

F. FALEZ



Custom made e recupero
delle geometrie

LA REVISIONE
COMPLESSA



LA REVISIONE
MOLTO
COMPLESSA

BERRY IVa,b,c

AAOS IV

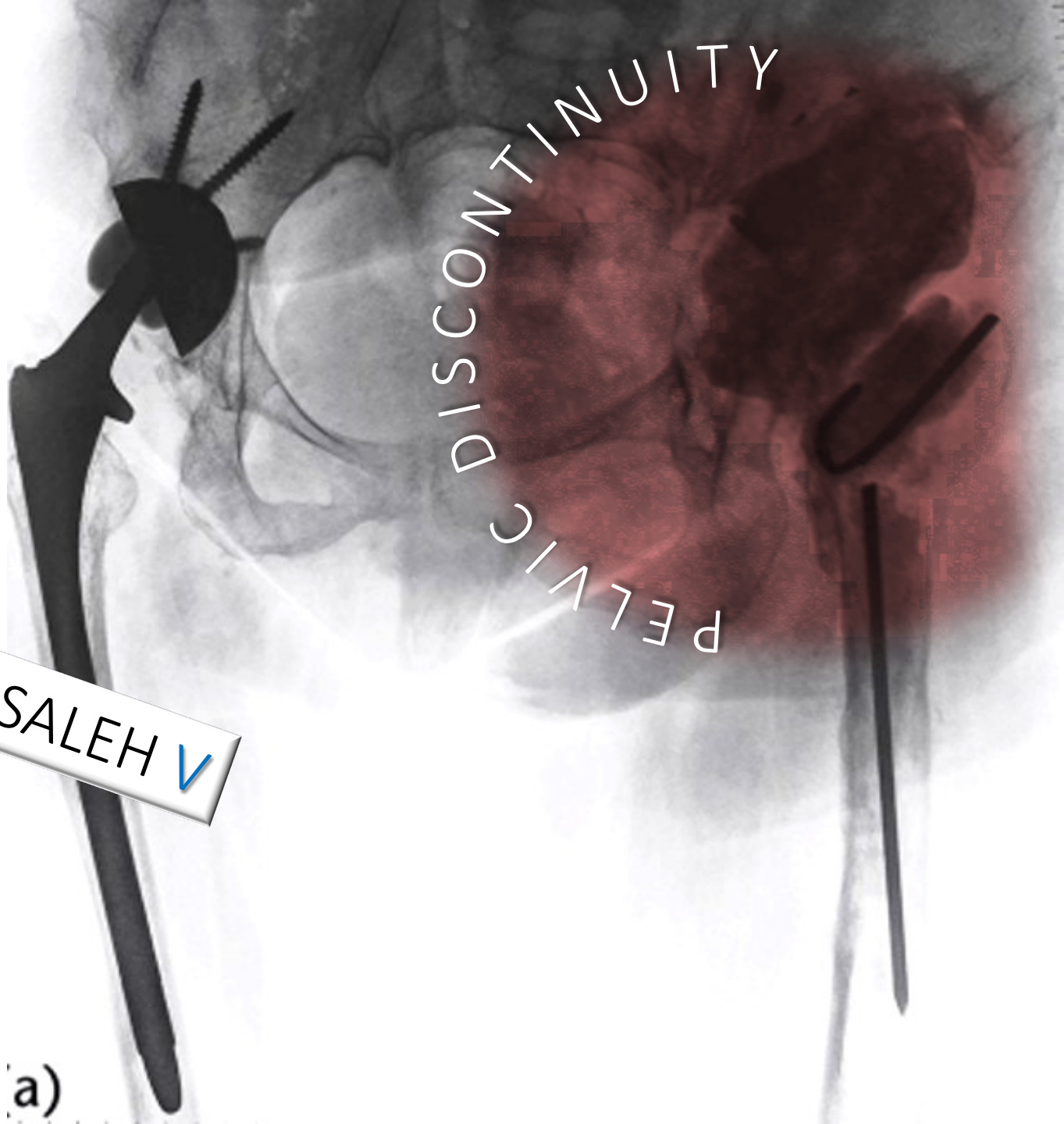
GROSS & SALEH V

PAPROSKY III B

(anche IIC e IIIA)

a)

PELVIC DISCONTINUITY

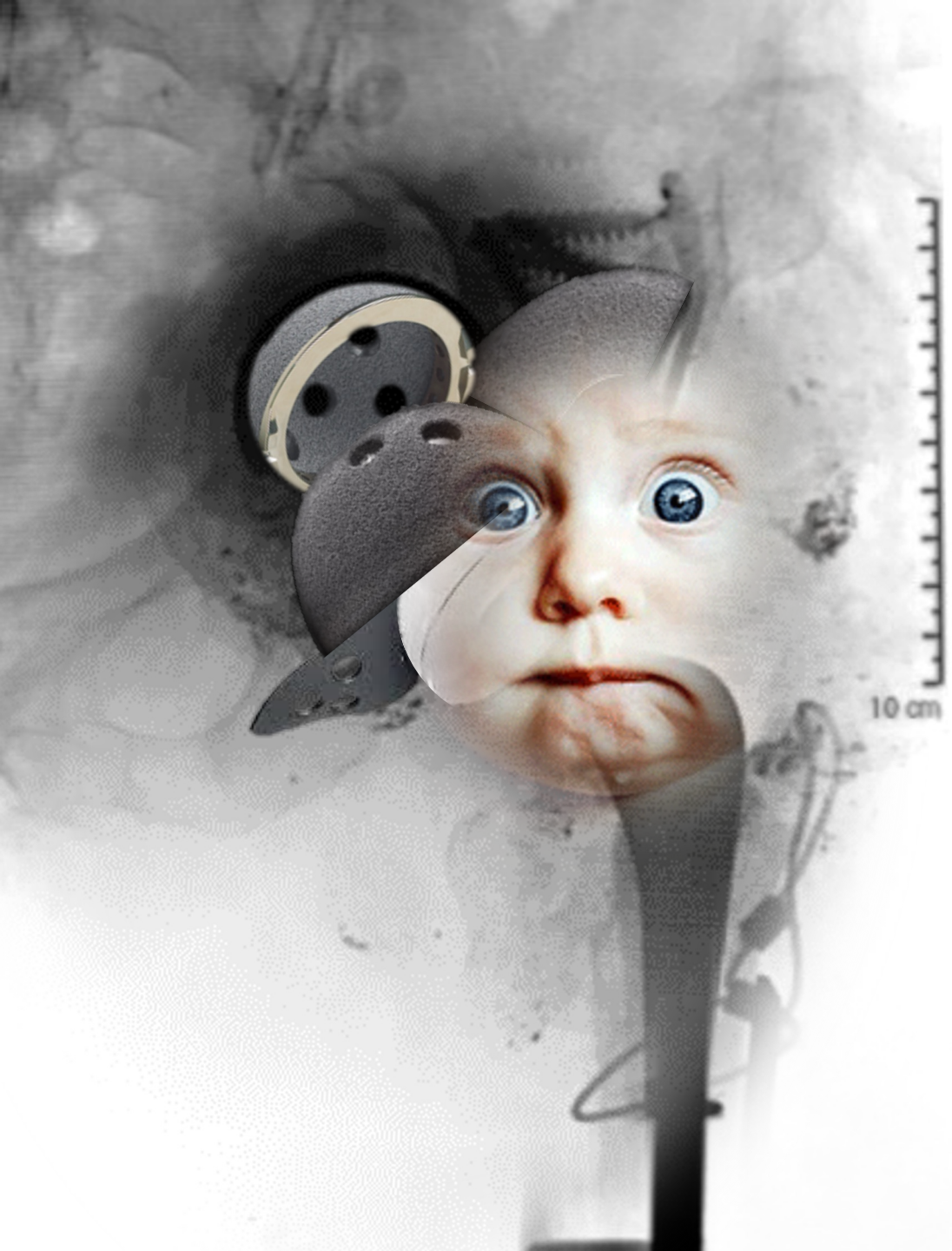


Classification	Configuration of acetabular bone defect	Recommended revision cup and illustration of the 3-point fixation
Type I		
Type II		
Type III		
Type IV		

Table 2 Acetabular defect classification and management based on 3-point fixation		
Classification	Acetabular bony configuration	Revision cup needed
Type I	Possible 3-point fixation within the boundaries of the acetabular wall, hemispherical configuration of the acetabulum	Hemispherical (preferably cementless; cemented only in case of adequate cancellous bone structure and absence of bone defects) ± allogenic cancellous bone
Type II	Possible 3-point fixation within the boundaries of the acetabular wall, cavity/oval configuration of the acetabulum	Cementless oval cups or spherical cups with augmentation parts ± allogenic cancellous bone
Type III	Impossible 3-point fixation within the boundaries of the acetabular wall, cavity with discontinuity	Cementless acetabular cup with cranial augmentation cup-cage system + allogenic cancellous bone
Type IV	Impossible 3-point fixation within the boundaries of the acetabular wall, severe discontinuity	Custom-made partial pelvic replacement

