AAOS
American Academy of Orthopaedic Surgeons
2023 Annual Meeting
March 7 – 11, Las Vegas, Nevada

Session: F

Session Title: Tips and Tricks to Save You During Revision Total Hip Arthroplasties: Video-Based Demonstrations

Session Type: Symposium

Location: Palazzo Ballroom L

Date & Time: 03-08-2023, 08:00 am - 09:30 am

INSTRUCTORS WHO CONTRIBUTED TO THIS HANDOUT: as of 1/24/2023

Moderator(s):

Matthew P. Abdel, MD,FAAOS

Faculty:

Daniel J. Berry, MD,FAAOS
James A. Browne, MD, FAAOS
Elizabeth Gausden, MD
George J. Haidukewych, MD,FAAOS
James I. Huddleston, MD,FAAOS
David J. Mayman, MD, FAAOS
R M. Meneghini, MD, FAAOS
Douglas E. Padgett, MD, FAAOS
Scott M. Sporer, MD, FAAOS
Bryan D. Springer, MD, FAAOS

AAOS 2023 Symposium
Tips and Tricks To Save You During Revision THAs: Video-Based Demonstrations

Moderator: Matthew P. Abdel, M.D. (Mayo Clinic)

OUTLINE (90 Minutes Total)

1. Introduction of Symposium and Faculty (5 minutes)- ***Matthew P. Abdel, M.D. (Mayo Clinic)***
2. Extended Trochanteric Osteotomy: How Do I Get In There Safely (7 minutes)- ***Daniel J. Berry, M.D. (Mayo Clinic)***
3. Acetabular Component Removal: It Is An Art! (7 minutes)- ***James A. Browne, M.D. (University of Virginia)***
4. Femoral Component Removal: Technical Pearls Going from the Top (7 minutes)- ***David J. Mayman, M.D. (Hospital for Special Surgery)***
5. Modular Fluted Tapered Stems: Making Femoral Revisions Easy (7 Minutes)- ***R. Michael Meneghini, M.D. (Indiana University)***
6. Hemispherical Cups and Augments: How to Make Them Work (7 minutes)- ***George J. Haidukewych, M.D. (Orlando Health)***
7. Cup-Cage for Massive Bone Loss or Pelvic Discontinuity: An Off-the-Shelf Solution (7 Minutes)- ***Scott M. Sporer, M.D. (Rush University Medical Center)***
8. Custom Triflange for Massive Bone Loss or Pelvic Discontinuity: Take the Guess Work Out (7 Minutes)- ***Bryan D. Springer, M.D. (OrthoCarolina)***
9. Instability Requiring Revision: Deciding What Construct to Use, and How to Perform that Construct Successfully (7 Minutes)- ***Douglas E. Padgett, M.D. (HSS)***
10. Now It's Infected: My Articulating Spacer Construct (7 Minutes)- ***James I. Huddleston III, M.D. (Stanford University)***
11. Periprosthetic Femur Fractures: Revision THA Pearls (7 Minutes)- ***Elizabeth B. Gausden, M.D. (Hospital for Special Surgery)***
12. Questions & Answers and Case-based Discussions (15 Minutes)- ***Matthew P. Abdel, M.D. (Mayo Clinic)***

OBJECTIVES

#1 To understand how to safely expose complex revision THAs with a variety of surgical techniques based upon video demonstrations

#2 To understand the principles and surgical techniques behind utilizing modern implants (such as porous metals to address complex acetabular defects, and modular fluted tapered stems to address the majority of femoral defects) most successfully in revision THA

#3 To understand the best techniques for treating postoperative instability and when using antibiotic spacers for infection

SUMMARY

This symposium will provide the latest information on managing patients with failed THAs who require complex exposures, biologic fixation to manage bone loss, and advanced techniques to treat and mitigate complications such as instability and infection.

Tips and Tricks to Save You During Revision Total Hip Arthroplasties: Video-Based Demonstrations
Symposium F
Wednesday, March 8, 2023
8:00 AM – 9:30 AM

Daniel J. Berry, M.D.
Mayo Clinic
Rochester, Minnesota, USA

Extended Greater Trochanteric Osteotomy In Revision THA

I. Introduction

A. Extended greater trochanteric osteotomy has revolutionized revision THA
B. Advantages in selected patients:
    1. Speeds implant/cement removal
    2. Allows implant/cement removal with less bone loss
    3. Gets upper femur out of the way → allows better preparation of distal femur for distally fixed uncemented stem
    4. Preserves abductor attachments → provides better postoperative function and potentially less dislocation risk
C. Disadvantages
    1. Nonunion potential (less than 2%)
    2. Potential for fracture of osteotomy fragment or femur
    3. To some degree dictates choice of revision femoral component → works best with distally fixed uncemented stem.

II. Traditional Extended Trochanteric Osteotomy in North America (Paprosky)

A. 1. Posterior approach to hip
    2. Lateral extended greater trochanteric osteotomy

B. While excellent, this conventional extended greater trochanteric osteotomy has drawbacks in some cases.
    1. Takedown all of posterior capsule → even if repaired, hip stability may be decreased
    2. Not optimal for placement of distally fixed straight stem.

