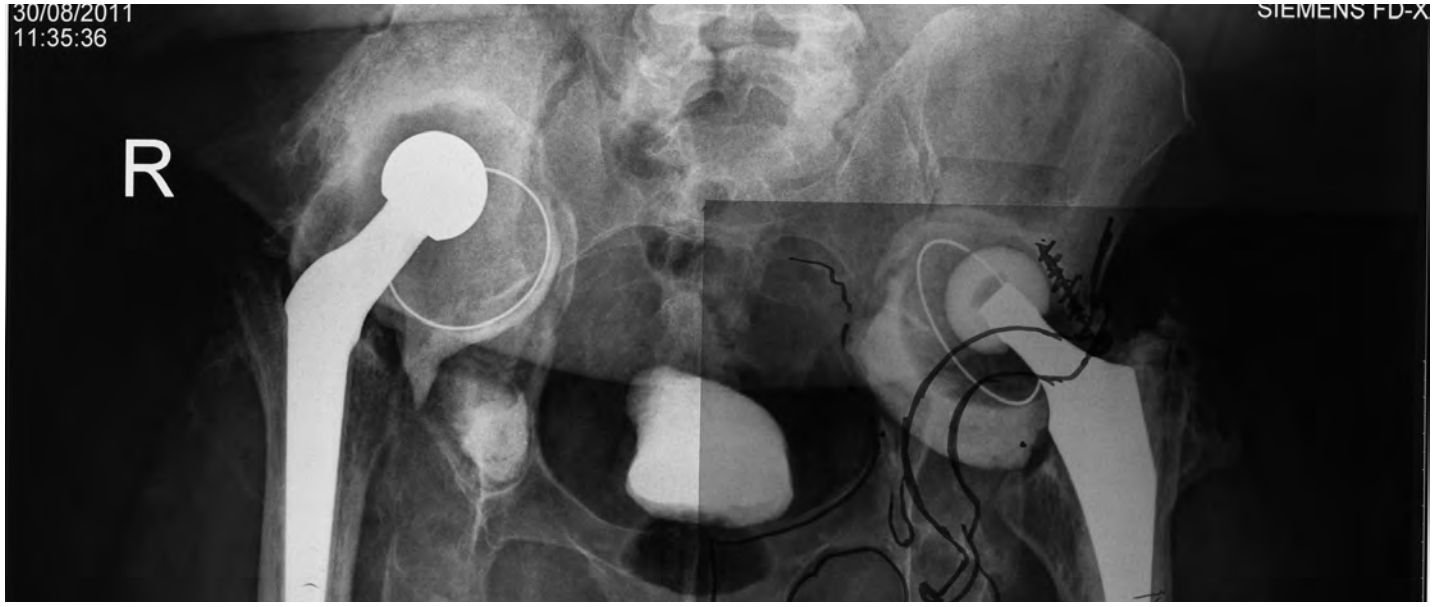
- traumatic





Traumatic

- Traumatic periprosthetic acetabular fractures have rarely been reported in the literature
- The challenge is to differentiate between an acute fracture after a traumatic event and a subtle fracture due to osteolytic bone loss. Even with a sudden onset of pain in the presence of an acute event, the fracture may be caused by an acute migration after progressive osteolysis



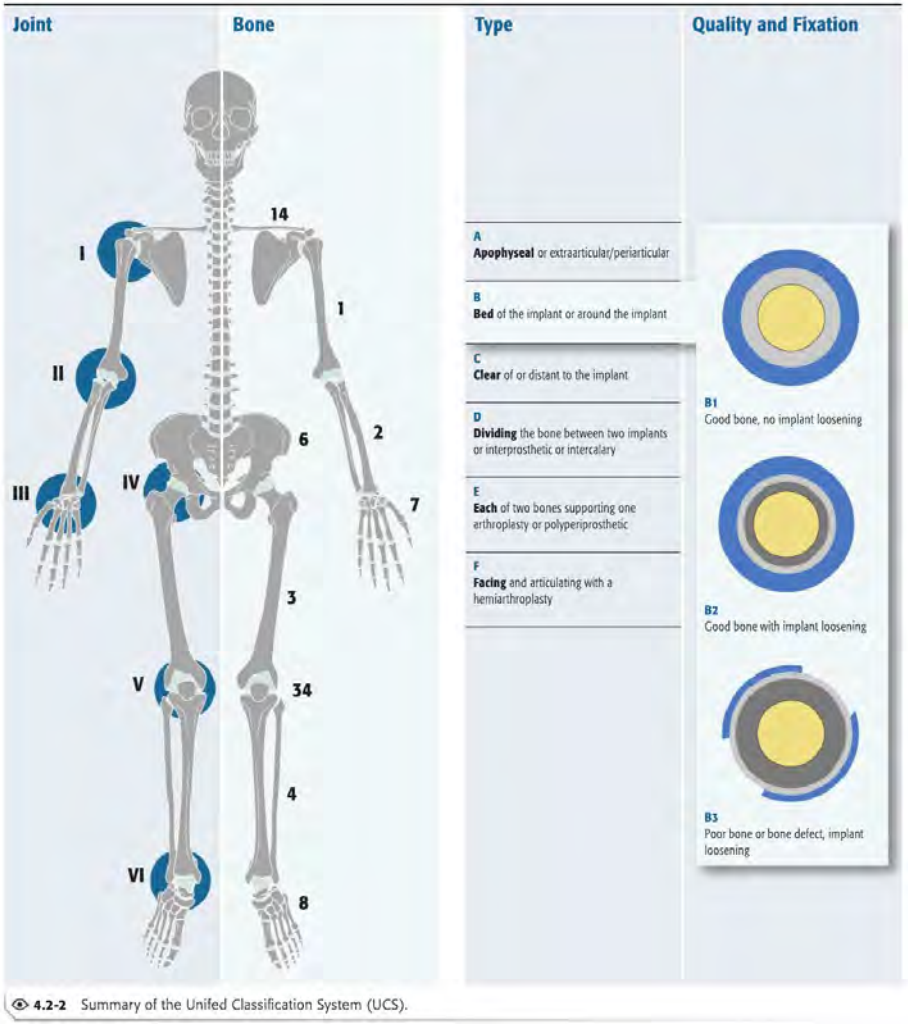
Benazzo et al. (2015) Periprosthetic acetabular fractures. Int Orthop 39(10):1959-63


DX

Classifications

Peterson and Lewallen

- type I: the cup was radiographically stable; in
- type II: the acetabular component was clearly displaced or radiographically loose



Peterson CA, Lewallen DG (1996) Periprosthetic fracture of the acetabulum after total hip arthroplasty. J Bone Joint Surg Am 78:1206

Duncan CP, Haddad FS (2014) The Unified Classification System (UCS): improving our understanding of periprosthetic fractures. Bone Joint J 96-b(6):713–716.

Classifications

1. Intraoperative during component insertion	a. Recognised, stable component, undisplaced fracture
	b. Recognised, displaced fracture, cup unstable
	c. Not recognised intraoperatively
2. Intraoperative during removal	a. Less than 50 % bone stock loss
	b. Greater than 50 % bone stock loss
3. Traumatic	a. Component stable
	b. Component unstable
4. Spontaneous	a. Less than 50 % bone stock loss
	b. Greater than 50 % bone stock loss
5. Pelvic discontinuity	a. Less than 50 % bone stock loss
	b. Greater than 50 % bone stock loss
	c. Associated with pelvic radiation

Della Valle CJ, Momberger NG, Paprosky WG (2003) Periprosthetic fractures of the acetabulum associated with a total hip arthroplasty. Instr Course Lect 52:281–290

Peterson CA, Lewallen DG (1996) Periprosthetic fracture of the acetabulum after total hip arthroplasty. J Bone Joint Surg Am 78:1206

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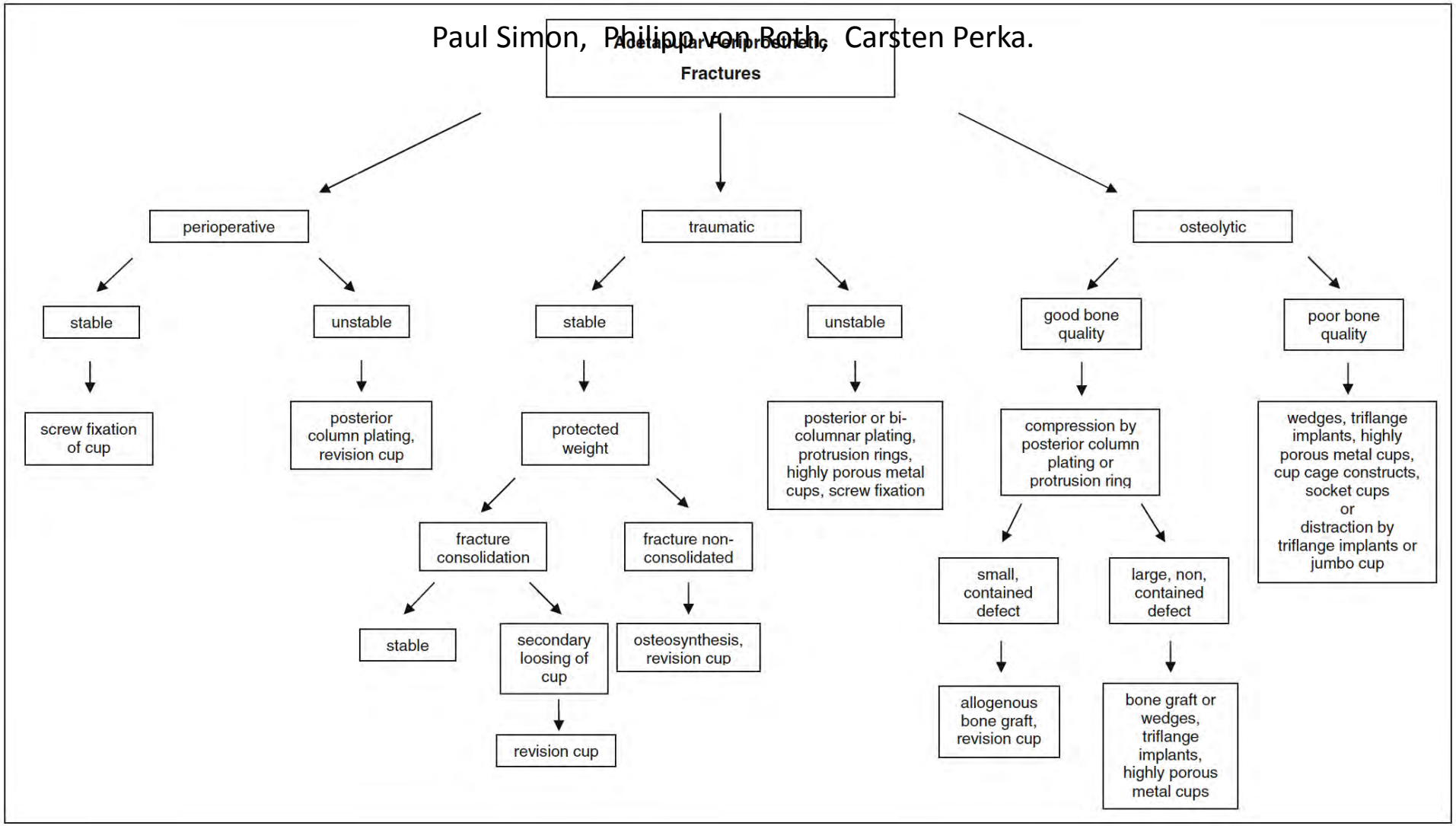
Treatment algorithm of acetabular periprosthetic fractures

Paul Simon, Philipp von Roth, Carsten Perka.