DISCONTINUTA' PELVICA

IMPOSSIBILITA' FISSAZIONE A 3 PUNTI



IMPOSSIBILE UNA FISSAZIONE A 3 PUNTI

REVISIONE MODULARE



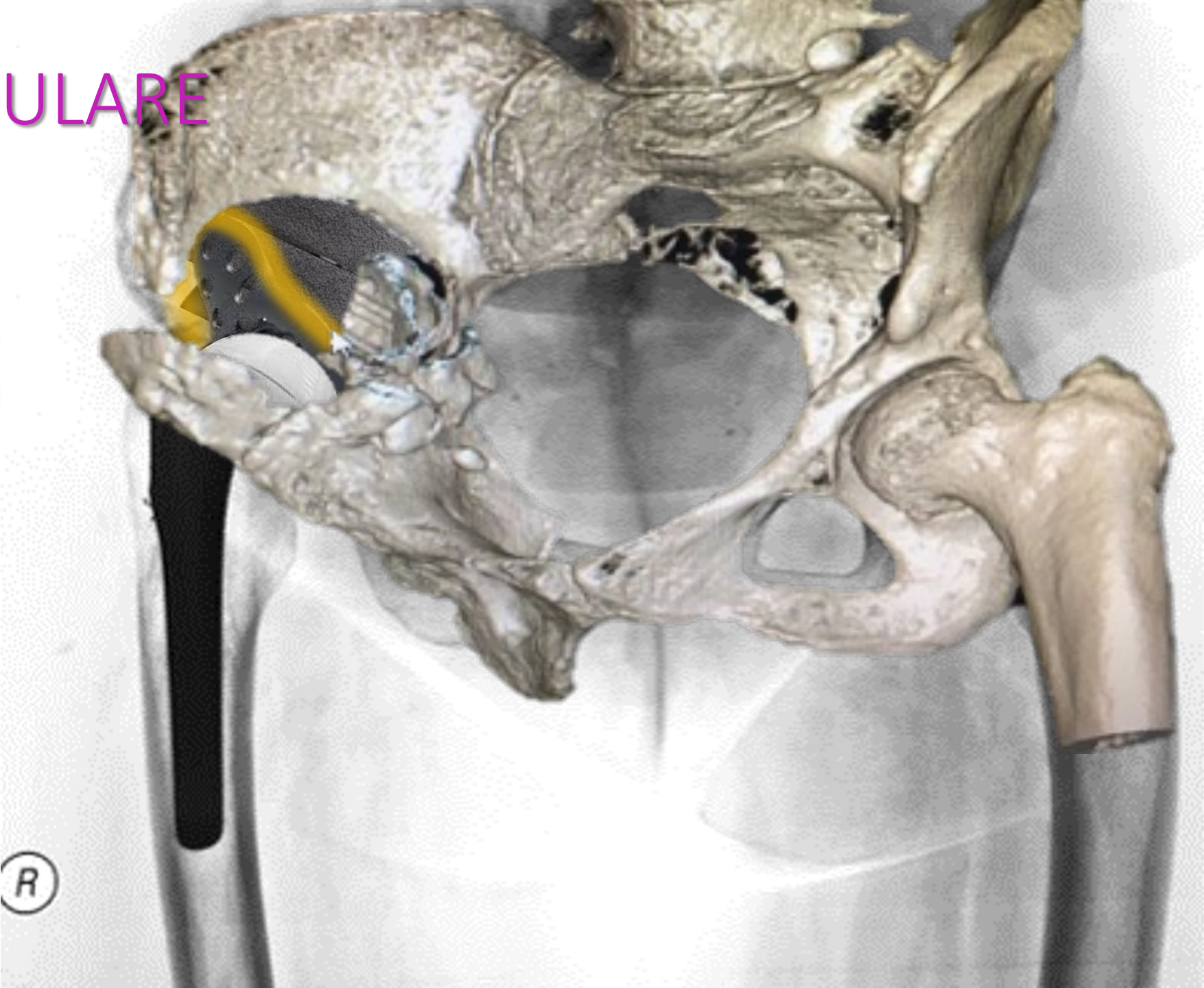
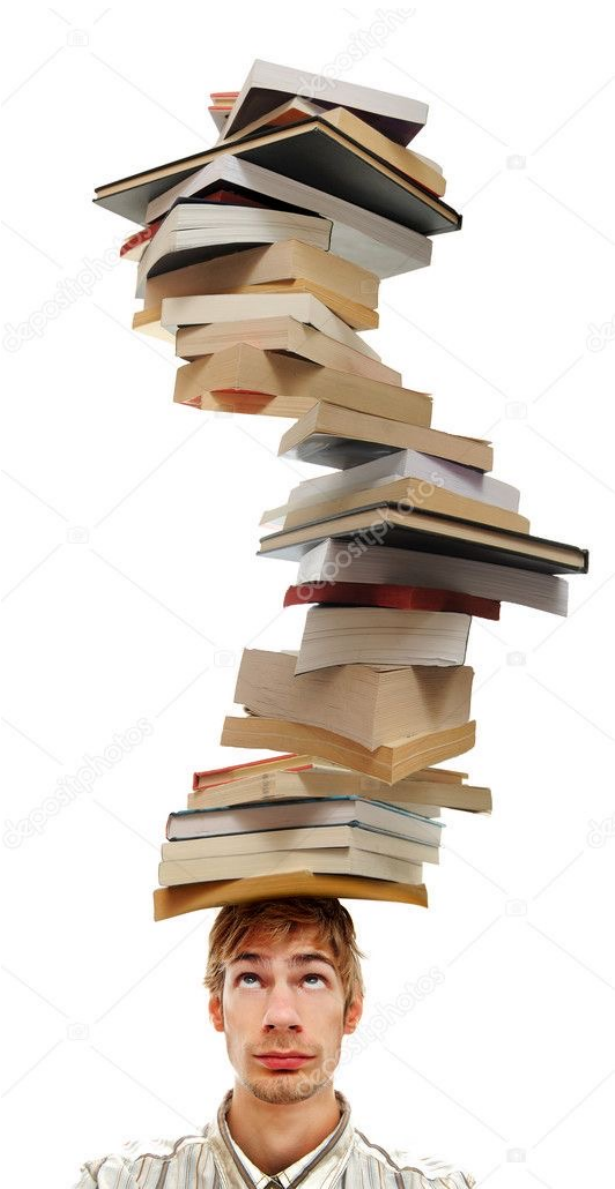
ASSEMBLAGGIO DIFFICILE

TEMPI OPERATORI LUNGH

MULTIPLE INTERFACCE

NECESSARIA STABILITA' EMIPELVI

REVISIONE MODULARE



VANTAGGI/



ASSEMBLAGGIO DIFFICILE

TEMPI OPERATORI LUNGI

MULTIPLE INTERFACCE

NECESSARIA STABILITA' EMIPELVI
E

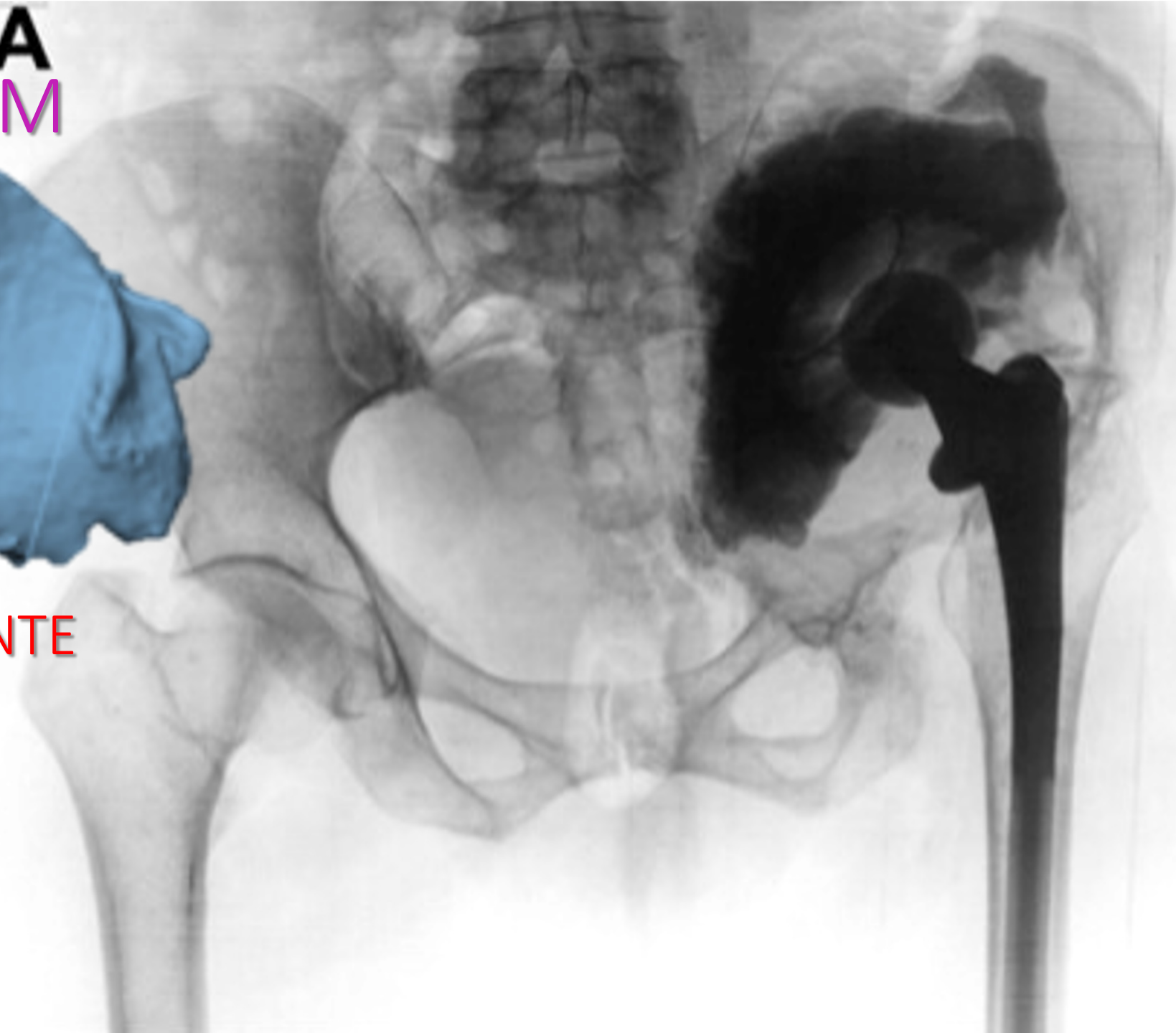
FISSAZIONE COMPONENTE

« ALL-IN-ONE »