C. In selected cases two extended greater trochanteric osteotomy variants are useful.

III. Alternative Technique: #1: Lateral Extended Osteotomy with Preservation of Posterior Capsule and Anterior Dislocation of Hip

A. Advanatages/Uses
1. Advantages: Keeps hip capsule intact, potentially improving hip stability
2. Uses: Can be used in most cases when lateral extended greater trochanteric osteotomy is desired.

*Exception: with well fixed stem that fills canal completely and doesn't allow proximal anterior osteotomy cut to be made from the back, dislocating hip posteriorly first to allow making anterior proximal femoral osteotomy cut under direct vision is advantageous.

C. Techniques
1. Patient position: lateral decubitus
2. Divide IT band, split gluteus maximus
3. Expose posterior femur joint anterior to linea aspera, and elevate vastus lateralis from femur for about 2 cm only at planned transverse osteotomy site.
4. Make straight posterior osteotomy, transverse distal osteotomy, distal anterior osteotomy (about 3 cm long). Round corners if possible using small high speed burr to make corner cuts.
5. Use saw from back to front to cut anterior greater trochanteric osteotomy. Do so by sliding saw over the lateral shoulder of implant. Be careful not to damage anterior soft tissue structures.
6. Keep posterior capsule attached to posterior greater trochanter.
7. Elevate osteotomy fragment from posteriorly with broad osteotomies, completing fracture of anterior cortex between the short anterior proximal and distal osteotomy limbs.
8. Dissect abductors off of pseudo-capsule, elevate soft tissues off of the proximal medial femoral fragment $\rightarrow$ this allows the osteotomy fragment to be transferred anteriorly.
9. Perform superior and anterior capsulectomy.
10. Dislocate hip anteriorly.
11. Perform hip revision with leg adducted. Insert stem with hip externally rotated and lower leg in "pocket".
12. Reattach greater trochanteric osteotomy with at least 2 cables.

IV. Alternative Technique #2: Anterior Extended Greater Trochanteric Osteotomy (Wagner)

A. Advantages/Uses

1. Advantages: Lifts anterior proximal femur out of the way → allows straight "shot" down distal femur (gets you around the bow of the femur)
2. Uses: Good approach when inserting long stem with straight distal section (such as fluted tapered stem) → allows you to fill the canal well without perforating distally.

B. Techniques

1. Patient position: Lateral or supine
2. Straight lateral incision
3. Split IT band, interval between gluteus maximus/tensor
4. Split abductors in line with their fibers from tip of greater trochanter to about 4 cm proximal to tip of greater trochanter.
5. Split vastus lateralis longitudinally down the center of muscle to level of desired transverse osteotomy.
6. Osteotomize lateral femur from tip of greater trochanter to level of planned transverse osteotomy.
7. Perform anterolateral transverse osteotomy (1/3 circumference of femur).
8. Make distal anterior bone cut (extending approximately 3 cm from distal transverse osteotomy) with hip externally rotated.
9. Use small narrow osteotome or drill to make line of perforations for the proximal anterior osteotomy.
10. Lift osteotomy fragment away from femur with broad osteotomes completing osteotomy. Keep muscle attached to osteotomy fragment.
11. Resect anterior/superior pseudocapsule.
12. Dislocate hip anteriorly.
13. Perform revision with hip adducted/externally rotated.
14. Reattach osteotomy fragment with 2 cables or wires, use heavy suture to repair abductors.

References:

Berry DJ: Anterior Extended Greater Trochanteric Osteotomy. **Semin Arthroplasty.** 2004; 15(2):126-9.

Abdel MP, Wyles CC, Viste A, Perry KI, Trousdale RT, **Berry DJ**. Extended Trochanteric Osteotomy in Revision Total Hip Arthroplasty: Contemporary Outcomes of 612 Hips**. J Bone Joint Surg Am**. 2020 Dec 2 Epub 2020 Dec 02 PMID: 33252587 DOI: 10.2106/JBJS.20.00215

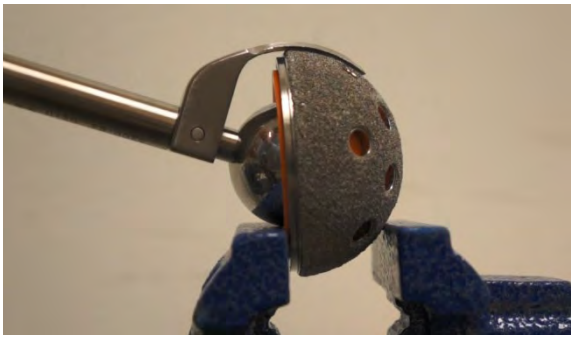
AAOS 2023 Symposium F

"Tips and Tricks to Save You During Revision THAs: Video-Based Demonstrations"

James A. Browne, MD

Acetabular Component Removal: It Is An Art!