International Orthopaedics (SICOT) (2015) 39:1995–2003 DOI 10.1007/s00264-015-2968-3

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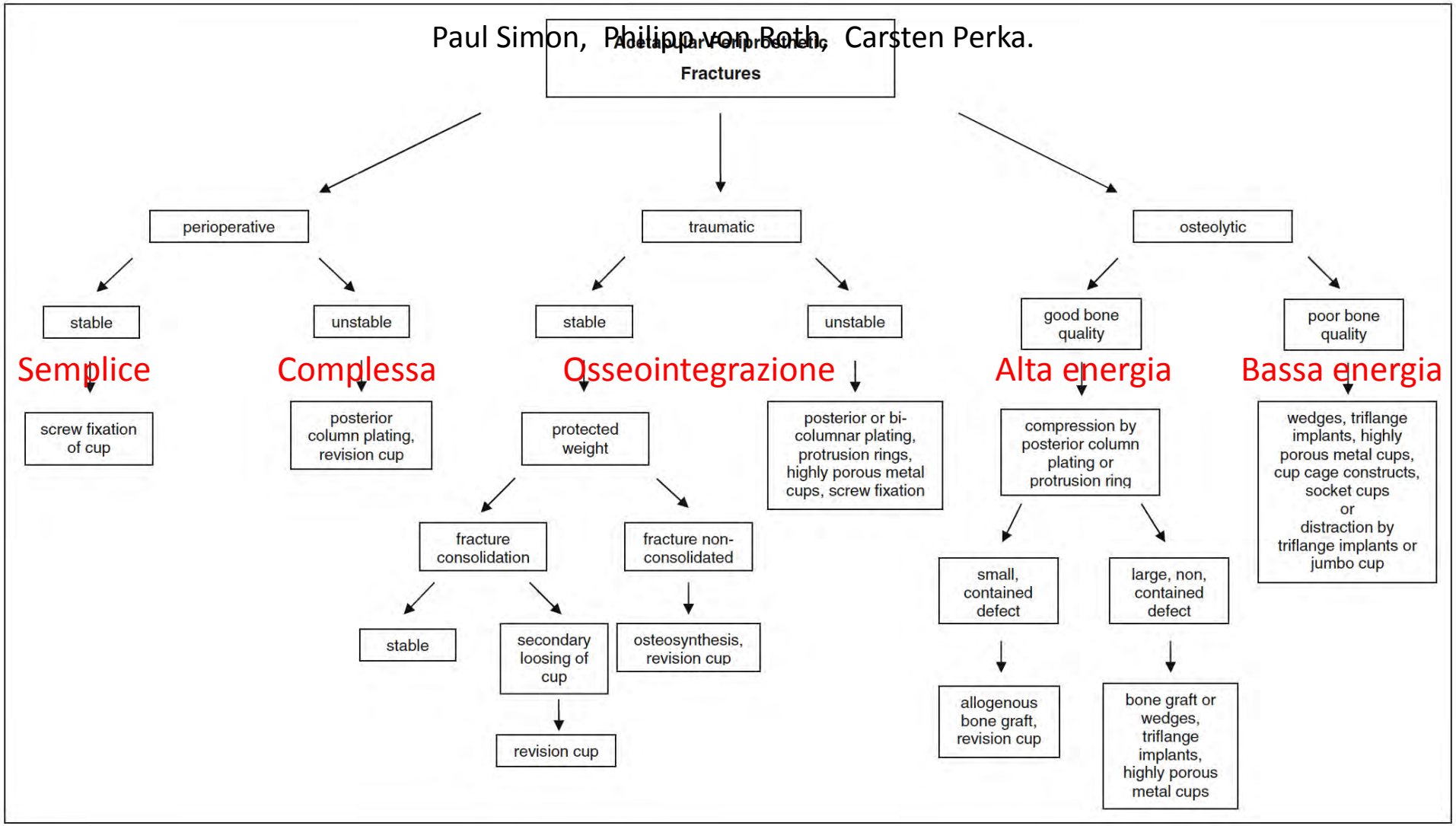

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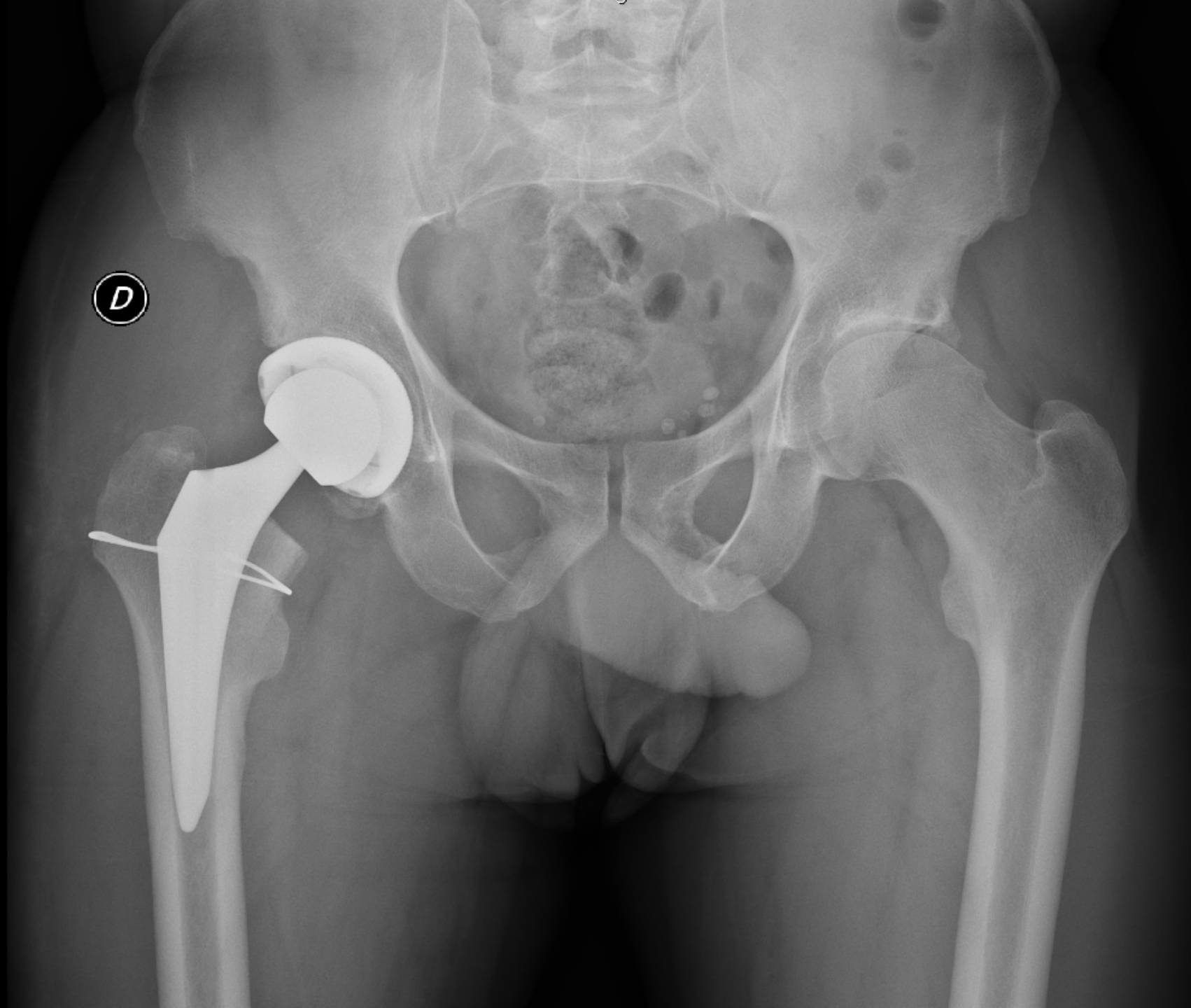
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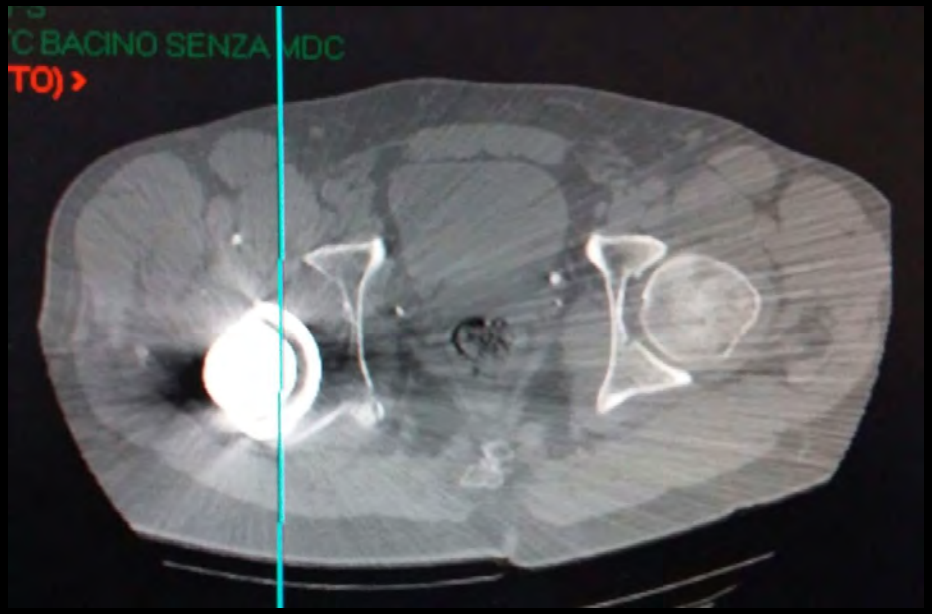
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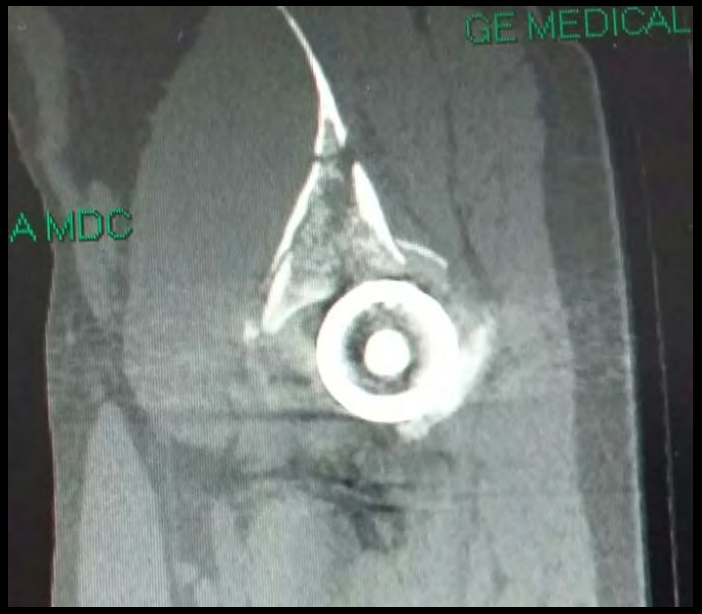
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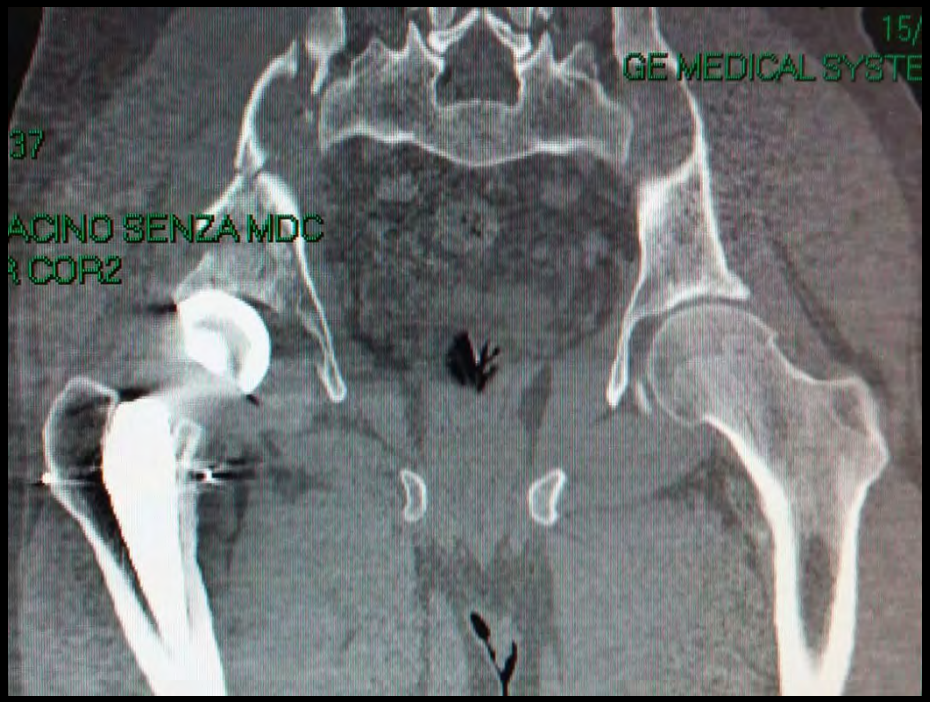
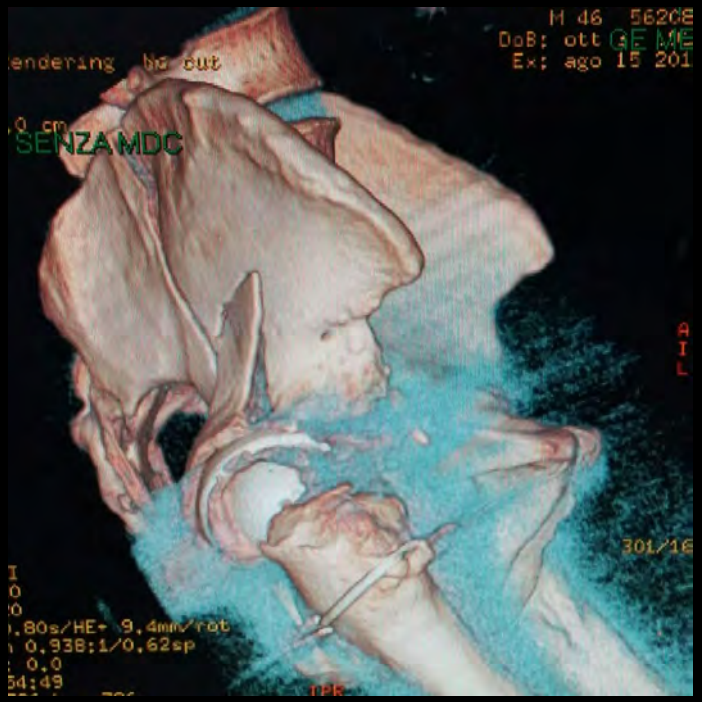
A MDC