A

REVISIONE CUSTOM

STABILIZZAZIONE
E
FISSAZIONE COMPONENTE
«ALL-IN-ONE»



Archives of Orthopaedic and Trauma
<https://doi.org/10.1007/s00402-018-0180-0>
HIP ARTHROPLASTY

Acetabular custom-made acetabular bone defect
in revision total hip arthroplasty: a review of the literature

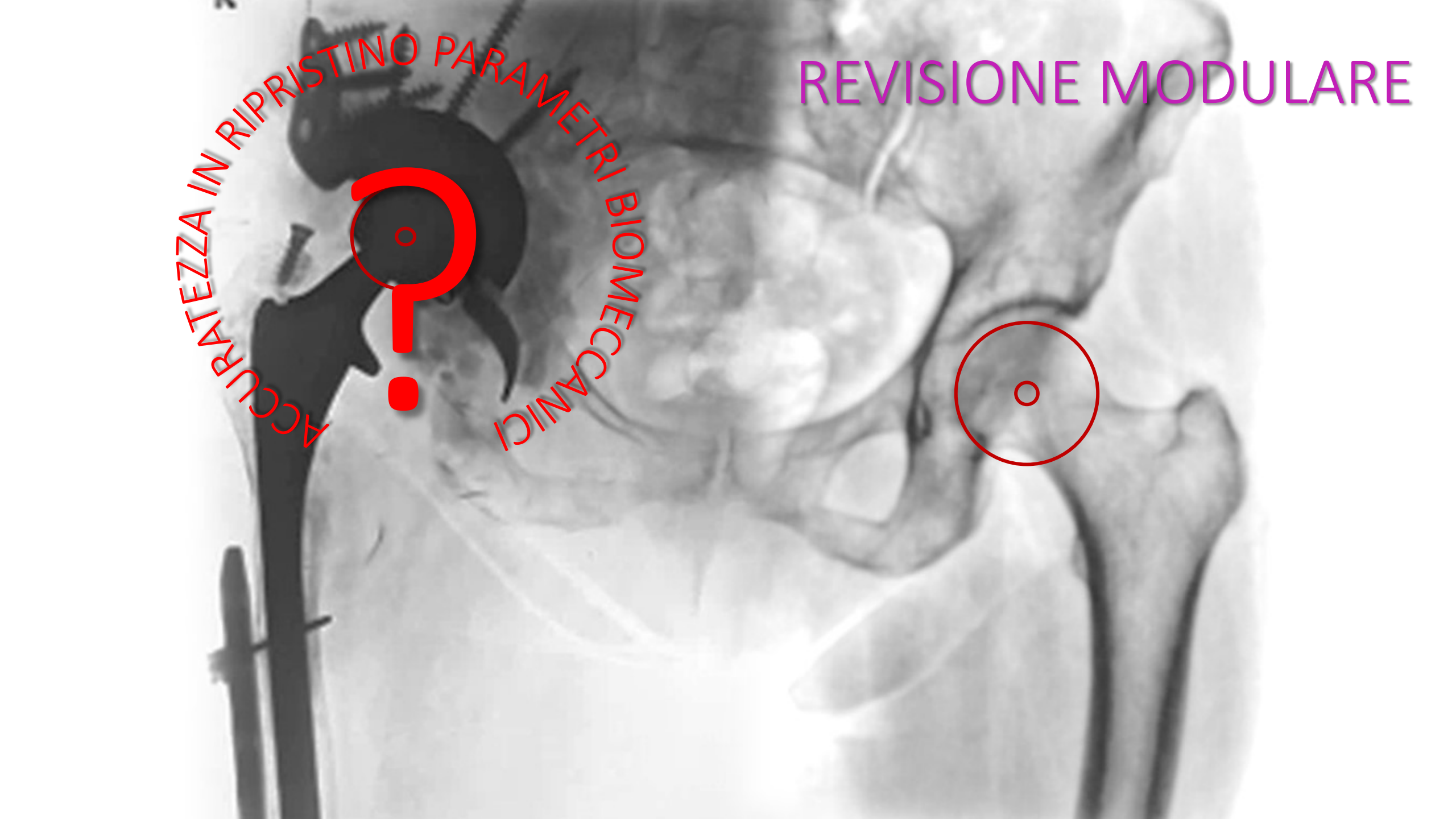
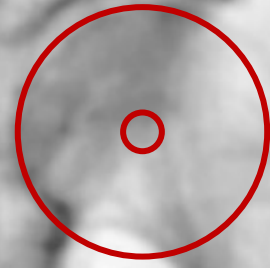
Francesco Chiarlone¹ · Andrea Zanirato¹ · Luca Cevegnyano¹ · Matteo Alessio-Mazzola¹ · Lamberto Felli¹ ·
Giorgio Burastero²

D
REVISIONE CUSTOM



REVISIONE MODULARE

ACCURATEZZA IN RIPRISTINO PARAMETRI BIOMECCANICI



REVISIONE CUSTOM



ACCURATEZZA IN RIPRISTINO PARAMETRI BIOMECCANICI



Revision Arthroplasty

Standard Versus Custom-Made Acetabular Implants in Revision Total Hip Arthroplasty



Rashid M. Tikhilov, MD, PhD, Alisagib A. Dzhabadov, MD^{*}, Anton N. Kovalenko, MD, Stanislav S. Bilyk, MD, Alexey O. Denisov, MD, Igor I. Shubnyakov, MD, PhD

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ABSTRACT

Background: Today, various options are used for the reconstruction of acetabular bone loss in revision total hip arthroplasty (RTHA). The aim of the study was to compare the outcomes of using standard acetabular implants (SAIs) and custom-made acetabular implants (CMAIs) in RTHA in cases with extensive acetabular bone loss.

Methods: This was a comparative analysis of the results of 106 operations of RTHA performed during the period from January 2013 to December 2019. In 61 cases (57.5%), CMAIs were used. In 45 cases (42.5%), SAIs were implanted.

Results: The incidence of aseptic loosening of the acetabular component after RTHA in uncemented loss of bone stock of the acetabulum (type III-IV as per the Gross and Saleh classification) using the CMAI was less than that using the SAI (2.4% and 10.0%, respectively). The most significant differences in aseptic loosening rates were noted after implantation of the CMAI and SAI in pelvic discontinuity with uncemented bone defect (0% and 60.0%, respectively; $P < .001$).

Conclusion: The ideal indications for the use of the CMAI are uncemented defects and pelvic discontinuity with uncemented loss of bone stock (types III-V Gross and Saleh classification). Treatment of these defects with the SAI leads to a higher incidence of aseptic loosening requiring re-revisions. Further observation is required to assess the effectiveness of using the CMAI and SAI in the long-term follow-up period.

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Revisions are more difficult than primary hip arthroplasty and require a deep understanding of the pathology. A wide range of options must also be available for these operations. Revision surgery carries a higher rate of complications [1]. One of the main challenges in long-term fixation of components is difficult in revision total hip arthroplasty requiring the use of custom-made acetabular implants in the varying severity of bone loss [2]. There are several options for bone loss of the acetabulum. The widely used

options are the following: Paprosky, American Academy of Orthopaedic Surgeons, and Gross and Saleh [3–6]. Standard radiographs often underestimate the severity of bone loss. Three-dimensional computed tomography reconstruction helps in understanding the true extent of bone loss [7].

Today, there are various surgical options for using standard acetabular implants (SAIs) to restore the biomechanics of the hip joint and achieve good long-term functional and radiological results [8–12]. However, reduced survival of SAIs in cases with extensive acetabular bone loss [13] led to the wider use of CMAIs [14,15].

The aim of the study was to compare the outcomes of SAIs and CMAIs in cases of revision total hip arthroplasty (RTHA) with extensive acetabular bone loss.

Materials and Methods

After institutional review board approval, we performed a retrospective cohort study. A comparative analysis of the results of RTHA performed on 106 cases from January 2013 to December 2019 was carried out. The CMAI was used in 61 cases (57.5%), and in 45 cases (42.5%), the SAI was used.

The authors have no relevant financial or non-financial interests to disclose. The authors declare that they have no conflicts of interest with the content of this article. The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript. The authors have no proprietary interests in any material discussed in this article.