- Curved blade cup explant device has dramatically improved our ability to safely remove well-fixed acetabular components
- Key steps
    - Adequate exposure of with visualization of entire rim
    - Remove screws
    - Assemble appropriate liner/trial/ball to centralize the tool in the cup
    - Short blade first to penetrate peripheral bones (impaction and axial rotation)
    - Long blade to extend to dome of cup and finalize cup removal
- Technical tips
    - Ensure your tools are in good working order (avoid dull and bent blades)
    - Penetrate peripheral bone in multiple radial positions
    - Side cutting blades create a channel around periphery of cup
    - Patience!
- Tricks
    - Cementing in a liner can centralize ball in jumbo monoblock cup (although large head ball sizes with multiple diameters are available)
    - Use of bone wax or suture foil wrapper may allow you to use femoral head implant
    - Most spikes are not porous coated and can be worked around with blade, will not remove excess bone with cup removal
    - Burr out stripped screws to allow blade to pass around cup
    - Impaction of blade may help dislodge well-fixed augments



Screenshot from symposium video demonstrating use of a curved blade explant tool

AAOS 2023 Symposium F
Tips and Tricks to Dave You During Revision THAs: Video-Based Demonstrations

Femoral Component Removal: Technical Pearls Going from the Top

David J. Mayman, M.D.
Hospital for Special Surgery (HSS)

Once the indication for femoral revision has been made, the surgeon must be prepared to evaluate the type, extent and anticipated difficulty of removing the femoral stem (Fig. 1). Failure to be prepared for a difficult prosthesis removal can lead to increased operative time, bone loss, fracture, bleeding and surgeon frustration.

Cemented Stem:
Most cemented hip stems can be removed without the need for an extended trochanteric osteotomy (ETO). This can be done using a high-speed pencil tip burr or a thin blade osteotome. Care must be taken to make sure the shoulder and collar of the prosthesis is clear of any bone overgrowth and that any trochanteric bone is removed before attempting extraction. If the cement prosthesis interface is adequately disrupted, a tamp or extraction device can be used to remove the stem. Care should be taken to strike the extraction devices in-line with the long axis of the prosthesis to minimize the risk of fracture. Note: many smooth femoral stems can be extracted and re-cemented into a well-fixed cement mantle. Textured cemented stems are often more difficult to remove than smooth stems and may require an ETO. Surgeons must diligently remove all remaining cement without removing bone from the femoral canal when a cementless revision stem is to be inserted. Metaphyseal cement can often be removed in large segments with a combination of a high-speed burrs and curved osteotomes. (Fig. 2) Distal cement can be removed with reverse hooks and osteotomes. Ultrasonic devices as well as long drill bits can be used to bypass the distal cement plug. Care should be taken when drilling to not perforate the anterior cortex due to the femoral bow.

Cementless Stem:
Removal of well-fixed cementless stem should begin by identifying the stem geometry and determining whether it is fully coated or proximally coated. Similar to a cemented stem, any trochanteric bony overgrowth should be removed prior to attempted removal. Although a cementless stem may appear unstable, extraction may remain difficult even with appropriate extraction tools. Typically, the bone-prosthesis interface can be disrupted with the use of a high-speed burr and flexible osteotomes. Notching of the femoral neck of the retained implant can be helpful to allow placement of an extraction tool in situations of stem/neck fracture or inability to obtain a stronger interference fit. (Fig 3) If the stem is still unable to be removed, an ETO should be considered.

Well-fixed modular or monoblock fluted cementless stems can be extremely difficult to remove. Whenever possible, the explant system for the particular modular/monoblock stem should be requested. Proximally, the bone-prosthesis interface can again be disrupted with the use of a motorized burr and thin flexile osteotomes. More distally, threaded K-wires have been used in an attempt to disrupt the bone in the "valleys" of the fluted stems. Modular systems may additionally allow the proximal body segment to be disengaged from the more distal segment. However, the

distal portion of the stem will remain well fixed and a long extended trochanteric osteotomy to the level of the stem tip may be required. In general, it is not advised to attempt to remove a well fixed diaphyseal stems from the top.

Fig. 1: Extensively coated, Modular tapered, monoblock tapered and cemented stem

Fig 2: Long curved cement gouges, reverse hooks and flat osteotomes to facilitate component removal

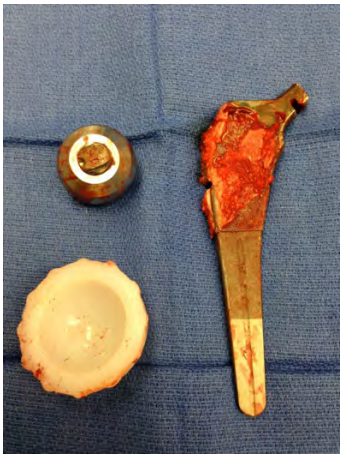


Fig 3: Fracture of stem at head/neck junction. Notching remaining femoral neck to facilitate removal

Modular Fluted Tapered Stems: Making Femoral Revisions Easy

Symposium F
Tips and Tricks to Save You During Revision THAs: Video-Based Demonstrations
AAOS Annual Meeting
March 8, 2023

R. Michael Meneghini, MD
Professor of Clinical Orthopaedic Surgery
Indiana University School of Medicine
Indianapolis, IN

Modular tapered stems have become the workhorse stem for the majority of revision total hip arthroplasties that require revision of the femoral component with excellent mid-term outcomes.[1-4] The main benefits of proximal body modularity are: 1) ability to customize and optimize hip biomechanics with offset, leg length and anteversion, "decoupled" from the distal stem seating to minimize risk of instability and optimize function, 2) optimal stem rigidity and modulus more similar to bone to minimize proximal bone resorption due to stress-shielding, minimize "end of stem pain" and optimize proximal bone remodeling and 3) optimized access to distal stem via removal of proximal body in cases of revision as in cases of periprosthetic infection