15/
GE MEDICAL SYSTE
37
ACINO SENZA MDC
COR2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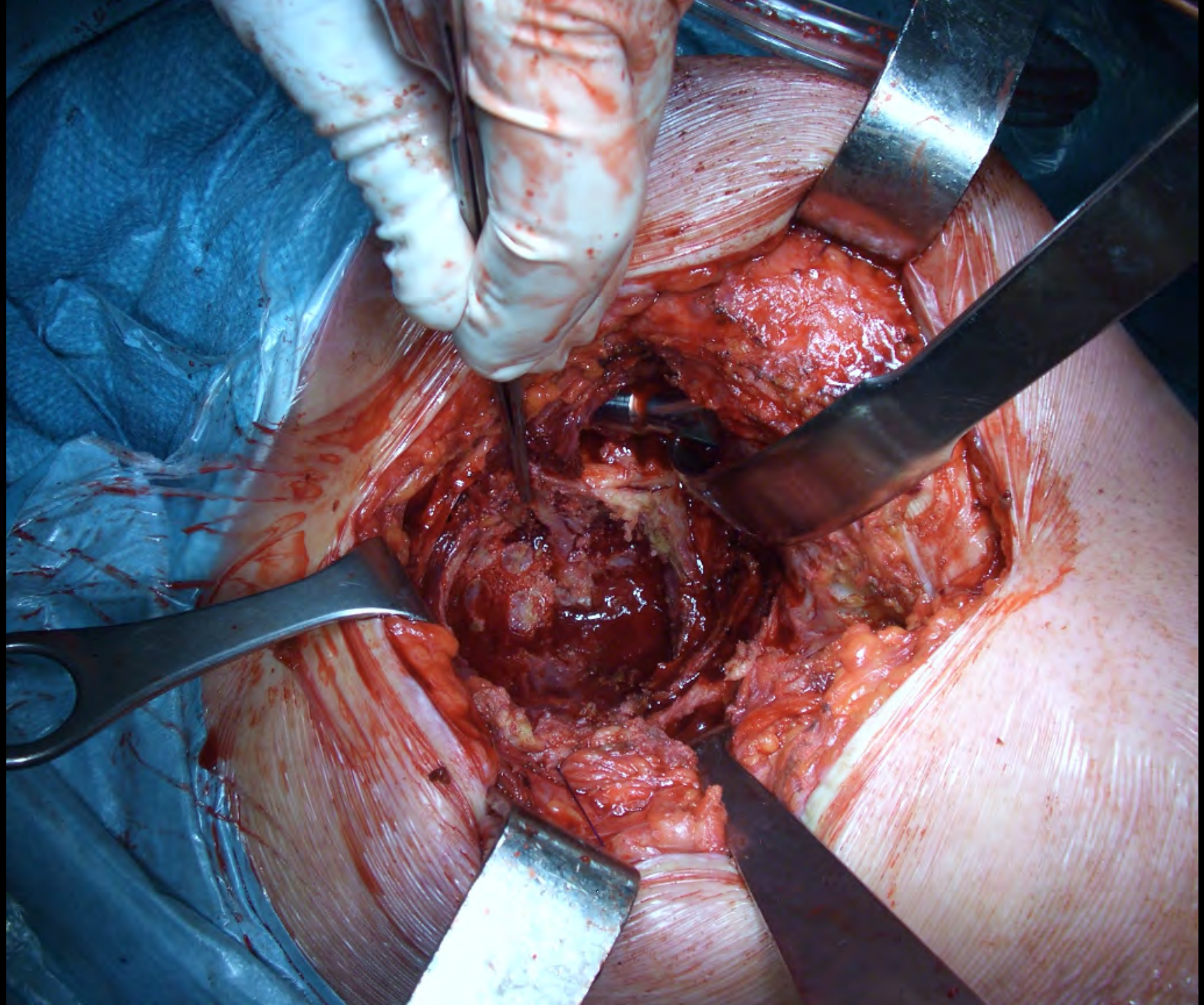
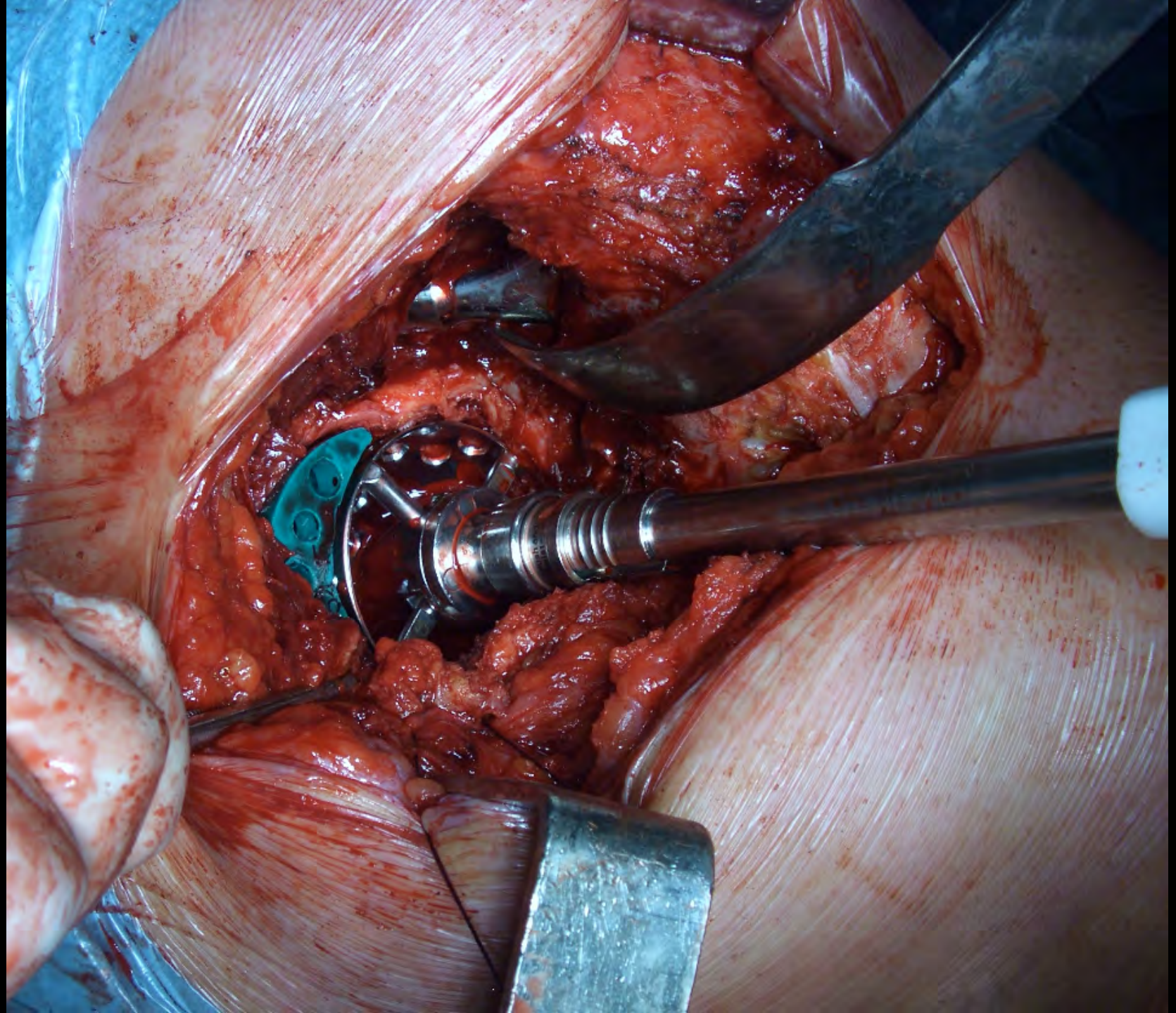
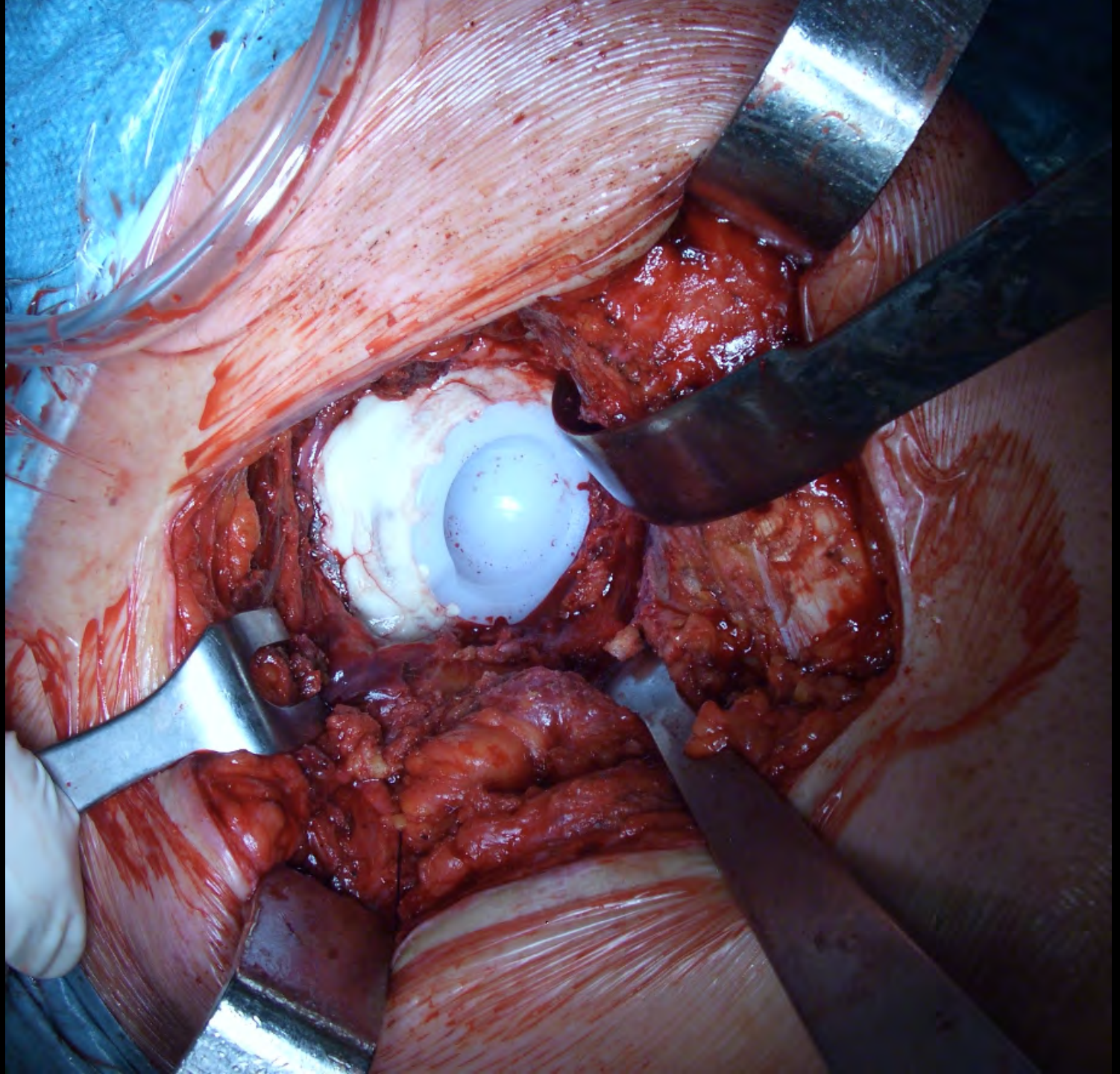
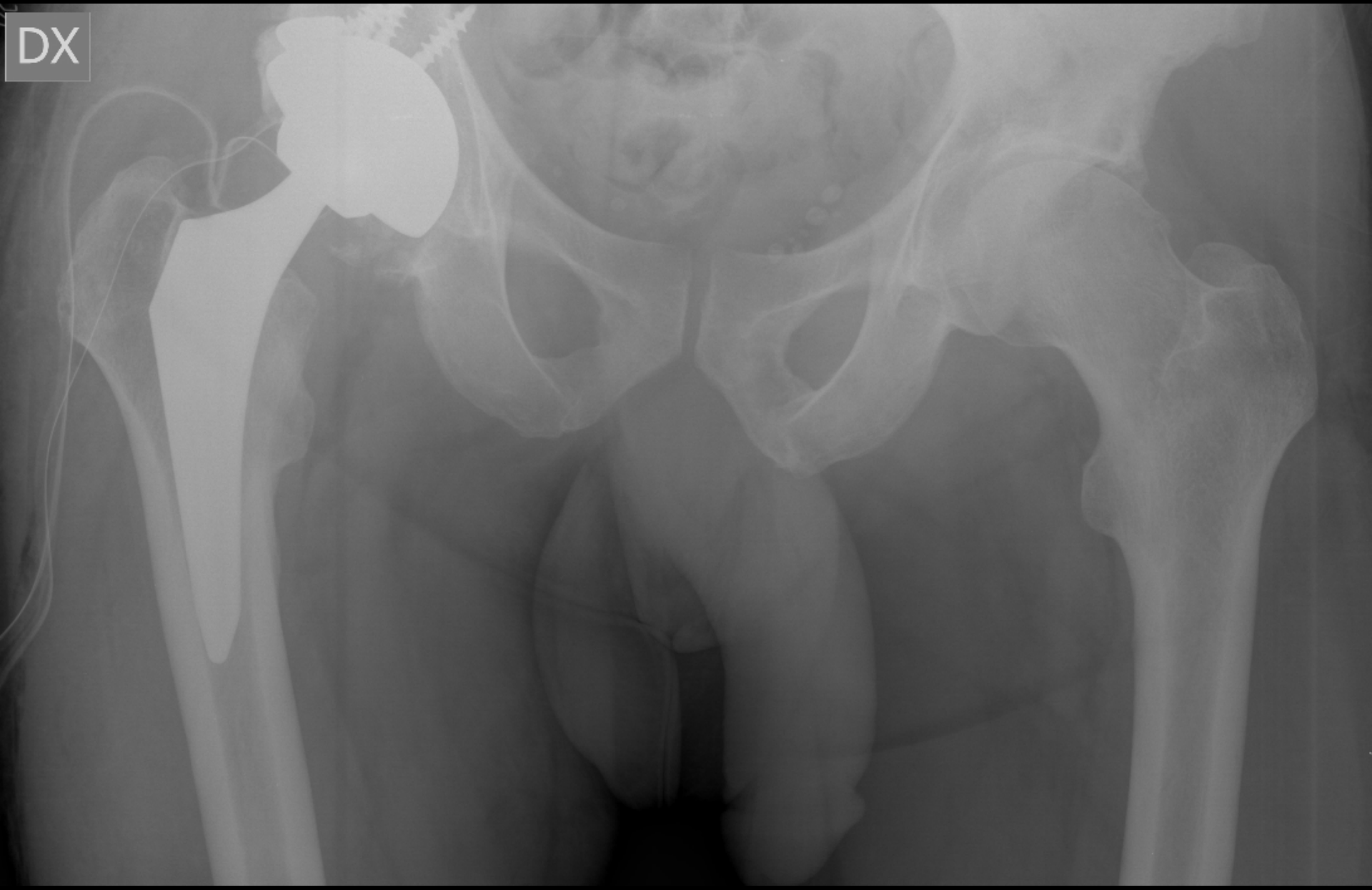
DoB: ott
Ex: ago 15 201
endering
SENZA MDC
301/16
.80s/HE
9.4mm/rot
0.938:1/0.62sp
0.0
54:49