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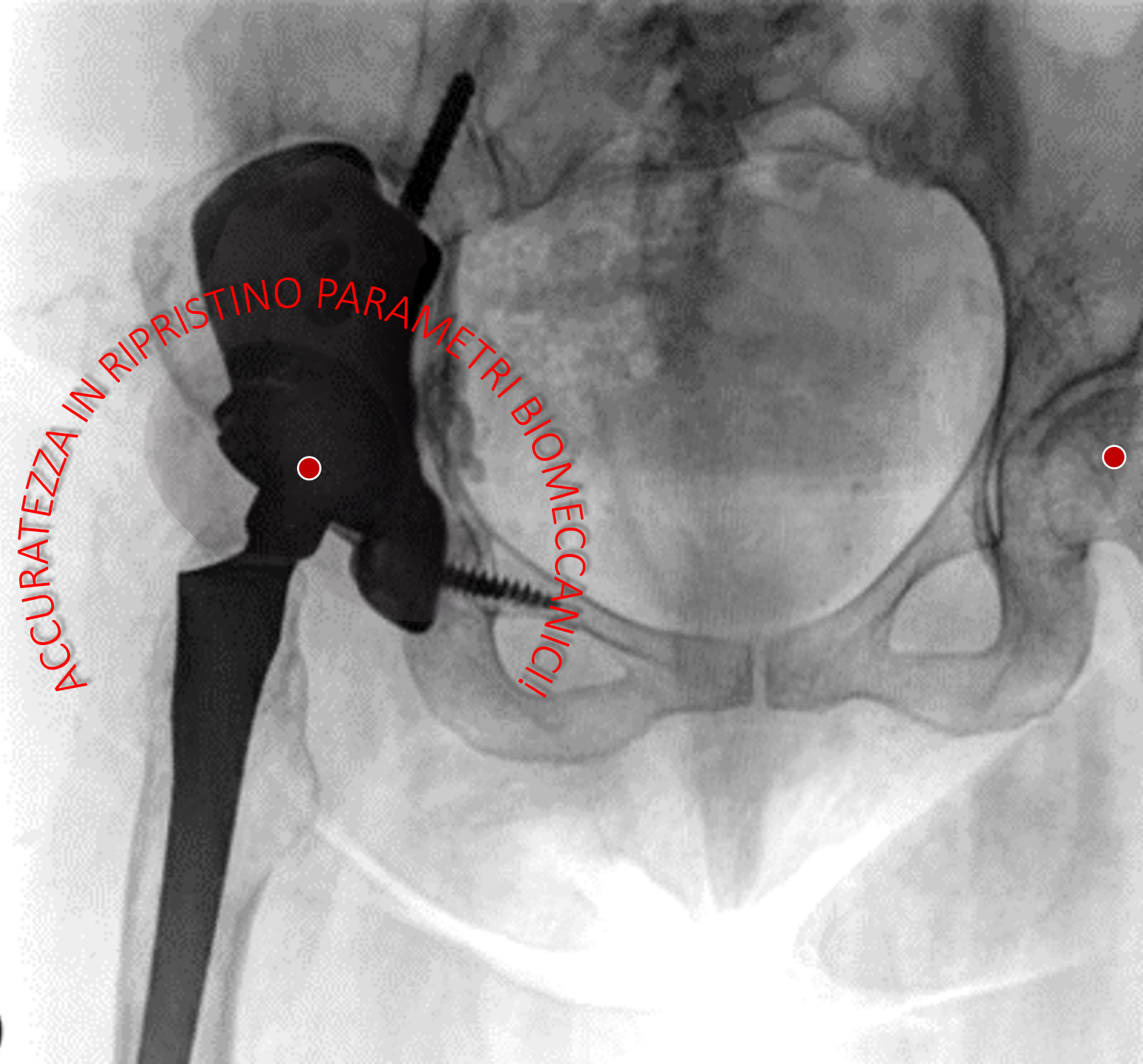
REVISIONE CUSTOM

STUDIO **PREOP**

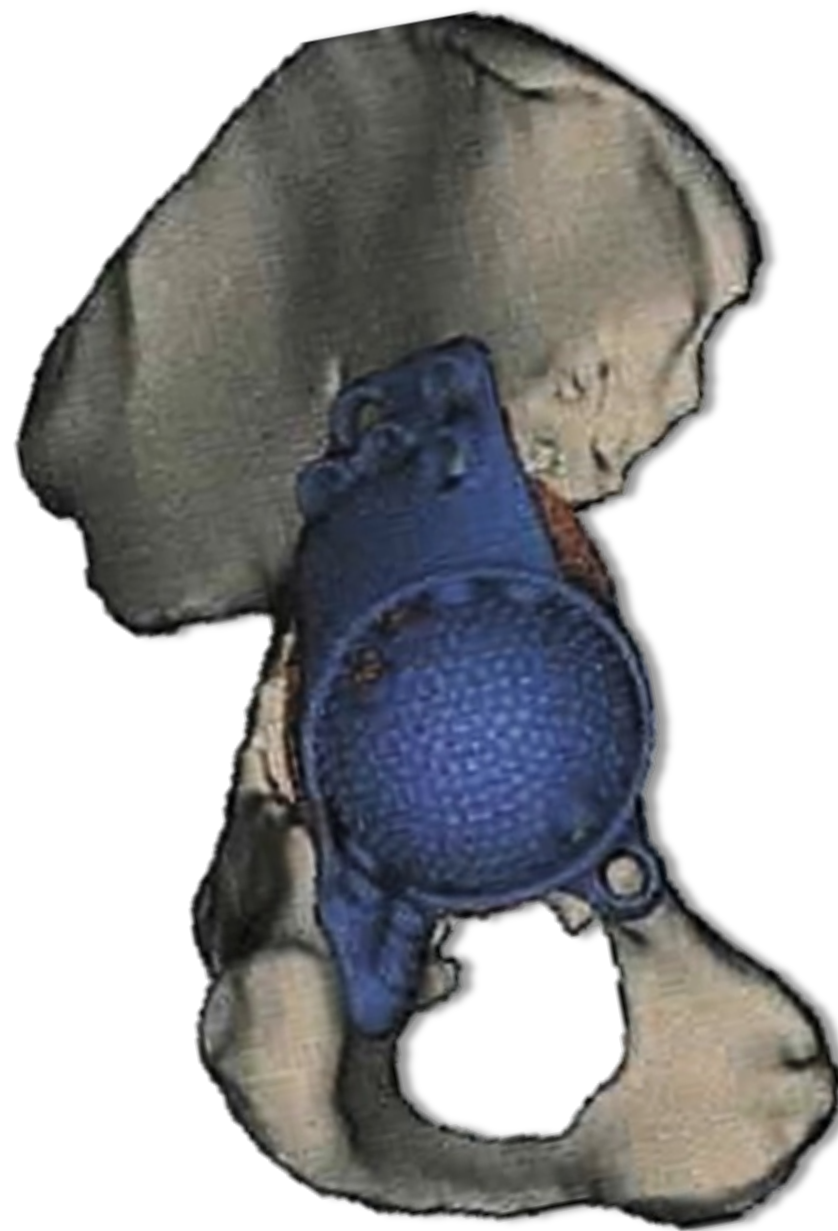
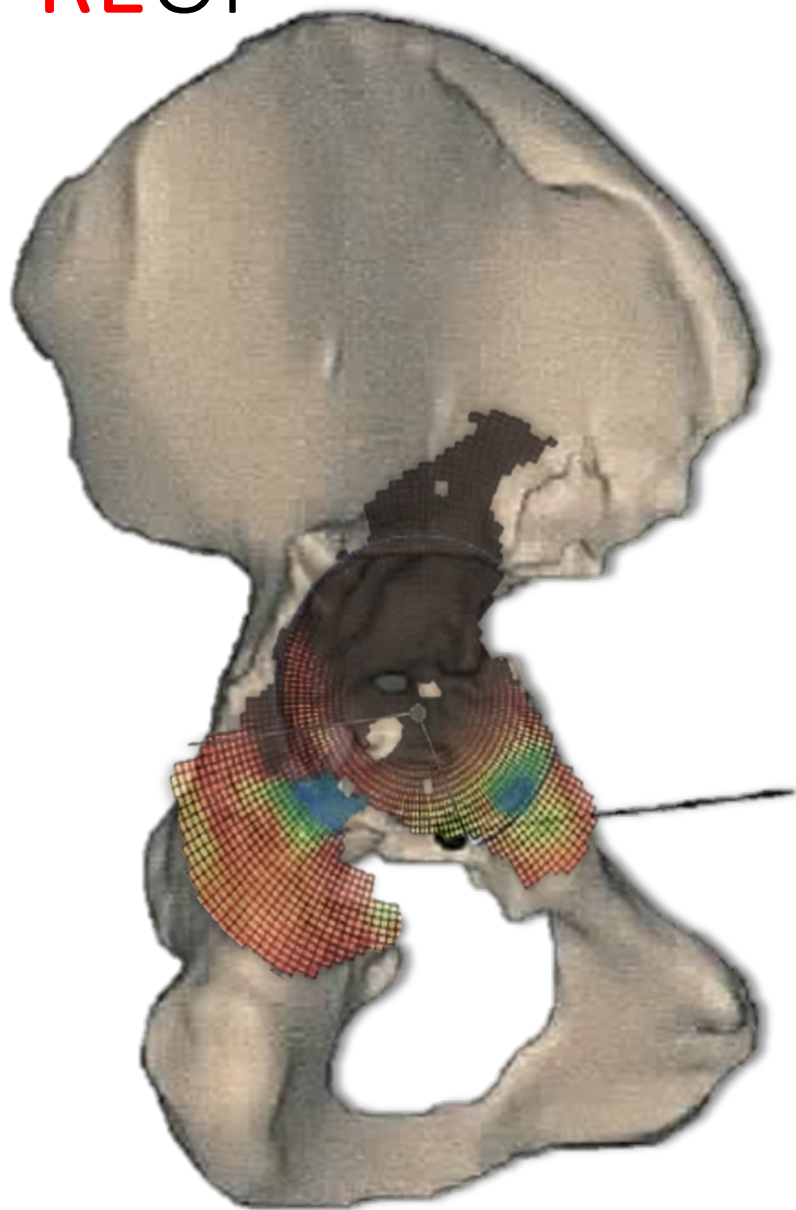
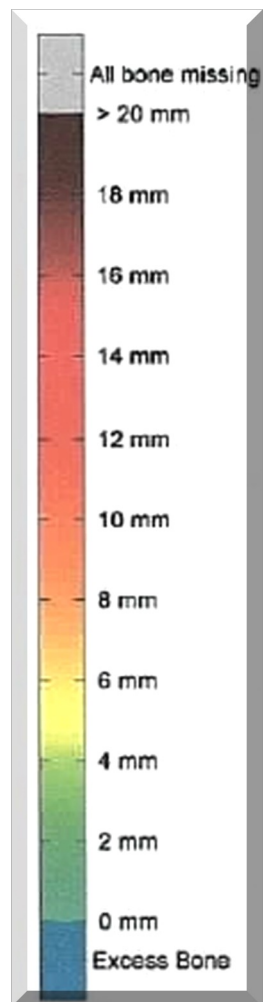
+