To maximize outcome of these particular Wagner-style tapered revision stems, optimal surgical technique is imperative. Each of these stem designs has slightly different geometries that include inner core taper angle, outer spline taper angle, surface finish and distance between splines. While the optimal geometry has not yet been established, there are nuances that exist with each geometry that assist in optimal implantation. The taper angle varies between 5^{O} and 2.5^{O} between designs. It is important to know that a more pronounced 5^{O} taper angle that is present in the Wagner "cone" primary stem will cause the stem to somewhat regularly sit "proud" compared to the reamer. Conversely, a less agressive taper angle such as 2.5^{O} may have a tendency to subside if optimal reaming technique is not performed diligently, as has been described by authors.[5] While the surgical technique with these tapered stem designs is simplified, straightforward and less prone to peri-prosthetic fracture, if a less aggressive taper angle is employed, subsidence may occur and has been attributed to under-sizing and can be mitigated with reaming on power to ensure maximal endosteal contact.[5] Other factors have been reported to affect stem subsidence such as poor bone quality (Dorr Bone Type C).[6] Additionally, patient weight greater than 80 kg and femoral stem press-fit distance of less than 2 cm have both been reported to be independent risk factors for significant stem subsidence.[7]

References

1. Abdel, M.P., et al., *Modular Fluted Tapered Stems in Aseptic Revision Total Hip Arthroplasty.* J Bone Joint Surg Am, 2017. **99**(10): p. 873-881.
2. Riesgo, A.M., et al., *Survivorship and Complications of Revision Total Hip Arthroplasty with a Mid-Modular Femoral Stem.* J Arthroplasty, 2015. **30**(12): p. 2260-3.
3. Pelt, C.E., et al., *Revision total hip arthroplasty with a modular cementless femoral stem.* J Arthroplasty, 2014. **29**(9): p. 1803-7.
4. Lakstein, D., et al., *Revision total hip arthroplasty with a modular tapered stem.* Hip Int, 2010. **20**(2): p. 136-42.
5. Patel, P.D., et al., *Influence of technique with distally fixed modular stems in revision total hip arthroplasty.* J Arthroplasty, 2010. **25**(6): p. 926-31.
6. Parry, J.A., et al., *Risk Factors for Subsidence of Modular Fluted Tapered Stems Used During Revision Total Hip Arthroplasty for Periprosthetic Hip Fractures.* J Arthroplasty, 2018. **33**(9): p. 2967-2970.
7. Tangsataporn, S., et al., *Risk Factors for Subsidence of a Modular Tapered Femoral Stem Used for Revision Total Hip Arthroplasty.* J Arthroplasty, 2015. **30**(6): p. 1030-4.

Hemispherical Cups and Augments: How to Make Them Work

George Haidukewych MD Orlando, Florida

Uncemented acetabular component fixation remains the gold standard for managing various defects in the revision hip setting. Multiple series have demonstrated over 90% ten-year survivorship of these constructs. Modern "enhanced" metals such as trabecular tantalum and titanium continue to perform well and are growing in popularity. So called "jumbo" cups, diameters >=62mm in females and >=66mm in males have demonstrated excellent survivorship. Good bony support with viable bone and stable initial fixation is necessary for long-term success. It is unknown how much remaining bone is necessary for reliable ingrowth with modern enhanced metals. The location of the remaining bone is probably more important than the absolute amount remaining. Excellent circumferential exposure of the acetabulum is necessary to allow identification of the desired hip center and safe reaming. Occasionally, the uncemented cup must be augmented with metal augments or even a so-called "cup cage" construct (covered by another speaker). Even in these situations, the uncemented cup remains the workhorse of revision THA due to its ingrowth potential and excellent track record. Augments are commercially available in various shapes and sizes to assist in the management of cavitary, segmental and combined defects while restoring the desired cup position. Trials are available to ensure good approximation of the augment to remaining bone. The author prefers a "cup first" technique. Augments can be intra-cavitary (for oblong defects) or extra-cavitary for segmental rim defects in an otherwise round acetabulum. The constructs are typically "unitized" to the cup via bone cement. Available data show excellent survivorship of augmented constructs for these challenging reconstructions.

Gustke et al. Use of jumbo cups for revision of acetabulae with large bony defects. J of Arthroplasty Aug 2013.

Lachiewicz et al. Fixation, survival, and dislocation of jumbo acetabular components in revision total hip arthroplasty. JBJS Am 2013 March.

Whaley et al. Extra-large uncemented hemispherical acetabular components for revision total hip arthroplasty. JBJS Am Sept 2001.

Whitehouse et al. Continued good results for modular trabecular metal augments for acetabular defects in hip arthroplasty at 7 to 11 years. CORR 2015,

Jenkins et al. Minimum five year outcomes with porous tantalum cup and augment constructs in complex revision THA. JBJS Am May 2017.

AAOS 2022

Scott M. Sporer, MD

Professor Adult Reconstruction – Rush University Medical Center Chicago, IL

Cup Cage for Massive Bone Loss or Pelvic Discontinuity: An Off-the-Shelf Solution

Defect Classification

The classification of Paprosky utilizes four radiographic criteria from an AP pelvic radiograph: 1) Superior migration of the hip center 2) ischial osteolysis 3) teardrop osteolysis and 4) position of the implant relative to Kohler's line. (Figure #1). Proximal migration of the acetabular component beyond 3 centimeters from the native hip center or severe ischial lysis correlates with difficulty obtaining initial stability with a hemispherical component alone. These defects will require additional structural support from either a bulk allograft, metallic augmentation, acetabular cage or a custom implant in order to obtain stable initial fixation. Our preferred method of treatment is a cup-cage for massive defects.

