Get ready to revise……

In 1979, Charnley suggested that revision surgery, because of loosening, would be the “primary concern in total hip arthroplasty over the medium and long term”

— Charnley J. Low friction arthroplasty of the hip: theory and practice. Berlin: Springer Verlag; 1979
Classifications in brief: Paprosky classification of acetabular bone loss.

Telleria JJ, Gee AO.


Biology is better

Avoid heavy metal

Advantages of Biologics

- Easily applicable to most / all patients
- Accurately restore hip center
- Restore bone stock
  - End the vicious cycle of metal, loosening, more metal, loosening....
  - Provide real estate for further revision if needed
  - Cost / surgical time?
- Structural vs. filler / autograft vs. allograft
Disadvantages of Mega Metal

- Failure of mega metal is disastrous
- Dealing with infection (TM cups) is horrible
- Ream away more bone to allow fit of augment or jumbo cup / tri-flange???
- Easy to develop the “high hip center”
- Conflict between proper cup orientation or positioning for adequate coverage

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Short-term Results of a Custom Triflange Acetabular Component for Massive Acetabular Bone Loss in Revision THA
Michael A. Wind Jr, MD; Michael L. Swank, MD; Joel I. Sorger, MD

<table>
<thead>
<tr>
<th>Study</th>
<th>No. of Patients</th>
<th>Mean HHS</th>
<th>Debridement Rate, %</th>
<th>Component Failure, %</th>
<th>No. (%)</th>
<th>Significant Postop. Complications</th>
<th>Component Failure or Explantation</th>
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<tr>
<td>Grade &amp; Childs-3</td>
<td>27</td>
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<td>27</td>
<td>9</td>
<td>3 (11)</td>
<td>5 (18)</td>
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<td>Hudak &amp; Dorr</td>
<td>26</td>
<td>29</td>
<td>70</td>
<td>6</td>
<td>12</td>
<td>3 (12)</td>
<td>5 (19)</td>
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<td>Jaffe et al</td>
<td>27</td>
<td>27</td>
<td>53</td>
<td>4</td>
<td>7</td>
<td>0 (0)</td>
<td>6 (23)</td>
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<td>Current study</td>
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<td>56</td>
<td>8</td>
<td>11</td>
<td>4 (13)</td>
<td>5 (16)</td>
</tr>
</tbody>
</table>

Abbreviations: HHS, Harris Hip Score; Postop, postoperative; Explant, explantation.
*Jaffe et al.* reported clinical models using Charnley’s modification of the Harris Hip Score and Harris Hip Score alone, i.e., rather than the Harris Hip Score alone, i.e., 9.199.
**Conclusion**

Managing massive acetabular bone loss during revision THA is a challenging task. Complication rates are high for all reconstructive options for massive bone loss (Paprosky types 3A/3B and AAOS types III/IV). The custom triflange acetabular component also has a high rate of complications and is technically demanding to insert. The patient and the surgeon should both be aware that multiple past surgeries and severe acetabular bone loss are preexisting problems for which no perfect reconstruction method currently exists. Therefore, patient and surgeon expectations should be realistic.

**Acetabular Reconstruction in Total Hip Arthroplasty**

Won Yong Shon, MD, PhD, Siva Swaminathan Santhanam, MD, Jung Woo Choi, MD

The disadvantages [of mega cups] are that extra-large sockets limit bone-stock restoration, and large, oblong bone deficiencies cannot be filled in an inferior-to-superior direction without extensive reaming of the anterior or posterior column or superior placement of the cup because many superior defects are oblong, and their supero-inferior dimension is larger than their AP dimension and converting the oblong to a hemisphere with progressive reaming might disrupt the posterior wall and column, which are critical for implant stability.

Acetabular fixation during revision THA in patients who have a non-supportive superior dome and proximal migration of the acetabular component (Paprosky type III A defect) cannot be achieved reliably with use of a hemispherical porous coated component alone. A high rate of failure has been noted ** when an unsupported porous-coated acetabular component has been inserted without an associated structural graft.


The current role of structural grafts and cages in revision arthroplasty of the hip.

Gross AE, Goodman S.

The structural graft has the advantage of restoring the center of rotation to the right level and restores bone stock for additional surgery if necessary.** Because these grafts support less than 50% of the cup, uncemented components can be used, and the graft does not have to be protected by a ring or a cage. These are called minor column or shelf grafts and results at 10 years have been very good with a 94% survivorship of the allograft reconstruction.

Segmental (uncontained) bone loss involving more than 50% of the acetabulum (Type IV) is one of the biggest challenges in revision hip surgery. The use of a structural allograft has the potential to restore bone stock for future surgery and restores the hip to the correct level. These grafts should be protected by a cage that extends from host ilium to host ischium. There are long-term results available and they are encouraging in a difficult situation.


Abolghasemian M, Sadeghi Hadi M, Tansimpoor S, Lee A, Ruchkin D, Safir O, Kuzyk P, Gross AE. Retrospectively reviewed 44 consecutive patients (50 hips) who underwent acetabular re-revision after a failed previous revision that had been performed using structural or morcellised allograft bone, with a cage or ring for uncontained defects.
At the time of re-revision, there were ten host acetabula with no significant defects, 14 with contained defects, nine with minor-column, seven with major-column defects and ten with pelvic discontinuity. When bone defects at re-revision were compared with those at the previous revision, there was restoration of bone stock in 31 hips, deterioration of bone stock in nine and remained unchanged in ten. This was a significant improvement (p < 0.001).

In 17 hips (34%), re-revision was possible using a simple acetabular component without allograft, augments, rings or cages. The use of a cage or ring over structural allograft bone for massive uncontained defects in acetabular revision can restore host bone stock and facilitate subsequent re-revision surgery to a certain extent.

... we chose to perform the acetabular reconstruction using frozen morselized allograft and a metal reinforcement ring. We hypothesized that by rebuilding the acetabular bone stock and restoring the hip centre of rotation, satisfactory functional results and good stability could be obtained over the medium and long-term. With failure criteria of surgical revision and/or radiological loosening, the cumulative survival at 13 years was 77.9% (95% confidence interval: 61.96% to 93.84%).
Non structural allografts
Patients >75 hips

- No migrations - >1-2 mm
- 1 failure
- 1 infection
- 0 revisions
Allografts supercharged with bone-marrow-derived mesenchymal stem cells possess equivalent osteogenic capacity to that of autograft: a study with long-term follow-ups of human biopsies.

Hernigou P1, Dubory A2, Roubineau F3, Homma Y4, Flouzat-Lachaniette CH2, Chevallier N5, Rouard H5

Twenty patients received acetabular grafting during hip surgery and subsequently underwent femoral hip revision eight to 13 years later (average 10 years).

New-bone-formation analysis showed that allografts loaded with BM-MSCs produced more new bone (35 %; range 20-50 %) compared with either uncharged allografts (9 %; range 2-15 %) or autografts (24 %; range 12-32 %).

Our observations with allografts charged with BM-MSCs provides evidence in support of a long-term benefit of supercharging bone allografts with autologous BM-MSCs.
MM 86 y/o female

Any Questions?