AUSILI **INTRAOP**

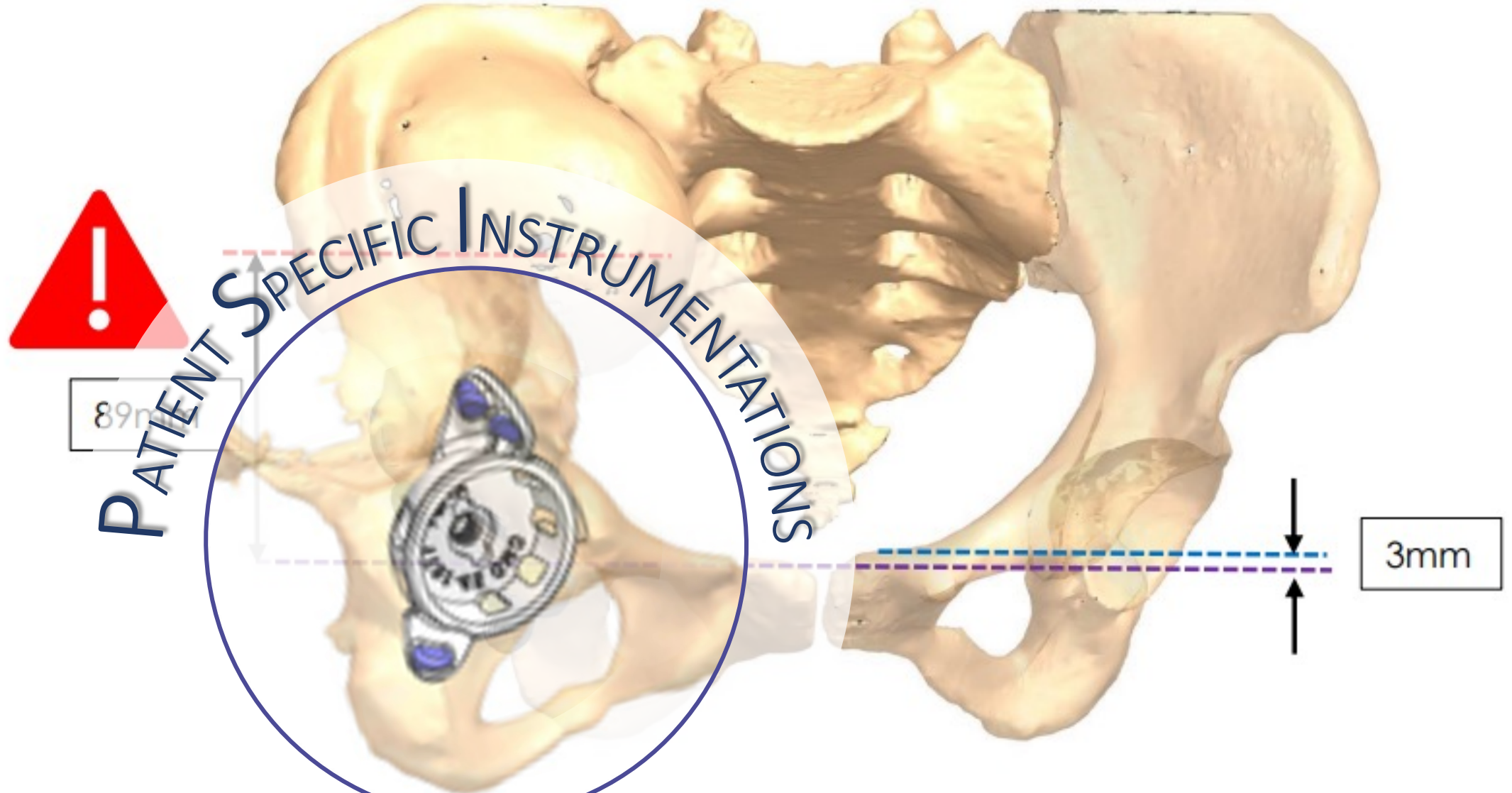
(d)



STUDIO PREOP

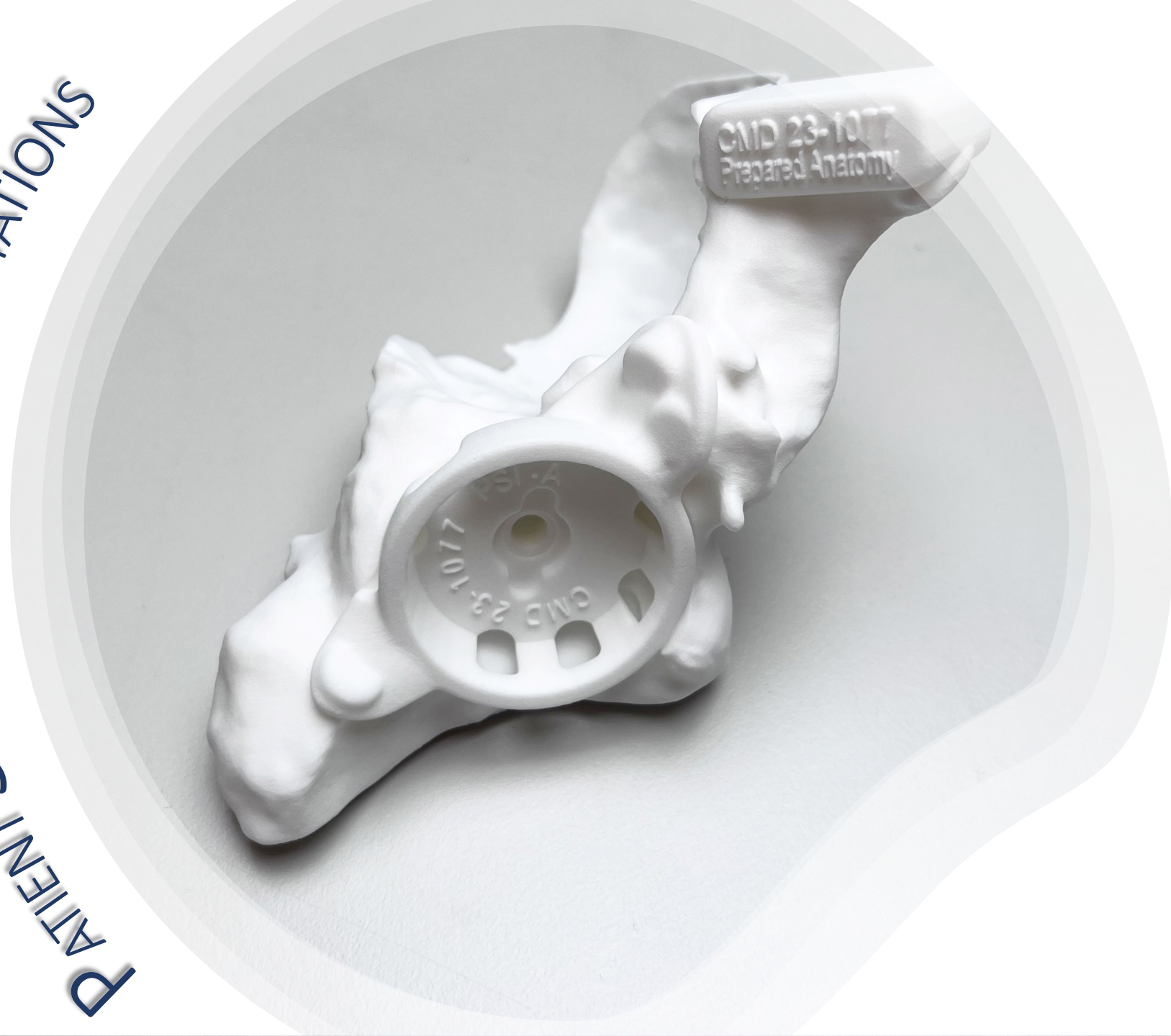


- **Positioning:** Centre Of Rotation recovery (COR); Leg length recovery (89,3mm)