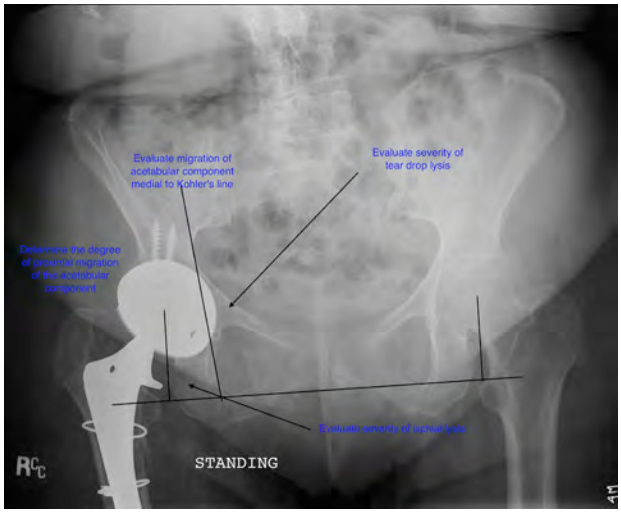


Figure #1: Criteria for Paprosky acetabular defect classification

Acetabular Reconstruction:

Acetabular reconstruction in massive bone loss is based on the integrity of the remaining anterosuperior (AS) and posteroinferior (PI) columns. The goal is to obtain an interference fit of a cementless hemispherical acetabular shell between the two columns, maximizing intimate host bone contact. Massive anterosuperior and medial defects have limited treatment options.

Use of augments in Paprosky 3B defects are classified as either secondary support or primary support. In massive bone loss, augments are necessary to provide primary support for the implant. Intracavitary porous metal augments providing primary support of the component having shown good short and intermediate term results for the treatment of severe acetabular bone loss.

Surgical Technique:

The acetabulum is completely debrided and inspected for pelvic discontinuity. The anterosuperior and posteroinferior columns are assessed to determine what type of augments are needed to provide primary support. The appropriate size and type of trial augment is selected and may require fastening two trial augments together using screws. The actual augments are press fit into the pelvis to recreate the anterosuperior column and fill the large medial defect and screws may be added if possible. Augments used in this manner provide primary stability. Sequential reverse reaming is performed to determine the size of the acetabular component. If there is no discontinuity, a revision tantalum shell is press fit into the newly constructed acetabulum. This type of reconstruction is supplemented with a half cage. If a pelvic discontinuity is present, distraction is performed using the distraction device in combination with a cup cage. The entire cup cage construct is fixed to remaining host bone with screws. Care is taken to correctly orient the construct and restore the hip center. Partial weight bearing is recommended for 6-12 weeks.

Take Home Points:

- Exposed all margins of acetabular defect and discontinuity thoroughly
- If gross motion seen and bone contact possible (acute discontinuity), use posterior column plate
- Progressively ream until two points of fixation are achieved. (ant-Superior, anterior-inferior, posterior-inferior)
- Intrinsic stability will not be able to be obtained.
- Use augments to decrease acetabular volume and facilitate press-fit between cup and augment. i.e.- attempt to place augment in direct contact with revision cup
- Bridge discontinuity with augment and place screws cephalad and caudal
- Do not remove fibrous tissue in discontinuity
- Reverse ream with augment in place to pack bone graft
- Porous acetabular component used to “reconstruct” pelvic bone loss as an internal fixation device across discontinuity.
- Clear bone graft from exposed host bone. i.e. – maximize host bone-Revision cup area
- Supplement Fixation with half cage along iliac wing
- Multiple screws in the superior and inferior hemipelvis
- Cement liner/cup into Cup/Cage construct to optimize position
- Avoid use of constrained liner

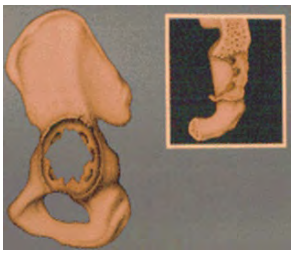
Tips and tricks to save you during revision THA: Custom Triflange for Massive Pelvic Bone Loss and Pelvis Discontinuity: Take the guess work out of it.

Bryan D Springer, MD

AAOS Symposium F

WHAT DO WE MEAN BY MASSIVE BONE LOSS?

- Paprosky Classification of Acetabular Defects (1-3)
- Migration >2 cm
- Type 3 Defect
  - Ant/post column defect
  - Absence of medial wall

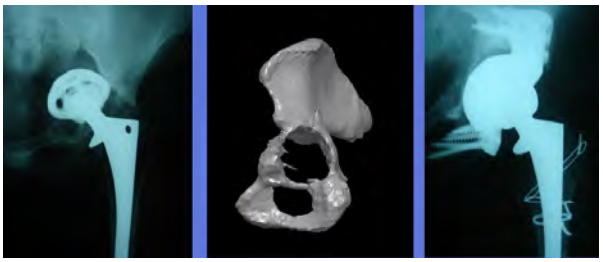


SURGICAL OPTIONS FOR TYPE 3 DEFECTS:

- Jumbo cup
- Jumbo cup with augments
- Cup cage construct
- Custom triflange

I use each of these for “massive” defects

X rays and 3D Evaluation:



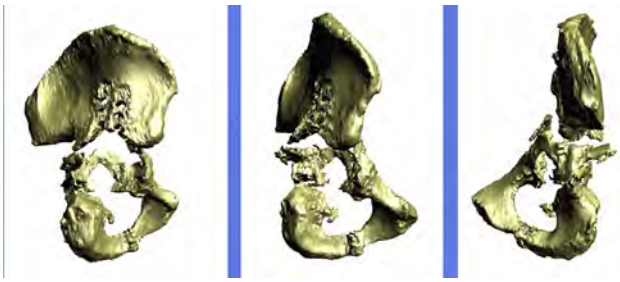
- Should use the diagnostic tools available today to accurately assess massive acetabular bone loss.