DX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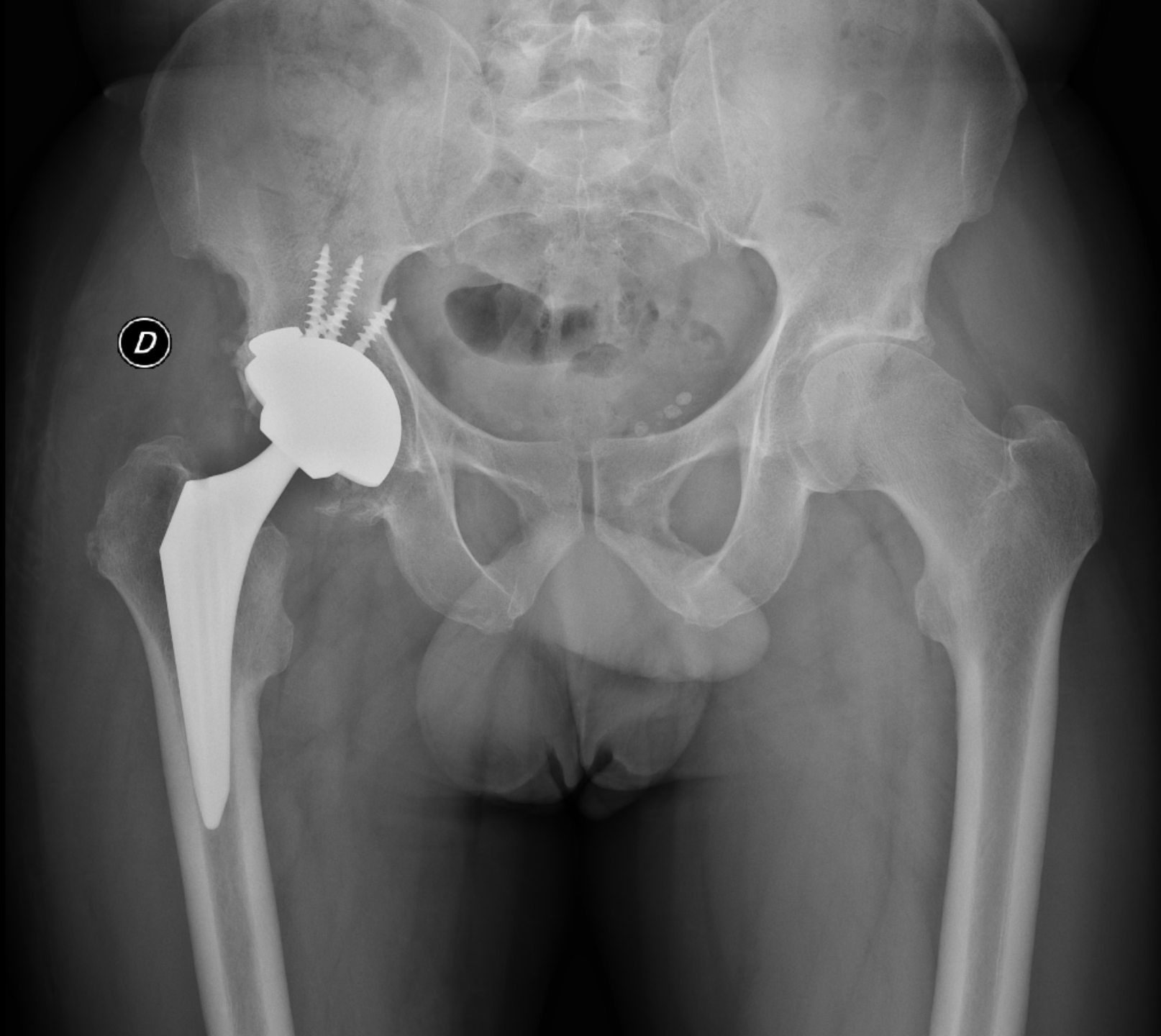
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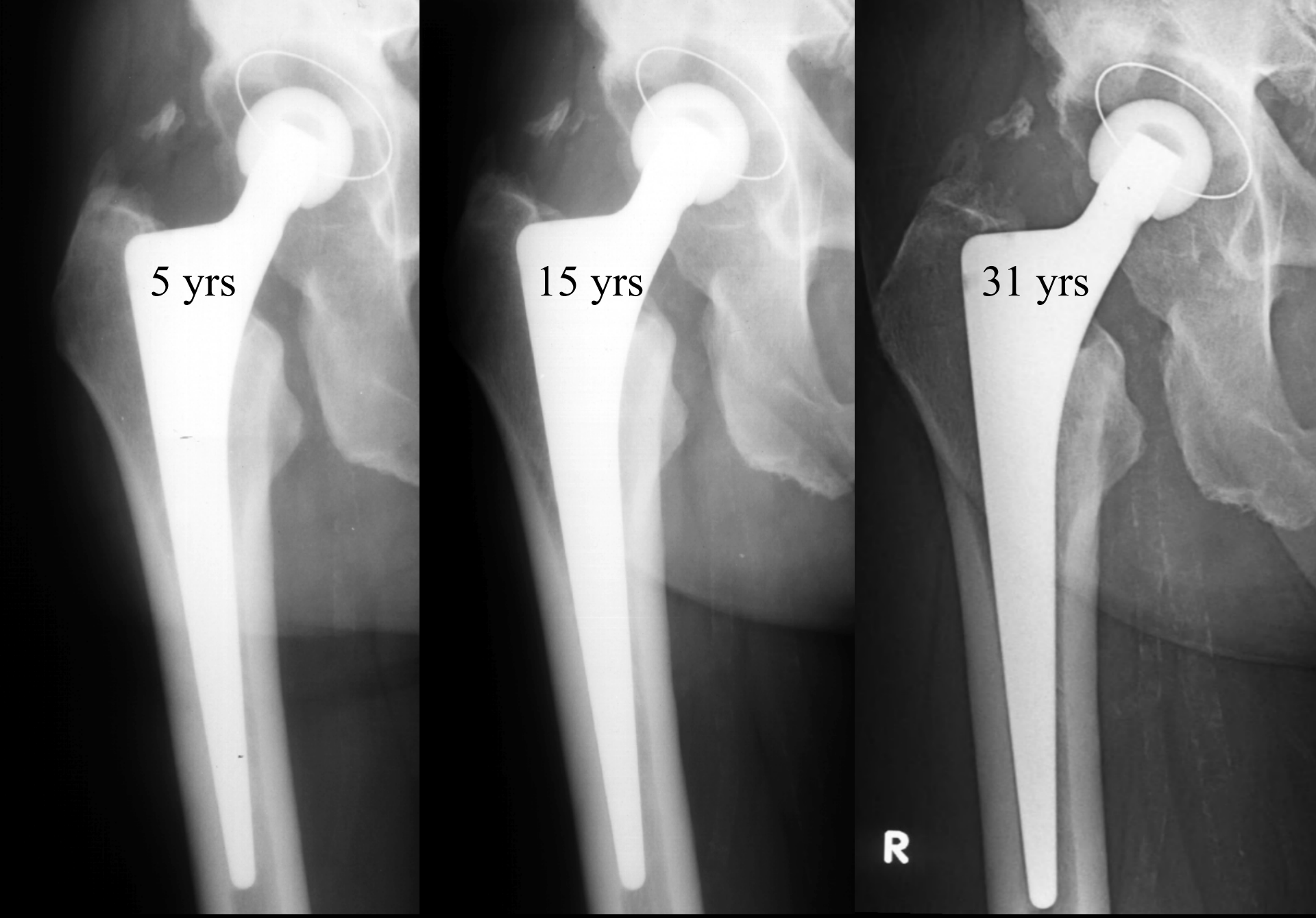
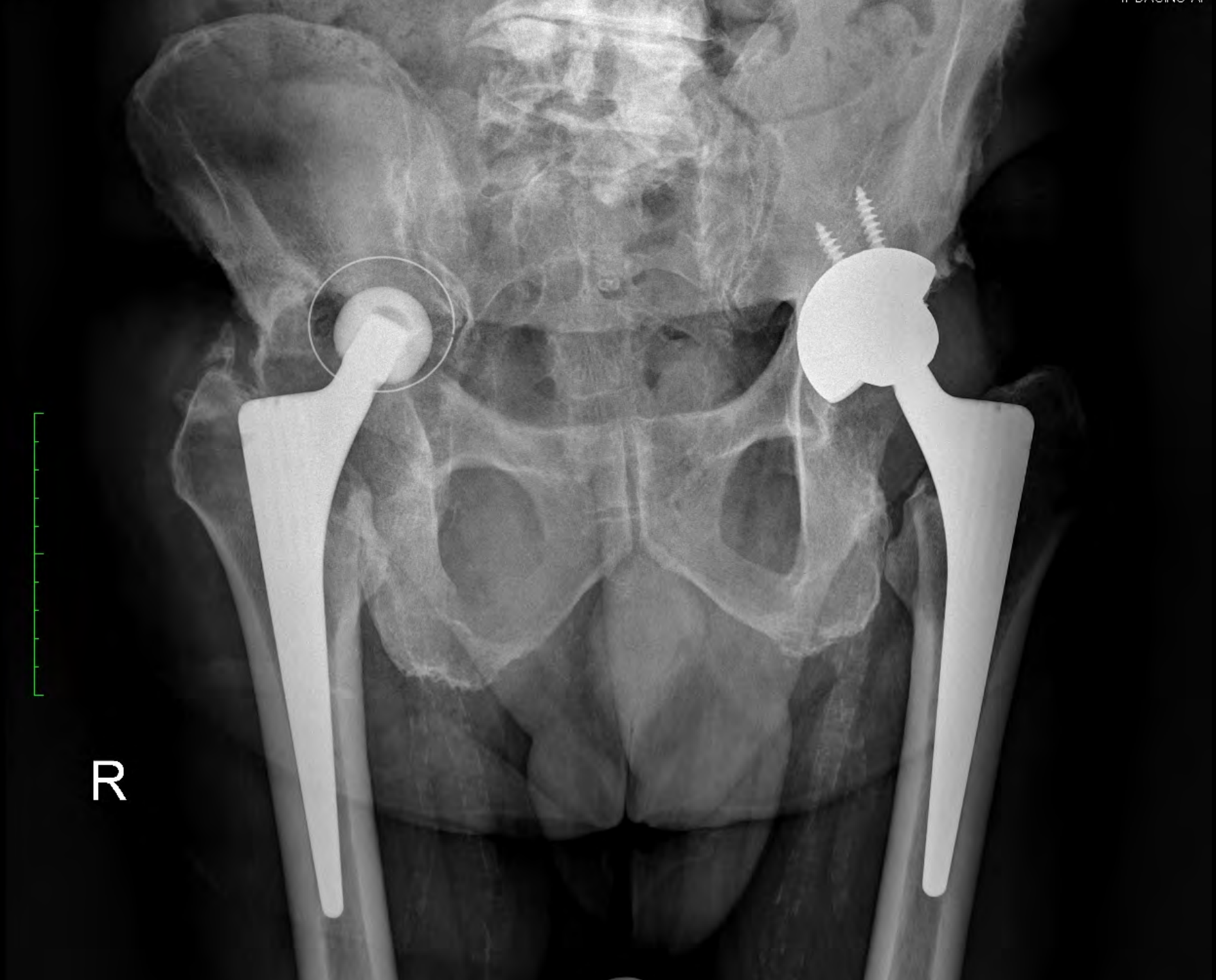