AUSILI INTRAOPERATIVE. In **Red** current COR position, in **Blue** contralateral COR **Purple** the new COR

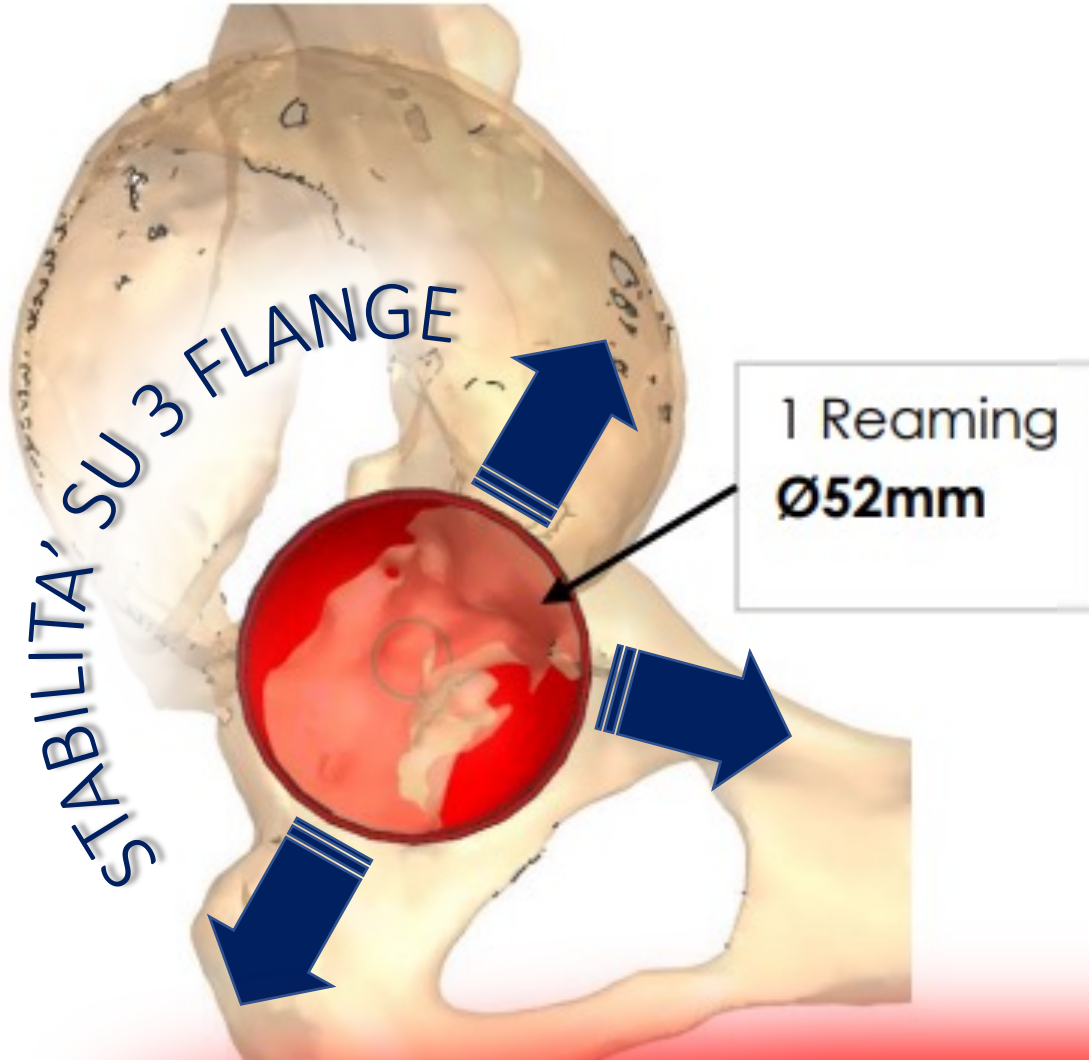
PATIENT SPECIFIC INSTRUMENTATIONS



CMD 23-1077
Prepared Anatomy

CMD 23-1077
Prepared Anatomy

- 1 Planned Reamings of Ø52mm



PREPARAZIONE OSSEA MINIMA

The Journal of Arthroplasty 17 (2022) 118–125

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Revision Arthroplasty

Standard Versus Custom-Made Acetabular Implants in Revision Total Hip Arthroplasty

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Keywords:
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Standard acetabular implants
Three-dimensional imaging

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Conclusion: The ideal indications for the use of the CMAI are uncemented defects and pelvic discontinuity with uncemented loss of bone stock (types III-V Gross and Saleh classification). Treatment of these defects with the SAI leads to a higher incidence of aseptic loosening requiring re-revisions. Further observation is required to assess the effectiveness of using the CMAI and SAI in the long-term follow-up period.

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Revision operations are more difficult than primary hip arthroplasties and require a deep understanding of the pathology. A wide array of implants must also be available for these operations. Revision surgery also has a higher rate of complications [1]. One of the main reasons why reliable long-term fixation of components is difficult in revision hip arthroplasty requiring the use of custom-made acetabular implants (CMAIs) is the varying severity of bone loss [2]. There are many classifications for bone loss of the acetabulum. The widely used ones are the following: Paprosky, American Academy of Orthopaedic Surgeons, and Gross and Saleh [3–6]. Standard radiographs often underestimate the severity of bone loss. Three-dimensional computed tomography reconstruction helps in understanding the true extent of bone loss [7].

Today, there are various surgical options for using standard acetabular implants (SAIs) to restore the biomechanics of the hip joint and achieve good long-term functional and radiological results [8–12]. However, reduced survival of SAIs in cases with extensive acetabular bone loss [13] led to the wider use of CMAIs [14,15].

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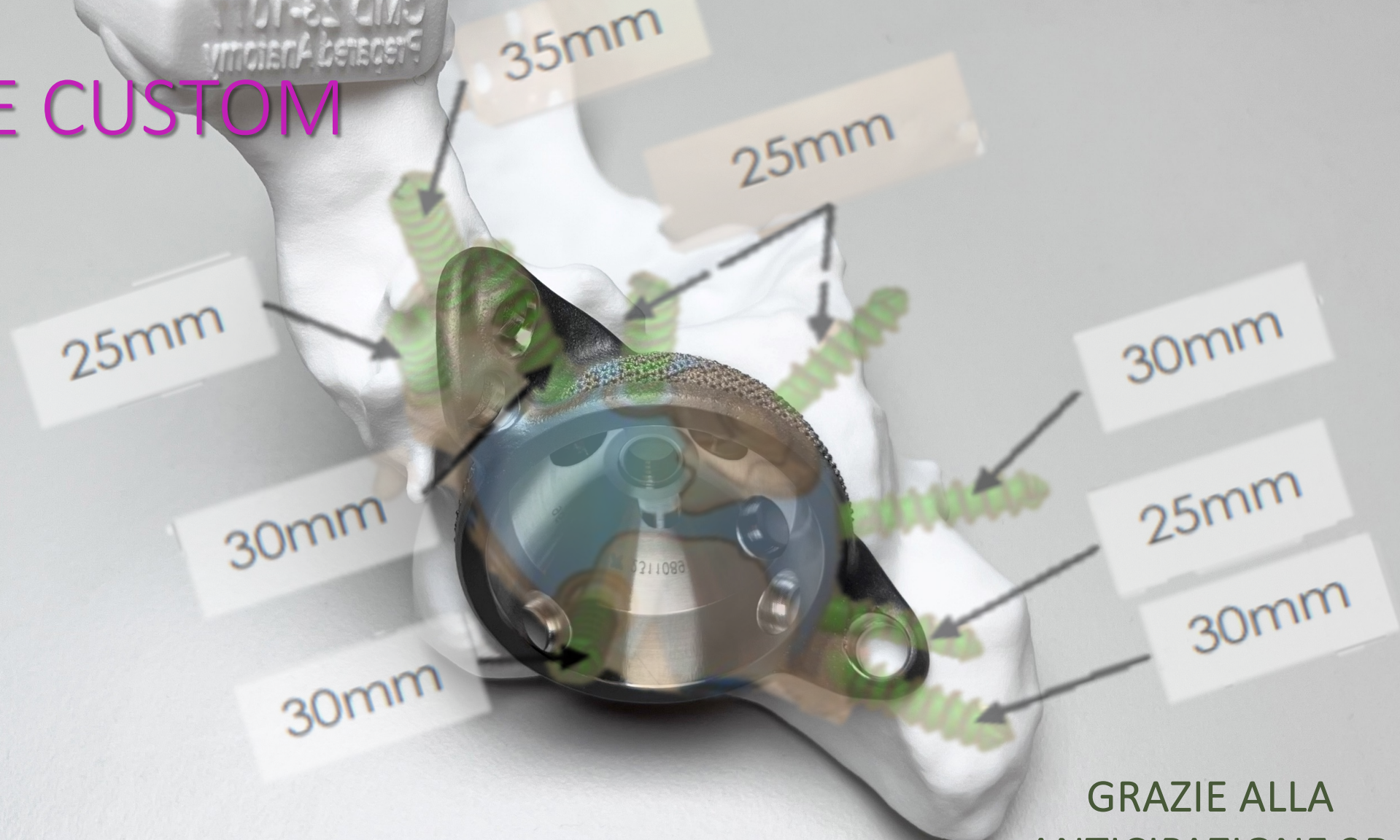
The authors associated with this paper has disclosed any potential or perceived conflicts which may be perceived to have impacting conflict with this work. For all other authors, no conflicts were declared.