CT MODELING OF ACETABULAR BONE LOSS:

• Removes the guesswork
• Facilitates planning
• Minimizes intraoperative surprises
• Facilitates intraop dissection
• Translates into lower complications and improved results

CT MODELING OF ACETABULAR BONE LOSS:

Digital Evaluation



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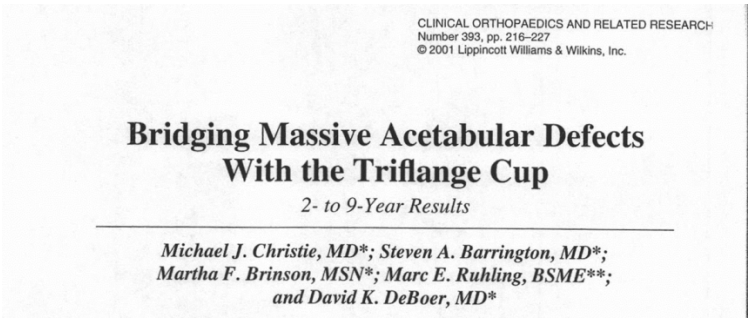


CLINICAL ORTHOPAEDICS AND RELATED RESEARCH
Number 393, pp. 216–227

Bridging Massive Acetabular Defects With the Triflange Cup

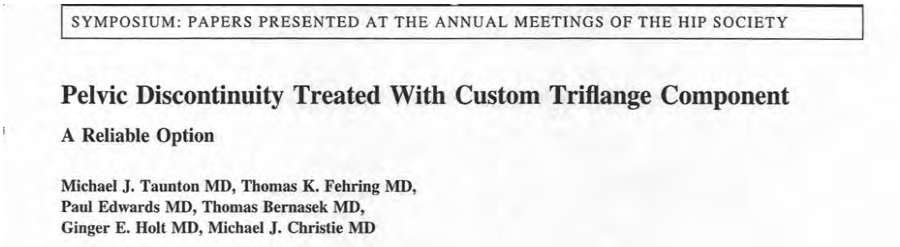
2- to 9-Year Results

Michael J. Christie, MD; Steven A. Barrington, MD*; Martha F. Brinson, MSN*; Marc E. Ruhling, BSME**; and David K. DeBoer, MD**

Clin Orthop Relat Res, 393, Dec. 2001

67 hips f/u 53 months

- preop Harris Hip Score – 33
- postop Harris Hip Score – 83
- no triflange removals



SYMPOSIUM: PAPERS PRESENTED AT THE ANNUAL MEETINGS OF THE HIP SOCIETY

Pelvic Discontinuity Treated With Custom Triflange Component

A Reliable Option

Michael J. Taunton MD, Thomas K. Fehring MD, Paul Edwards MD, Thomas Bernasek MD, Ginger E. Holt MD, Michael J. Christie MD

Clin Orthop Relat Res 470, Feb. 2012

57 patients f/u 65 month average

56/57 free of revision for aseptic loosening

46/57 stable triflange and healed discontinuity

COST COMPARISON:

- Custom triflange implant $11,500
- (includes CT)
- TM cup cage construct $11,250
- TM cup and 2 augments $14,500
  (Distraction technique)

SOUNDS GOOD – BUT DOES IT WORK?

Midterm Survivorship After Revision Total Hip Arthroplasty With a Custom Triflange Acetabular Component

Brian P. Gladnick, MD, Keith A. Fehring, MD, Susan M. Odum, PhD, Michael J. Christie, MD, David K. DeBoer, MD, Thomas K. Fehring, MD

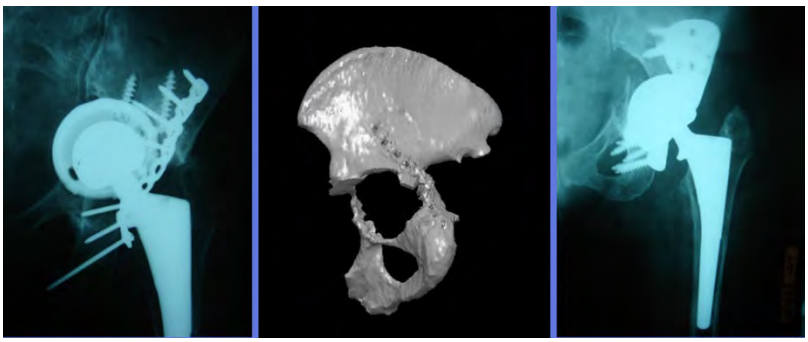
*The Journal of Arthroplasty: **February 2018**Volume 33, Issue 2, Pages 500–504*

The purpose of this multicenter study was to report our mid-term experience with custom triflange acetabular reconstructions for major acetabular defects at a minimum 5-year follow-up.