5 yrs
15 yrs
31 yrs
R


R

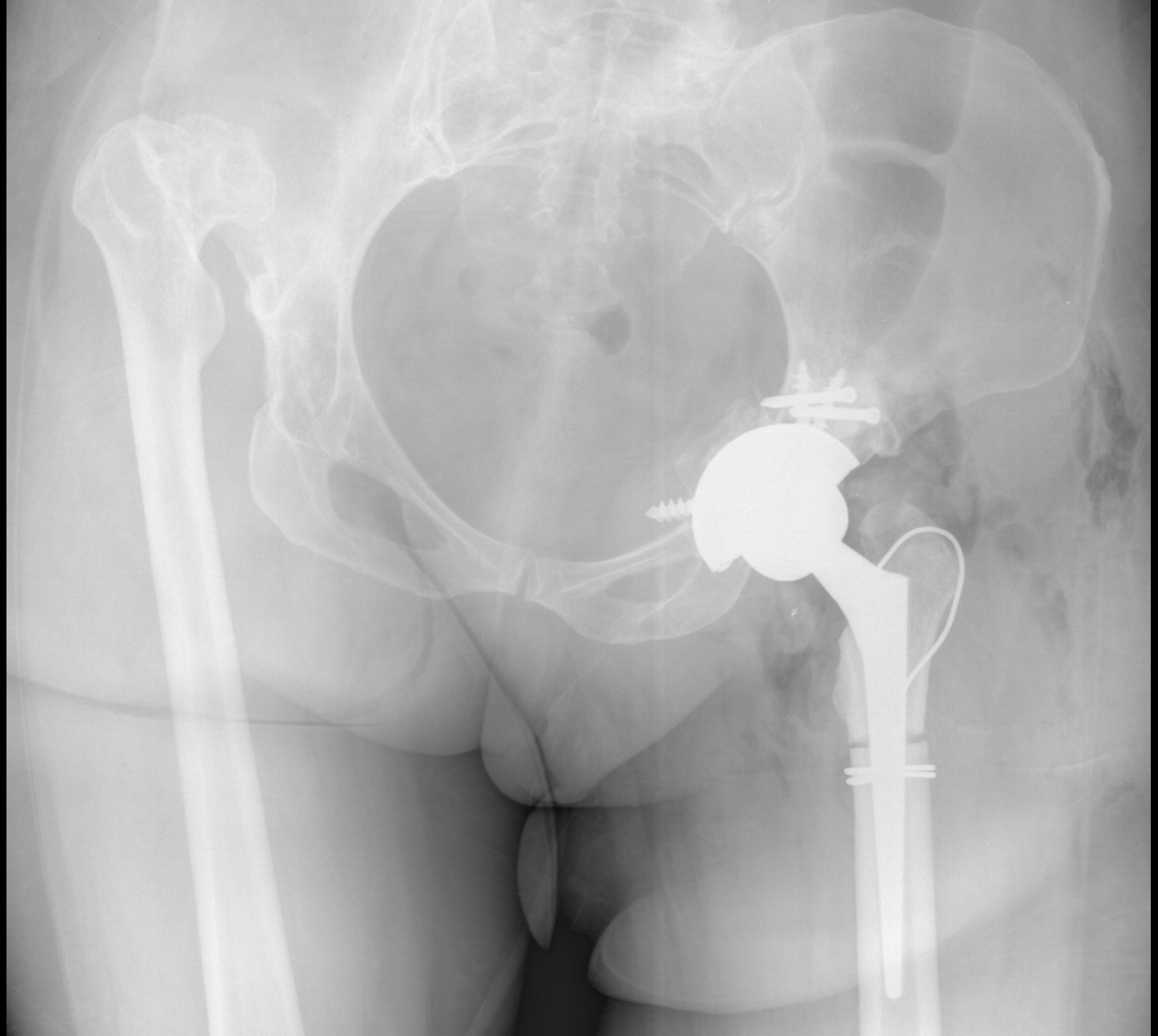

Dimensione Immagine: 4200 x 3408
WL: -2980 WW: 793
Piana Paolo Luigi 1883510 (84 y , 84 y)
Rx Bacino
DX

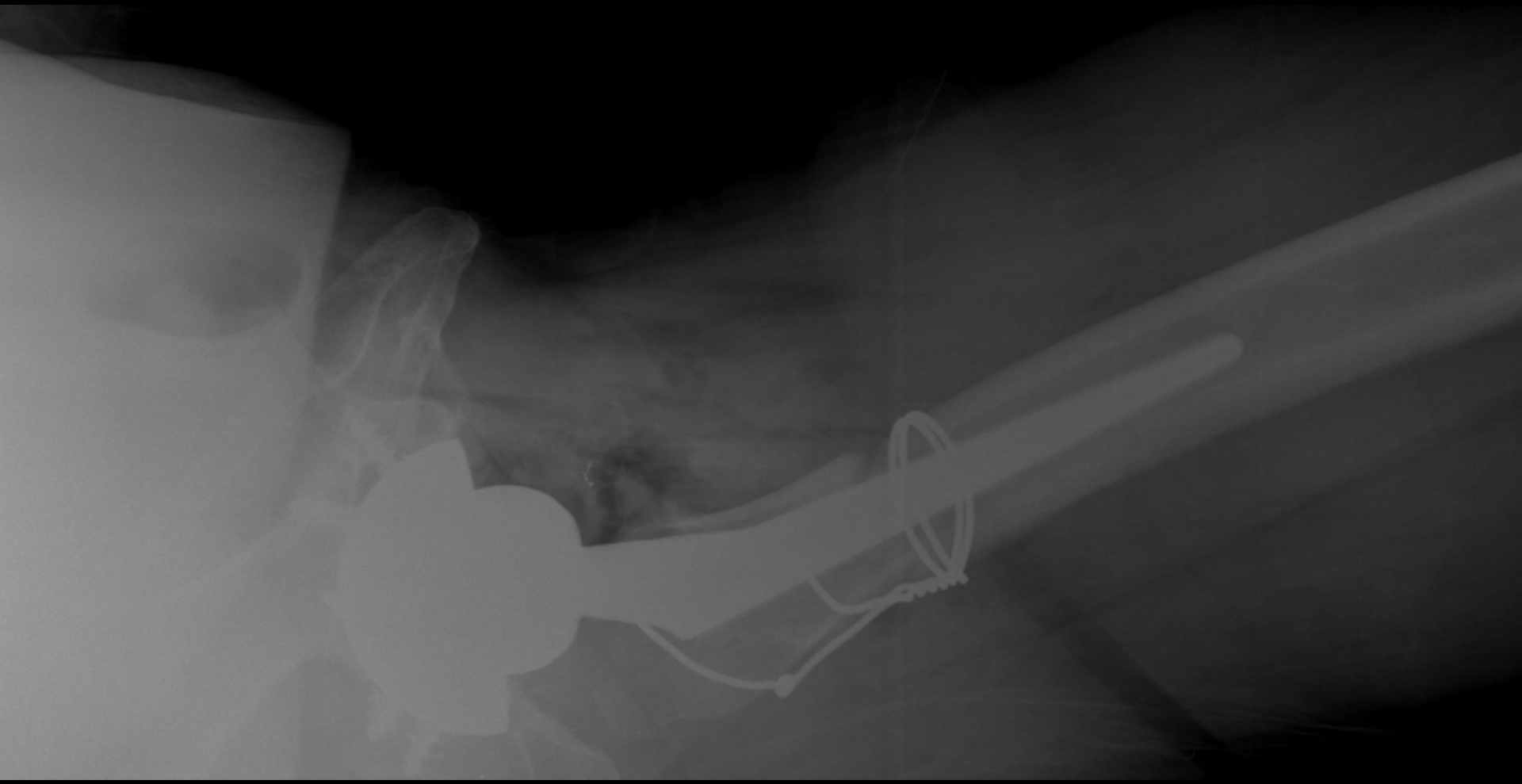
Peri-operative

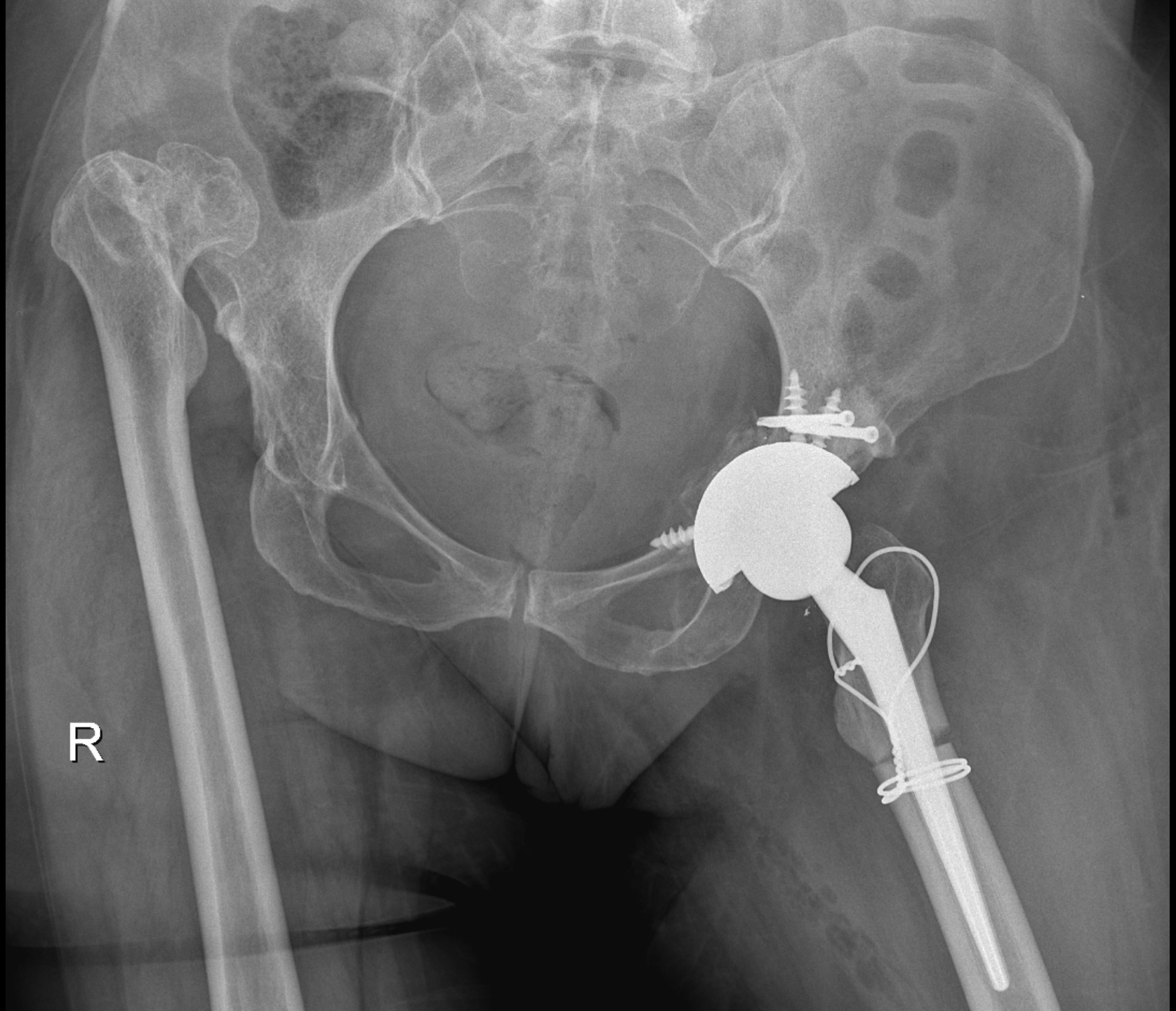
Intraoperative

- Recognized intraoperatiovely
- The most common event is a vertical, incomplete splitting of the posterior column due to under-reaming in sclerotic bone
- if the final implant appears to be stable on testing with a cup introducer, the use of supplemental screws is recommended
- In displaced fractures with an unstable cup pelvic stabilisation should be performed with single or double plating of the posterior column before implanting the final cup

Benazzo et al. (2015) Periprosthetic acetabular fractures. Int Orthop 39(10):1959-63