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PATIENT SPECIFIC INSTRUMENTATIONS



REVISIONE CUSTOM



TEMPI OPERATORI RIDOTTI

GRAZIE ALLA
ANTICIPAZIONE 3D
DI QUASI TUTTE LE FASI
DELLA PROCEDURA



R

46 mm

32 mm

96 mm

16 mm

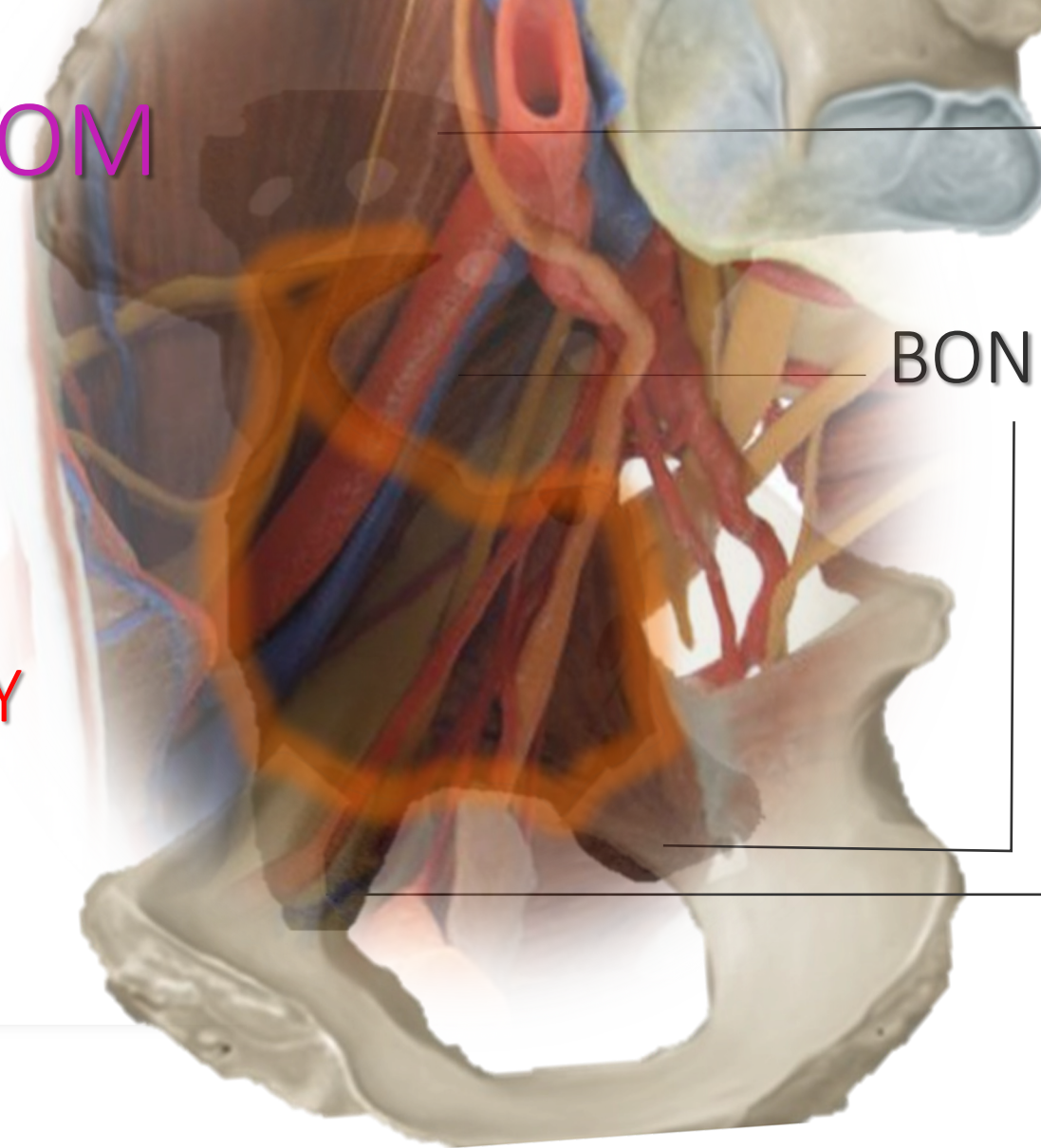
Right leg is 3 mm longer

32 mm

29 mm

REVISIONE CUSTOM

VESSELS PROXIMITY



BONE INGROWTH

Check for updates

HIP
ISSN 1120-7000

Hip Int 2015; 25 (4): 375-379
DOI: 10.5301/hipint.5000294
REVIEW

**Custom 3D-printed acetabular implants in hip surgery –
innovative breakthrough or expensive bespoke upgrade?**

Michael C. Wyatt

Princess Elizabeth Orthopaedic Centre, Exeter - UK

FINITURA DI SUPERFICIE « A ZONE »

REVISIONE CUSTOM

RIDUZIONE POSSIBILI ZONE DI FALLIMENTO
RIDUZIONE INTERFACCE

RIDUZIONE COMPONENTI MODULARI

ACCURATEZZA IN RIPRISTINO PARAMETRI BIOMECCANICI



Acetabular custom-made implants for severe acetabular bone defect in revision total hip arthroplasty: a systematic review of the literature

Francesco Chiarlone¹ · Andrea Zanirato¹ · Luca Cavagnaro² · Mattia Alessio-Mazzola¹ · Lamberto Felli¹ · Giorgio Burastero²

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Abstract

Purpose The management of acetabular bone loss is a challenging problem in revision total hip arthroplasty (rTHA). The aim of this systematic review is to summarize and critically analyze indications, complications, clinical and radiological outcomes of custom-made acetabular components in rTHA.

Methods A systematic review of English literature was performed on Medline. Retrospective or prospective studies with minimum 2 years of follow-up (FU) were included. The PRISMA 2009 flowchart and checklist were considered to edit the review. Rates of intra- or post-operative complications, aseptic loosening (AL), periprosthetic joint infection (PJI), reoperations and re-revisions rates were extrapolated.

Results 18 articles with a level of evidence of IV were included. Six hundred and thirty-four acetabular custom components (627 patients) with a mean FU of 58.6 ± 29.8 months were analyzed. The studies showed good clinical and functional outcomes. Custom-made acetabular components allowed a stable fixation with $94.0 \pm 5.0\%$ survival rate. The estimated rate of re-operations and re-revisions were $19.3 \pm 17.3\%$ and $5.2 \pm 4.7\%$, respectively. The incidence of PJI was $4.0 \pm 3.9\%$.

Conclusions The acetabular custom-made implants represent a reliable solution for pelvic discontinuity and particular cases of bone loss classified as Paprosky Type IIIA-B or type III-IV according to American Academy of Orthopaedic Surgeons system where the feature of the defect cannot be handled with standard implants. This strategy allows to fit the implant to the residual host bone, bypassing the bony deficiency and restoring hip biomechanics. Satisfactory clinical and radiological outcomes at mid-term follow-up are reported in literature.

Keywords Revision total hip arthroplasty · Acetabular bone defects · Paprosky classification · Pelvic discontinuity · Custom-made acetabular implants · Triflanged acetabular custom-made component

Introduction

Primary total hip arthroplasty (THA) is one of the most successful and common procedure in orthopedic surgery. A commensurate burden of revision surgery is expected to rise in the future [1]. Acetabular bone loss is a common finding during revision total hip arthroplasty (rTHA) and it represents a real challenge for orthopedic surgeon [2–4].

Different approaches have been proposed for bone defects management but a real consensus is far to be reached [5]. The reported incidence of Paprosky type III B bone defects and pelvic discontinuity is between 1 and 5% in patients undergoing rTHA [6–8].

The goals of acetabular revision for severe bone defect are a stable pelvic fixation with implant stability and restoration of bone stock, ischium and ilium continuity and reconstitution of hip biomechanics [9].

In literature, multiple treatment options have been proposed for management of severe acetabular defects, including porous tantalum acetabular components with early implant integration [10, 11], with or without structural allograft or metal augments [12, 13], standard cage reconstruction with iliac or ischial screw fixation [7, 13], cup-cage

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CLINICAL RESULTS?

Wind et al (15) published a retrospective case series of 19 of these implants in 19 patients who had Paprosky 3 defects. The mean follow-up was 31 months (16-59) and the HHS were 38-68. A total of 2 cases in this series had a mechanical failure.



PAPROSKY III

SOPRAVVIVENZA

90%

Holt et al (14) published their series of implants used in Paprosky 3B defects. In total, 23 or 26 patients had excellent results and there were 3 failures from loss of ischial fixation.