METHODS:

- 324 patients were identified with Triflange reconstructions at two centers
- Inclusion
  - custom triflange reconstruction of the acetabulum for Type 3 defects
  - minimum 5-year clinical follow-up

DATA SET:



73 Patients Had Minimum 5 Years Follow Up

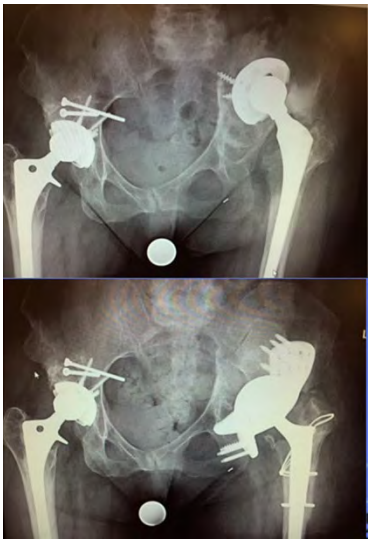
METHODS:

- Medical records and xrays were reviewed to determine
- triflange revision rate
- re-operation rate
- radiographic loosening rate
- HOOS Jr pain and function score
- Average Follow up 7.5 years (5-12 years)

RESULTS:

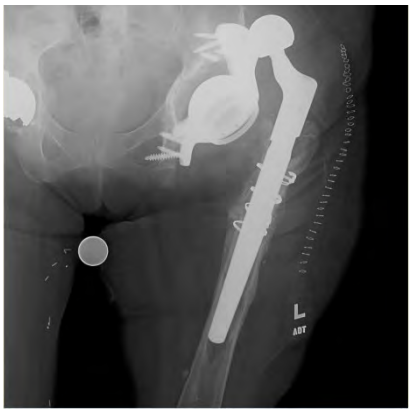
Triflange Revision Rate 15 of 73 (20.5%) !!

- Instability 6 of 73 (8%)
- Infection 9 of 73 (12%)
- Aseptic Loosening 1 of 73 (1%) (Not Revised)



Instability Revision 6/73 (8%)

All Revised to Constrained Liners



Revision for Infection 8/73 (12%)

- 2 I & D's with Poly Xchange
- 6 Explanted
- 4 Reimplanted
- 2 Not Reimplanted

Reoperation Rate 12/73 (16%)

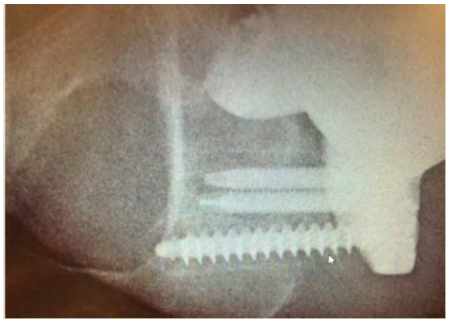
3 Troch Hardware Removals
2 Hematomas
1 Broken Stem
1 Femoral Loosening

2 Periprosthetic Femur Fractures
2 Poly Wear/ Osteolysis
1 Closed Reduction

HOOS JR SCORES
Median 85
IQR 73-100

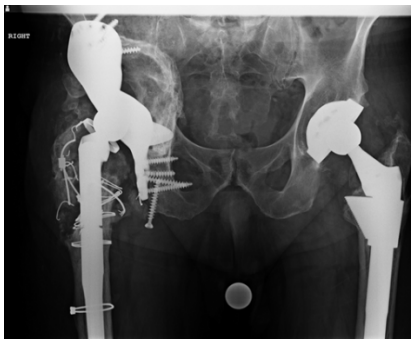
Radiographic Evaluation

- 1/73 Loose
- 2 Cases of Ischial Screw Radiolucencies with stable implants



DISCUSSION:

- Custom triflange acetabular reconstruction is a viable option for addressing major acetabular defects.
- Mid-term results are satisfactory; however, complications are common and significant challenges remain in those that fail.



LESSONS LEARNED:

- Extensive soft tissues dissection predisposes to instability
- Angle ILIAC screws
- Shorten ILIAC flange
- Protect superior gluteal nerve
- Standard flip osteotomy if necessary
- Cup that Allows very large heads or constrained implants
- Standard roof pile screws to assure bite/augment screws with cement if needed

Suggested Reading and References[1 2 3 4 5 6] :

1. Moore KD, McClenny MD, Wills BW. Custom Triflange Acetabular Components for Large Acetabular Defects: Minimum 10-Year Follow-up. *Orthopedics*. 2018;41(3):e316-e320. doi:10.3928/01477447-20180213-11

2. Wind MA, Swank ML, Sorger JI. Short-term Results of a Custom Triflange Acetabular Component for Massive Acetabular Bone Loss in Revision THA. *Orthopedics*. 2013;36(3):e260-e265. doi:10.3928/01477447-20130222-11

3. Holt GE, Dennis DA. Use of Custom Triflanged Acetabular Components in Revision Total Hip Arthroplasty. *Clin Orthop Relat Res*. 2004;429:209-214. doi:10.1097/01.blo.0000150252.19780.74