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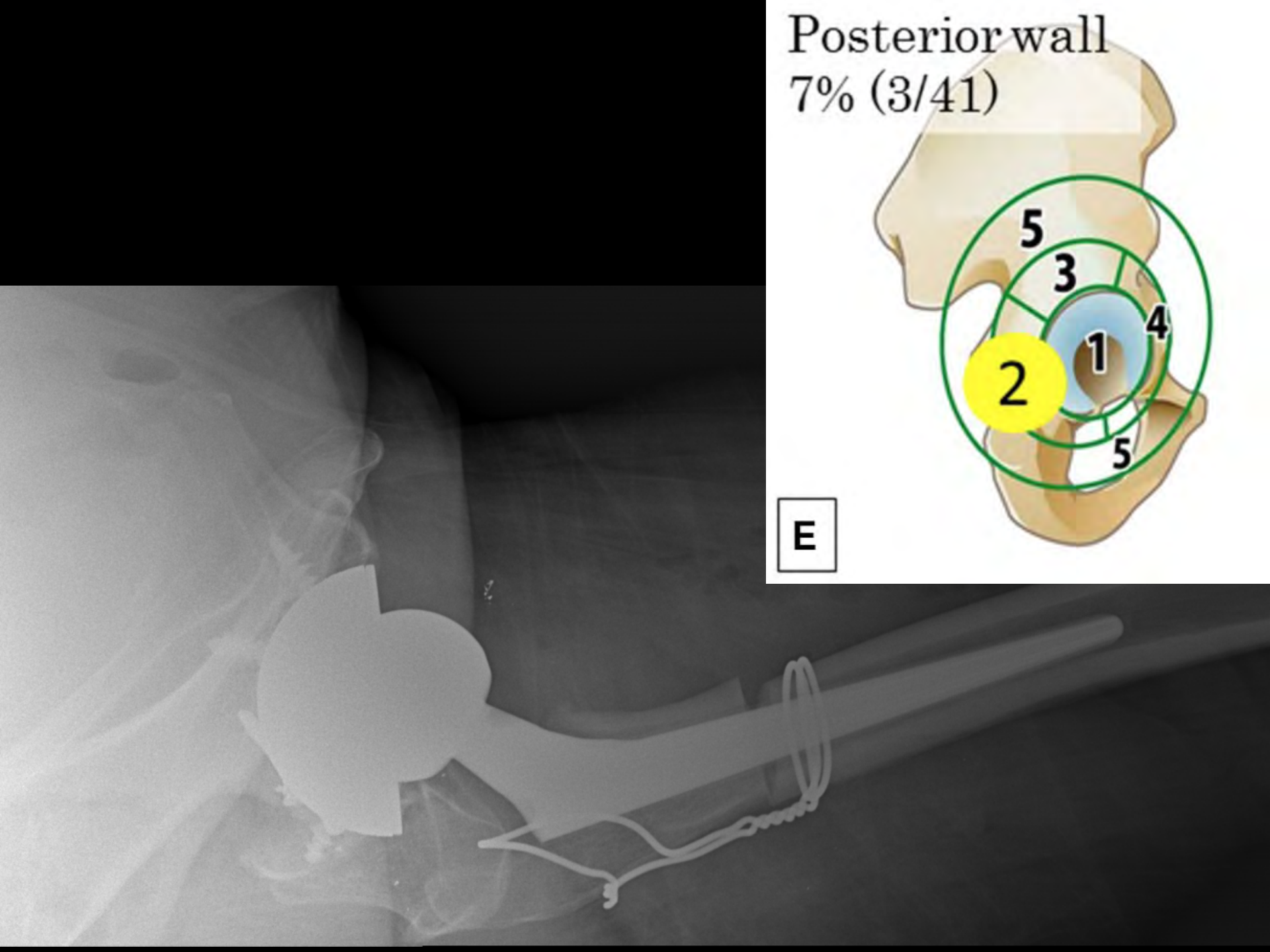
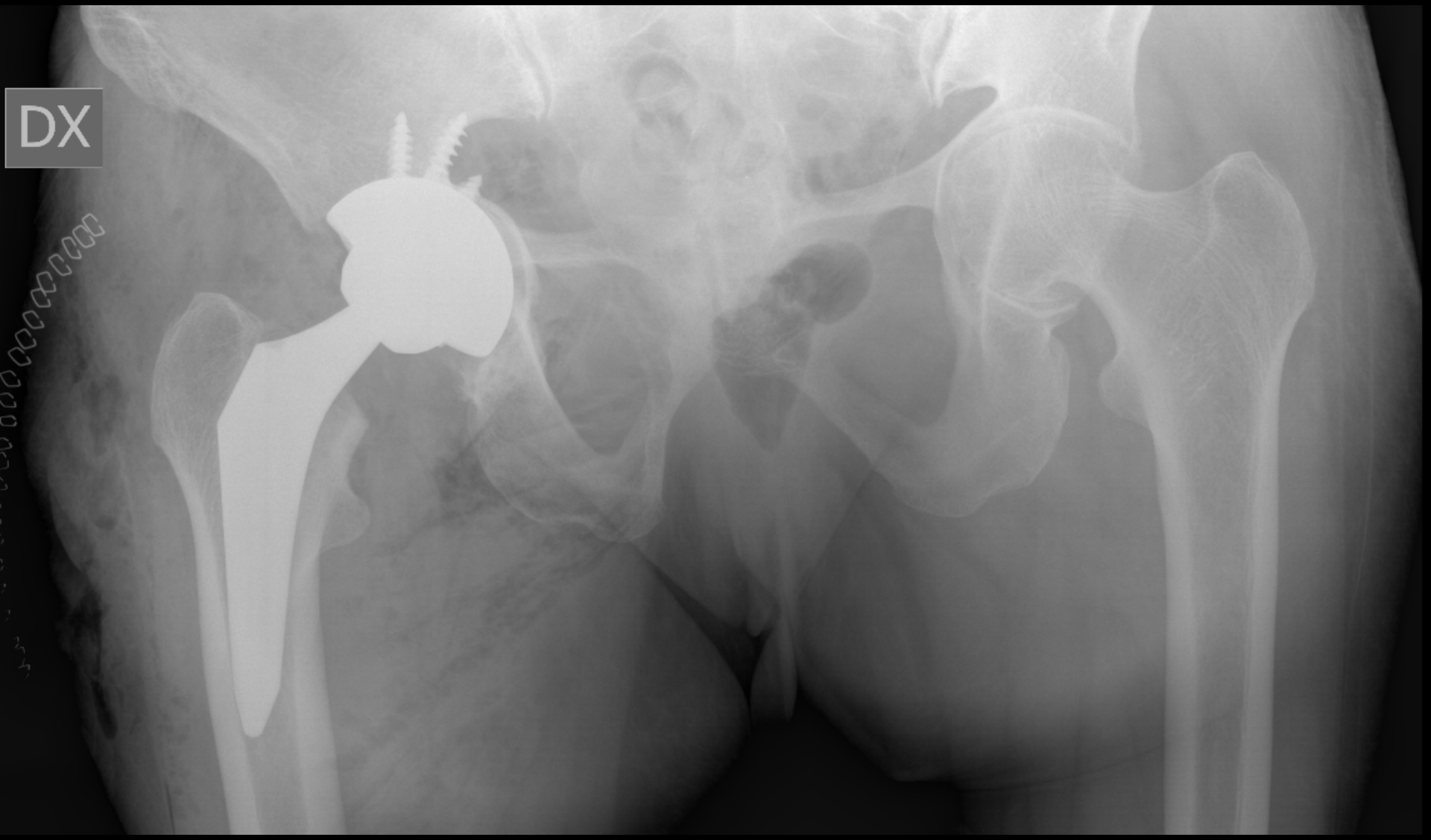

Posterior wall
7% (3/41)
5
3
4
1
2
5
E

Peri-operative

Early post-operative

- Not recognized intraoperatiovely and diagnosed at the post-op x-ray or
- the fracture may be missed initially and present with delayed displacement and even pelvic discontinuity
- In the case of an early post-operative acetabular fracture, a missed intra-operative fracture should be considered

Benazzo et al. (2015) Periprosthetic acetabular fractures. Int Orthop 39(10):1959-63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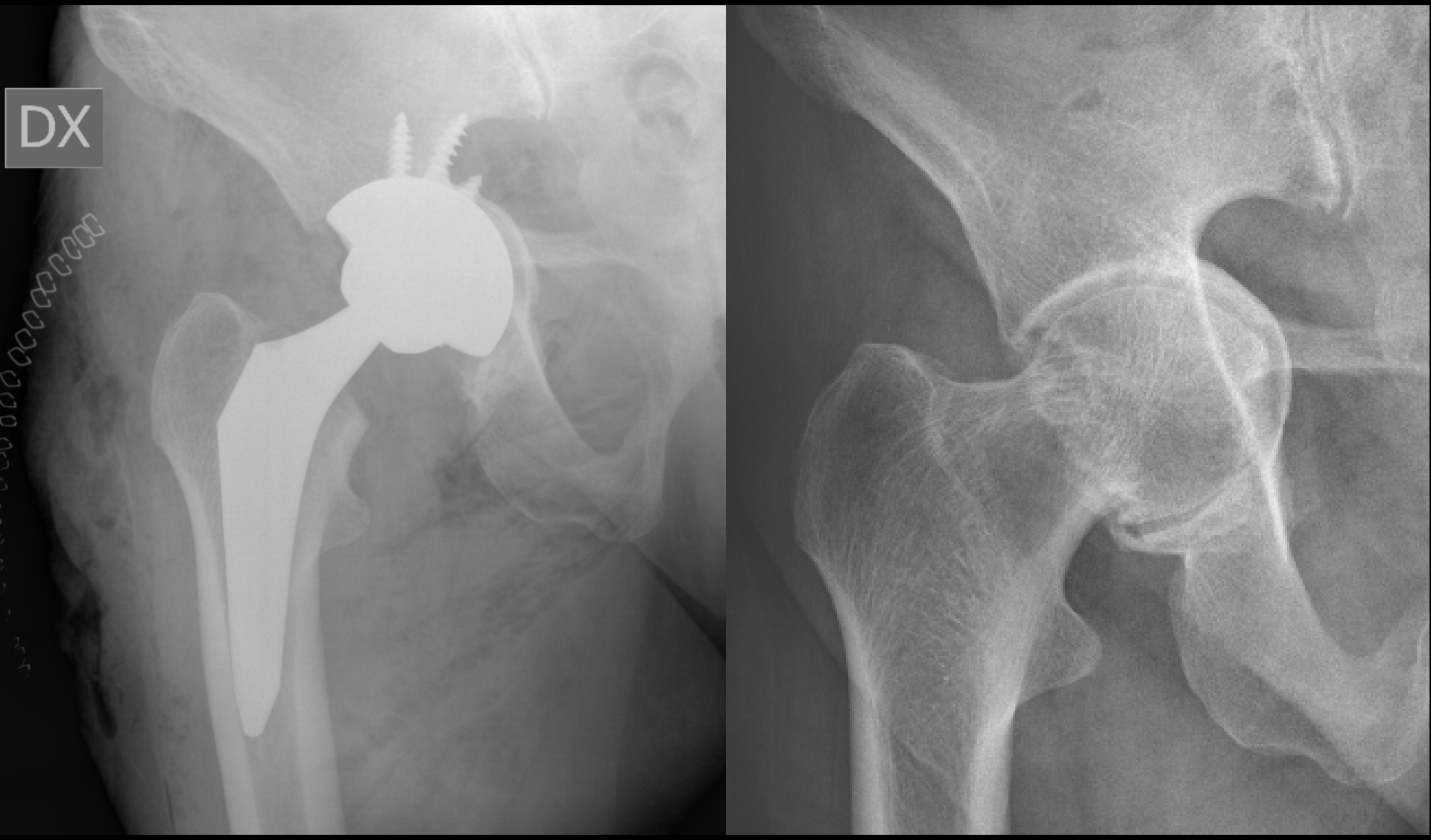
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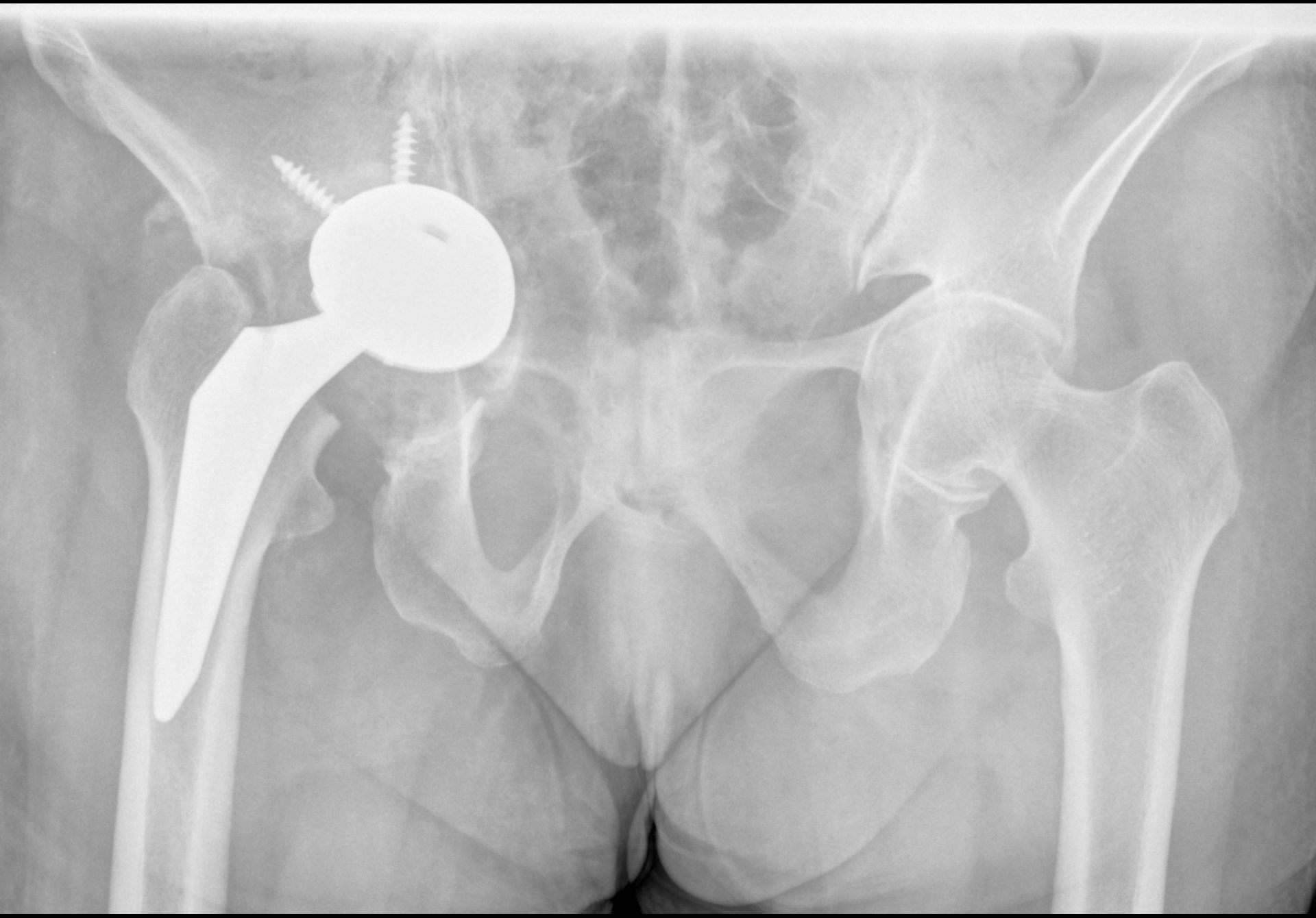