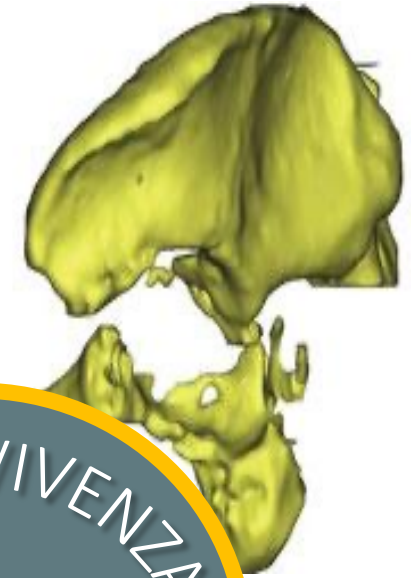


Taunton et al (16) reviewed 57 patients who had pelvic discontinuities retrospectively with a follow-up of 24 to 215 months.

Berasi et al (17) reported on 28 custom triflanges used in 26 patients for failed salvage revision surgeries and pelvic discontinuities. There were 2 failures for infection but none for migration or loosening.

PELVIC DISCONTINUITY

DeBoer et al (18) examined outcomes of 30 custom implants in 28 patients who had pelvic discontinuities with a mean 10 year follow-up. There were no mechanical failures. However 5 patients had multiple dislocations



SOPRAVVIVENZA
95%

18 ARTICOLI

627 IMPIANTI

F.U. 58 +/- 28 MESI



Acetabular custom-made implants for severe acetabular bone defect in revision total hip arthroplasty: a systematic review of the literature

Francesco Chiarlone¹ · Andrea Zanirato¹ · Luca Cavagnaro² · Mattia Alessio-Mazzola¹ · Lamberto Felli¹ · Giorgio Burastero²

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Abstract

Purpose The management of acetabular bone defects in revision total hip arthroplasty (rTHA). The aim of this systematic review is to assess the outcomes of custom-made acetabular components.

Methods A systematic review of the literature was conducted. Studies or prospective studies with a minimum 2 years of follow-up were included. Rates of intra- or post-operative complications and re-revisions rates were considered to edit the review. Rates of intra- or post-operative complications and re-revisions rates were considered to edit the review.

Results 18 articles with a total of 627 patients) with a mean follow-up of 58 months. Custom-made acetabular components showed good clinical and functional outcomes. The estimated rate of re-operations and re-revisions was 4.0 ± 3.9%.

Conclusions The acetabular custom components allow to fit the implant to the residual host bone, bypassing the discontinuity and particular cases of bone loss classified as Paprosky type III B. The use of custom-made acetabular components allows to fit the implant to the residual host bone, bypassing the discontinuity and particular cases of bone loss classified as Paprosky type III B. The use of custom-made acetabular components allows to fit the implant to the residual host bone, bypassing the discontinuity and particular cases of bone loss classified as Paprosky type III B.

Keywords Revision total hip arthroplasty · Acetabular bone defect · Pelvic discontinuity · Custom-made acetabular implants · Triflange acetabular component

Introduction

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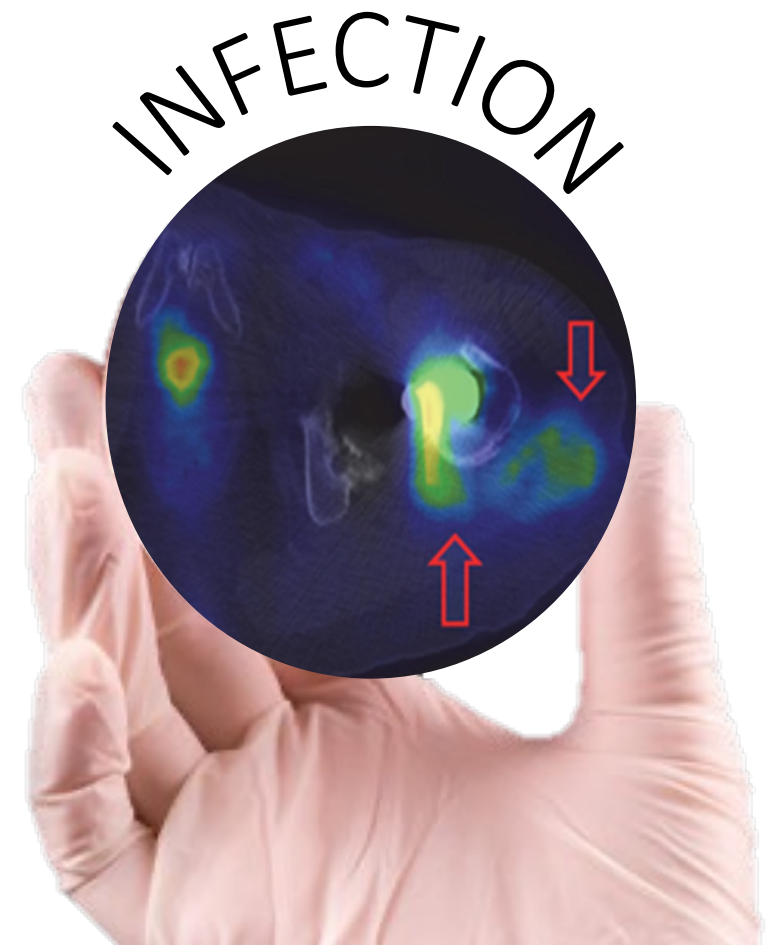
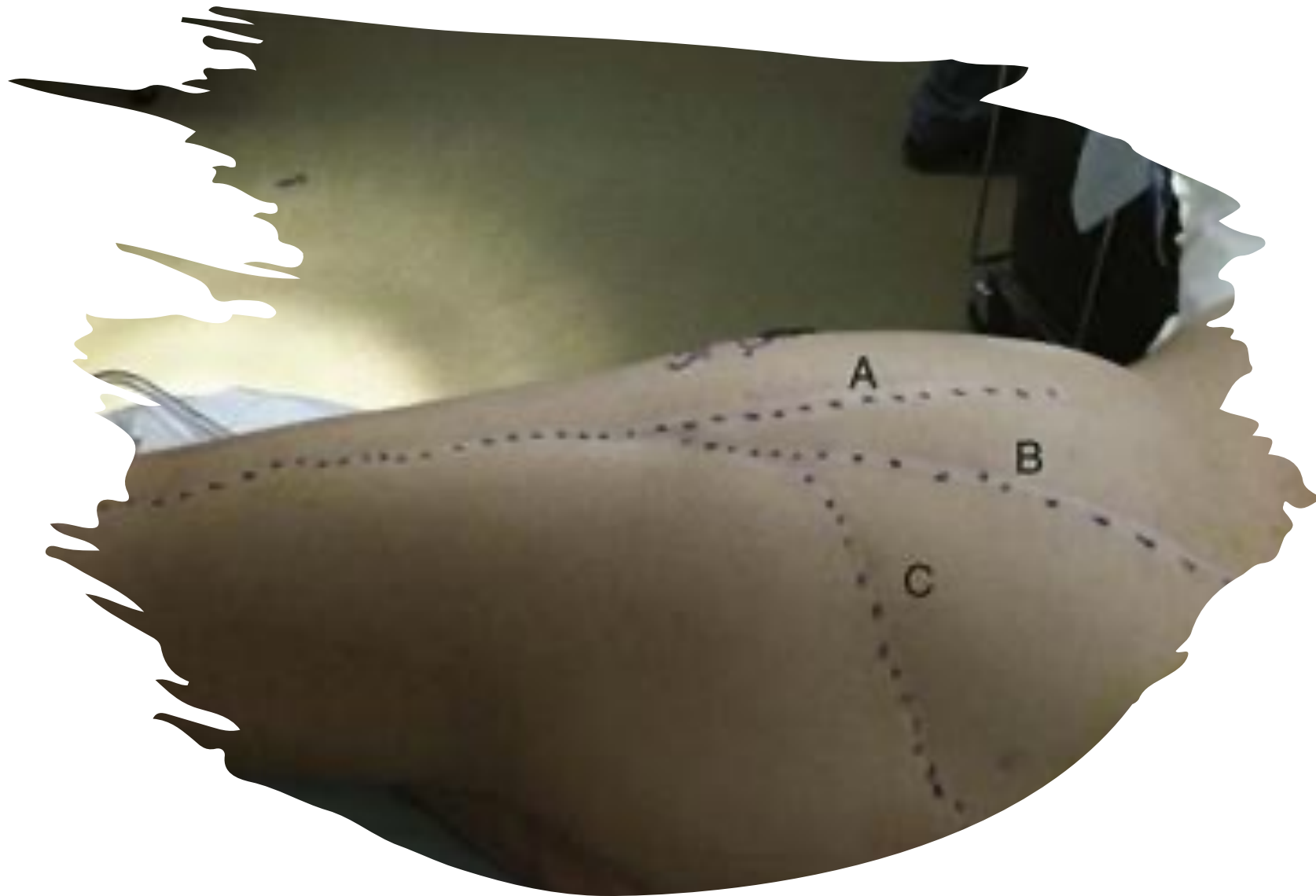


TUTTO
PERFETTO
QUINDI?



INVASIVITA' SU TESSUTI MOLLI?

MULTIPLE CHIRURGIE



ANALISI

COSTI

EFFICACIA

?



GRAZIE



Casi class.

Chirurgia Ortopedica, Neurochirurgia e Oncologia
Migliore Direzione Sanitaria Complesso di Ospedale

3A e 3B

revisioni acetabolari
nienze cliniche