4. Gladnick BP, Fehring KA, Odum SM, Christie MJ, DeBoer DK, Fehring TK. Midterm Survivorship After Revision Total Hip Arthroplasty With a Custom Triflange Acetabular Component. *J Arthroplasty*. 2018;33(2):500-504. doi:10.1016/j.arth.2017.09.026

5. De Martino I, Strigelli V, Cacciola G, Gu A, Bostrom MP, Sculco PK. Survivorship and Clinical Outcomes of Custom Triflange Acetabular Components in Revision Total Hip Arthroplasty: A Systematic Review. *J Arthroplasty*. 2019;34(10):2511-2518. doi:10.1016/j.arth.2019.05.032

6. Berasi CC, Berend KR, Adams JB, Ruh EL, Lombardi AV. Are Custom Triflange Acetabular Components Effective for Reconstruction of Catastrophic Bone Loss? *Clin Orthop Relat Res*. 2015;473(2):528-535. doi:10.1007/s11999-014-3969-z

AAOS 2023

Symposia: Tips and Tricks to Save You During Revision THAs:

Instability Requiring Revision:

Deciding What Construct to Use and How to Perform

Douglas E Padgett, MD

Hospital For Special Surgery

3 Step Process When Performing Revision for Instability:

1. Appropriate Workup
2. Assign Cause of Instability
3. Develop Plan based upon best evidence and execute

1. Workup of Instability
    a. History
        i. Timing and direction of instability
    b. Labs:
        1. Don't forget about infectious / biologic causes (ALTR)
    c. Imaging
        i. Plain radiographs
            1. Implant position / presence of wear & lysis / status of troch
            2. Consider CT if pelvic lysis suspected and need to consider cup revision
        ii. Functional Imaging
            1. Stand-sit (plain xray or EOS)
        iii. MRI in instances where abduction deficiency is suspected
2. Assignment of Cause
    a. Cup or Stem Malposition
    b. Impingement (Bone or implant)
    c. Abductor Deficiency
    d. Poly wear
3. Plan / execution
    a. Malpositioned implants should be revised
    b. Impingement may require implant revision
    c. Abductor deficiency often requires additional constraint !

Now It's Infected: My Articulating Spacer Construct

James I. Huddleston, III, MD

AAOS 2023 Annual Meeting Symposium
Tips and Tricks To Save You During Revision THAs: Video-Based Demonstations

Factors to consider in choosing a hip spacer include articulating vs. non-articulating constructs, function in between stages, function after reimplantation, infection eradication rates, technical difficulty, surgeon-made vs. commercially-manufactured, cost, dislocation rates, choice of antibiotics, dose of antibiotics, and spacer preparation. In comparing articulating vs. non-articulating hip spacers, expert consensus is:

1) Non-articulating spacers should be used in cases of massive bone loss and/or compromised soft tissues.

2) Articulating spacers are more difficult to place but allow for easier reimplantation.

3) Patient function in between stages is better with articulating spacers.

4) There is no difference in function 2 years after reimplantation.

5) There is no difference in infection eradication rates for two-stage exchange.

6) There are no differences in function or infection eradication rates between commercially-manufactured and surgeon-made spacers.

7) Antibiotic choice and dose should be individualized for each patient.

8) Vancomycin and gentamicin or tobramycin are the most commonly-used antibiotics in hip spacers. Per 40g bag of bone cement, doses are 1-4g of vancomycin and 2.4-4.8g of gentamicin or tobramycin.

9) There is no consensus on best preparation techniques for high-dose antibiotic spacers.

Spacers.
Citak M, Argenson JN, Masri B, Kendoff D, Springer B, Alt V, Baldini A, Cui Q, Deirmengian GK, del Sel H, Harrer MF, Israelite C, Jahoda D, Jutte PC, Levicoff E, Meani E, Motta F, Pena OR, Ranawat AS, Safir O, Squire MW, Taunton MJ, Vogely C, Wellman SS. J Orthop Res. 2014 Jan;32 Suppl 1:S120-9. doi: 10.1002/jor.22555.

Tips and Tricks Revision THA Symposium AAOS 2023: Periprosthetic Femur Fractures

Elizabeth Gausden, MD, MPH

I.) Vancouver B2 periprosthetic femur fractures
- a. Special consideration for early <6 weeks fractures following THA
  - i. Higher incidence of subsequent PJI
- b. Preoperative Evaluation
  - i. Plain radiographs (calibrated)
  - ii. CT scan
    - 1. Assessing comminution of greater trochanter
  - iii. Assessing femoral stem stability
    - 1. Previous images
    - 2. Knowledge of the stem
    - 3. Patient considerations
    - 4. Exceptions to the rules- when to treat a rare B2 without revision

II.) Surgical Pearls
- a. Approach
  - i. Pros and Cons of DAA versus PLA
  - ii. Considerations for separate approach for revision THA
- b. Stem extraction & avoiding further GT displacement
- c. Strategies
  - i. "Pot in place" and use the stem as scaffold
    Versus
  - ii. "Recreate the tube" and insert the new stem
- d. Modular fluted tapered stems (MFTS)
  - i. Using fluoroscopy/x-ray to assess canal fill
  - ii. Taper angle differences
- e. Displaced trochanters and plating
  - i. When to use a trochanteric claw plate
  - ii. Cables/wire techniques
  - iii. Suture strategies
- f. Strategies to Mitigate Subsequent Instability
  - i. Head Size
  - ii. Dual mobility
  - iii. Constrained liners
  - iv. Approach options