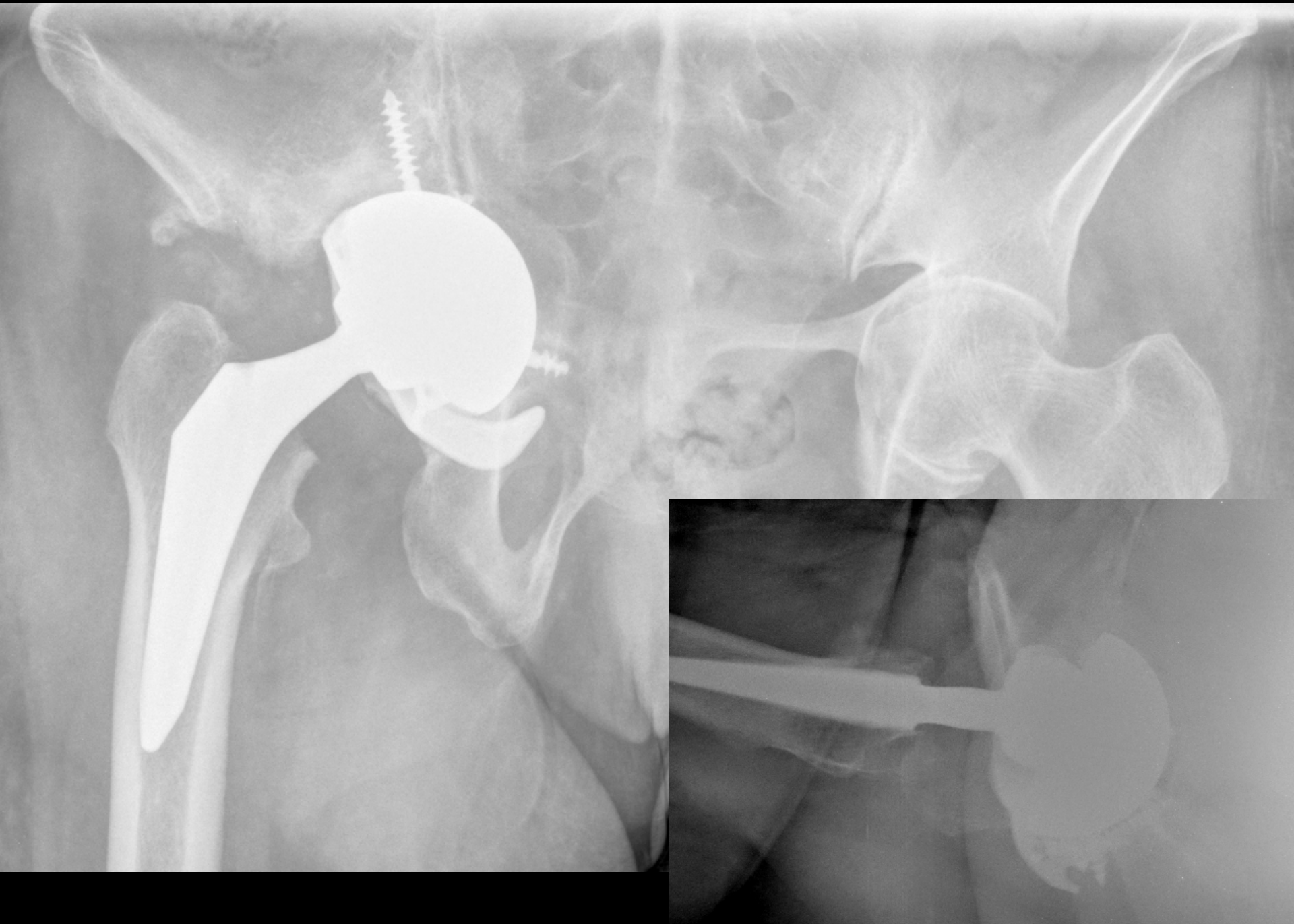

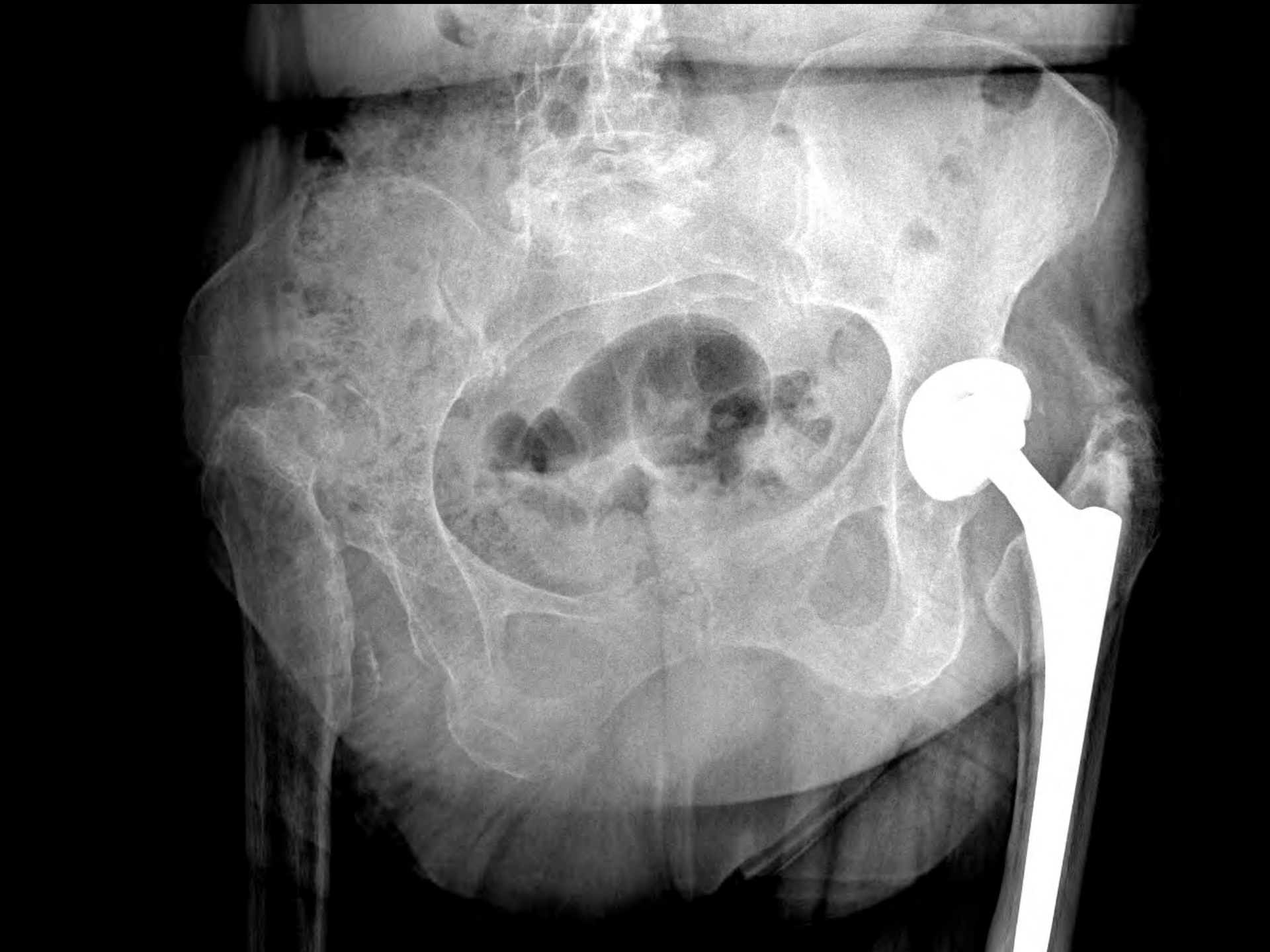


DX
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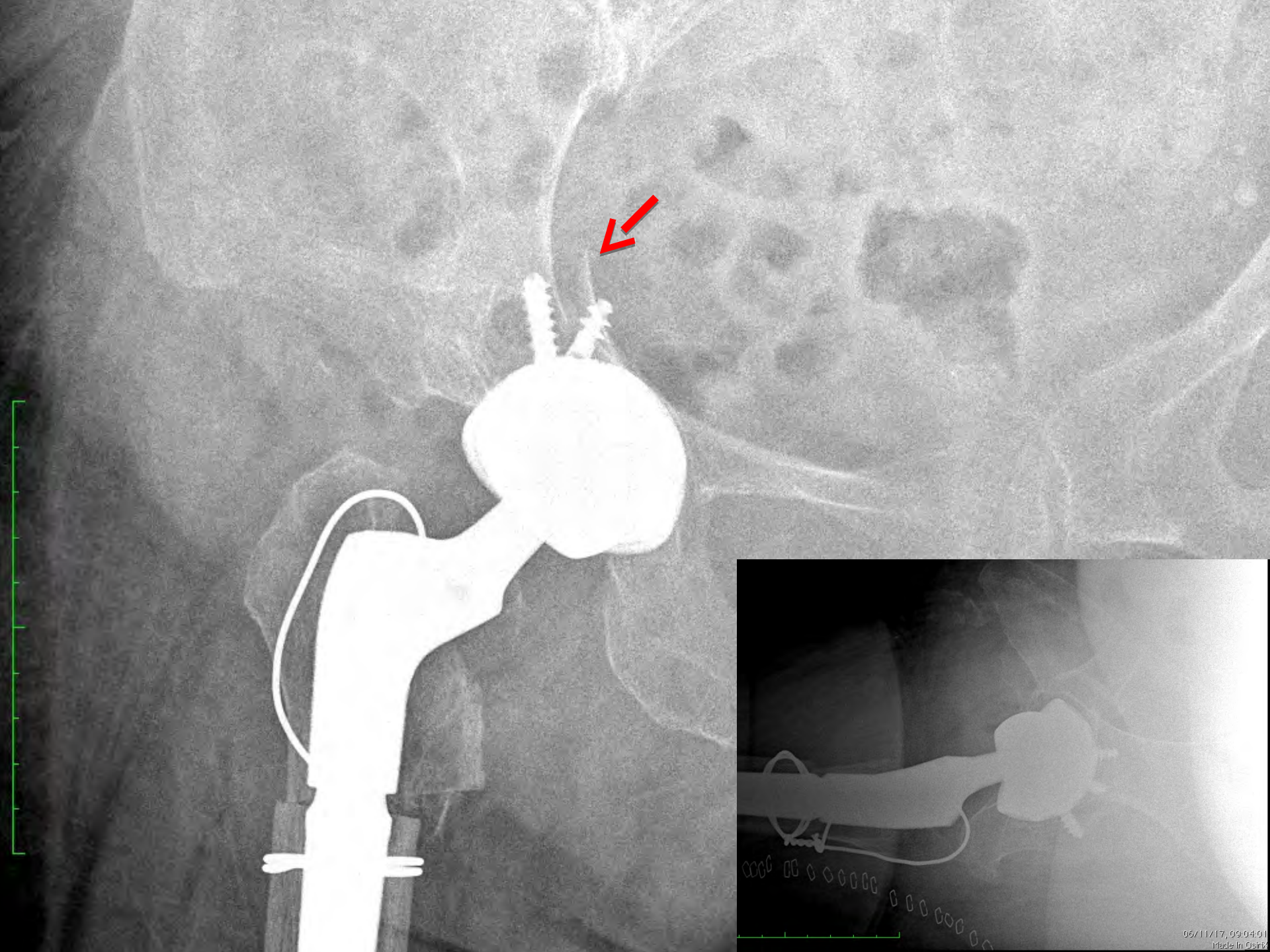
JPEG2000LosslessOnly
Posizione: AP

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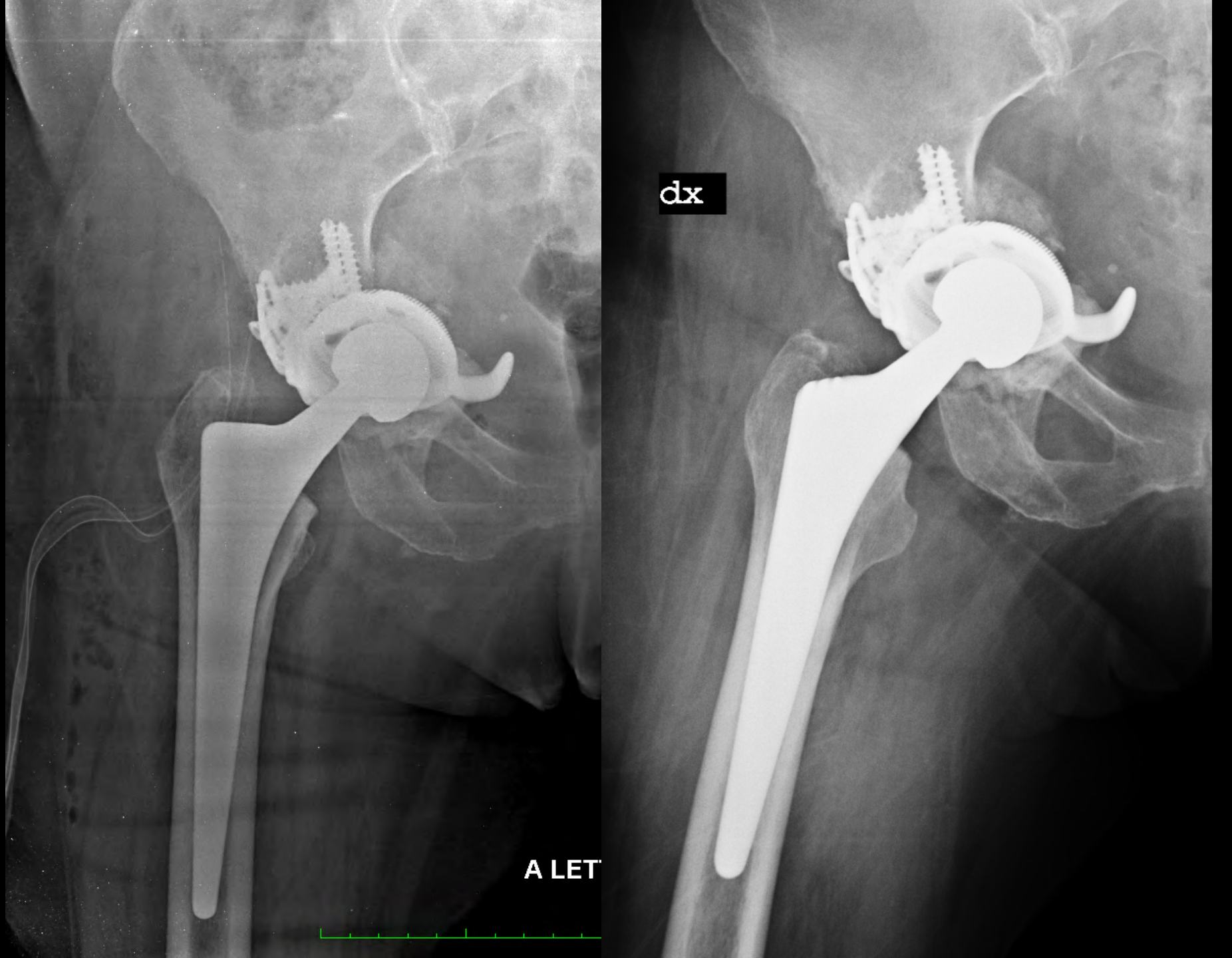
A LETTO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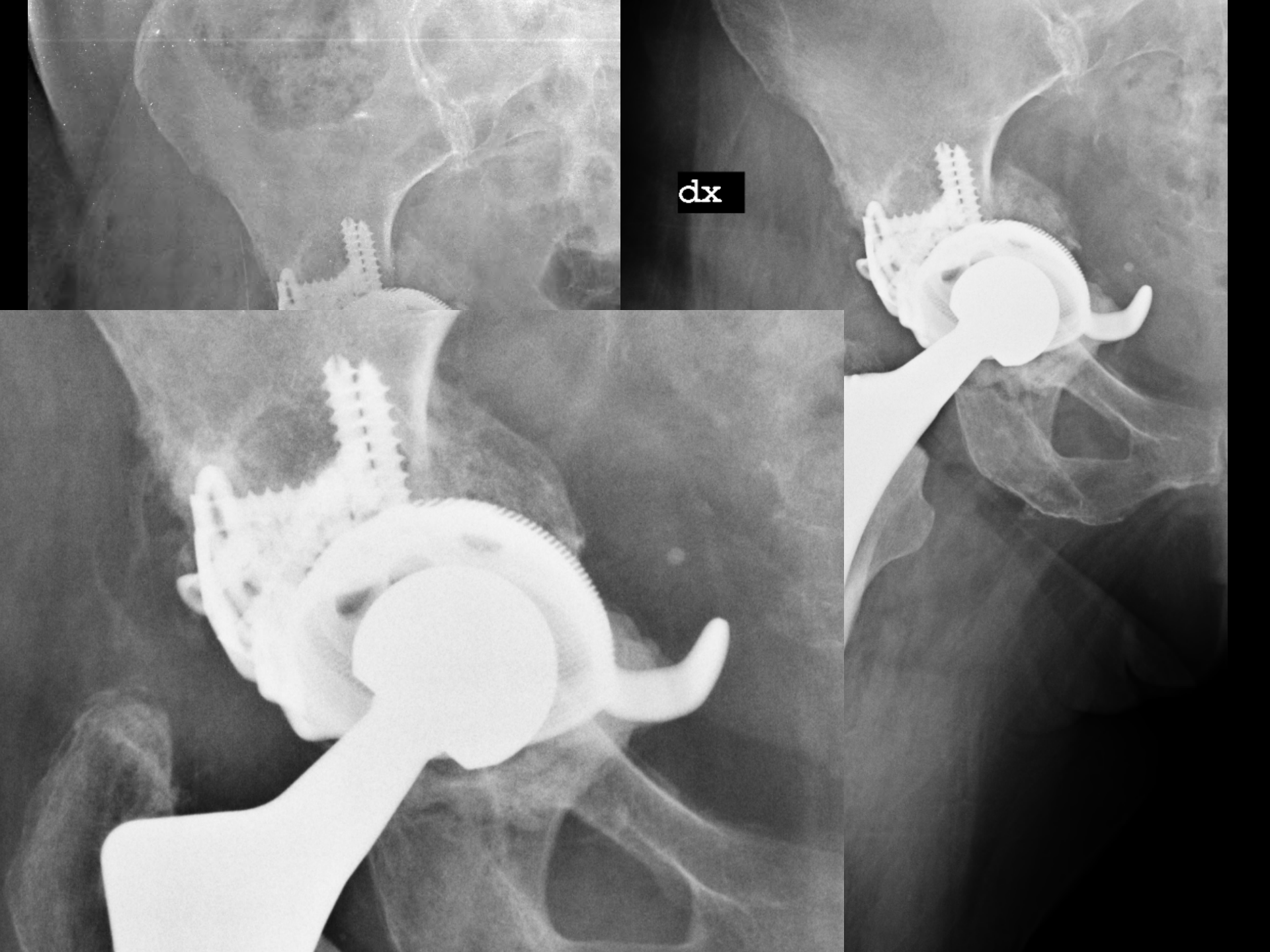
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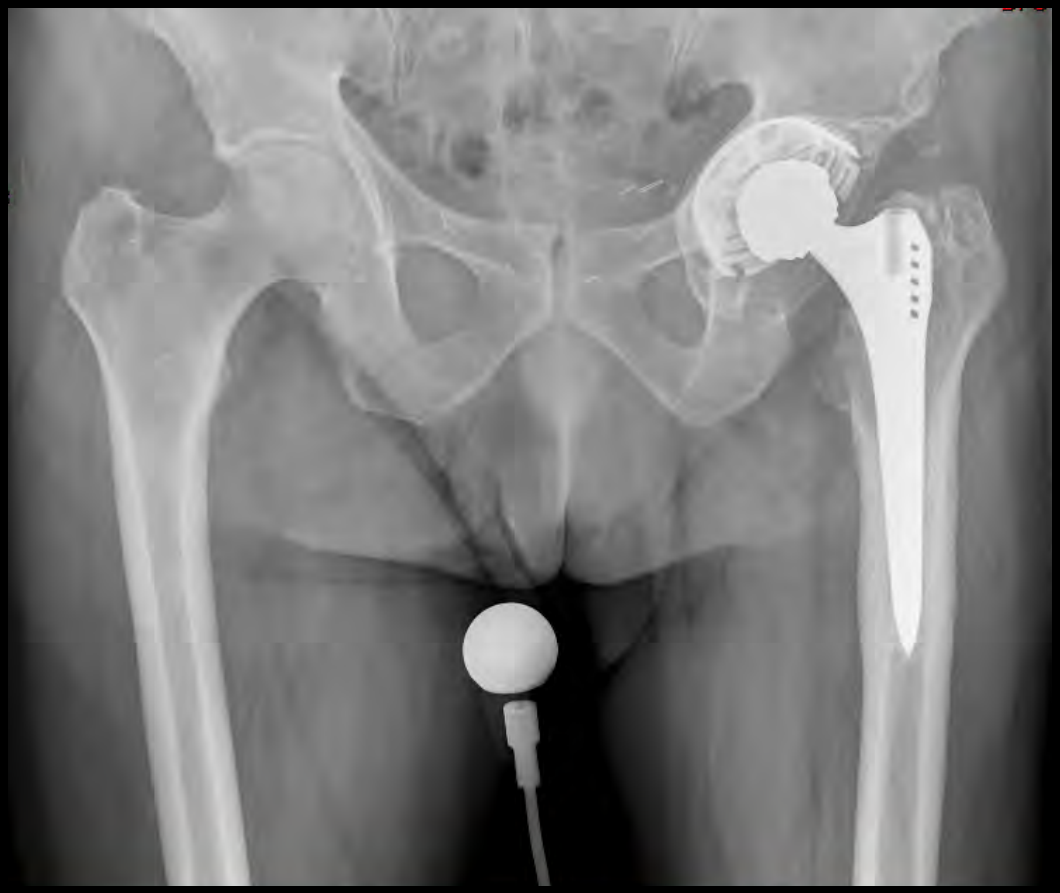
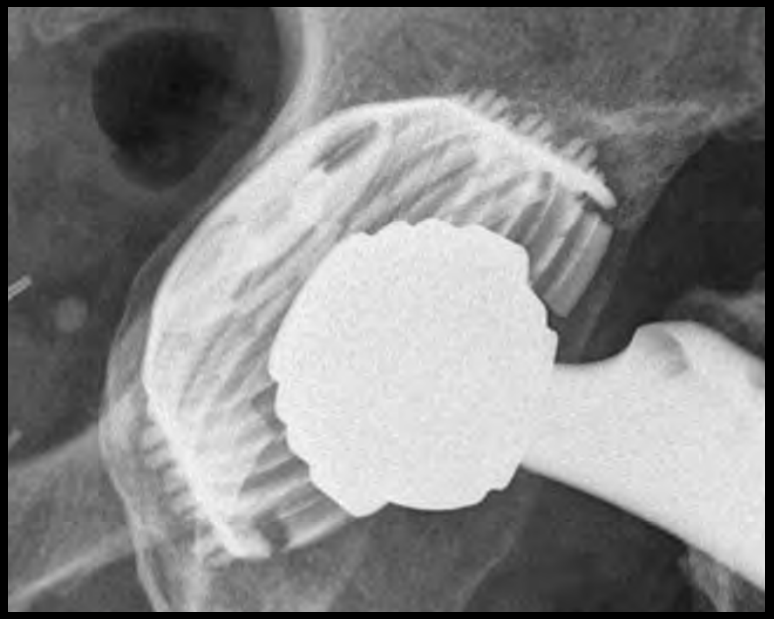
Rev PTA Sinistra

84 anni





Rev PTA Sinistra
84 anni

Intervento Chirugico
9.11.2017 – Controllo Postop

Rev PTA Sinistra

84 anni

16.11.2017 – controllo Rx

(Situazione attuale)

HUMANITAS
RESEARCH HOSPITAL

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