Commentary

State-of-the-art on reconstruction of massive acetabular defects in revision total hip arthroplasty: a commentary on "Comparable results with porous metal augments in combination with either cemented or uncemented cups in revision hip arthroplasty: an analysis of one hundred forty seven revisions at a mean of five years"

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Comment on: Mahmoud AN, Sundberg M, Flivik G. Comparable Results With Porous Metal Augments in Combination With Either Cemented or Uncemented Cups in Revision Hip Arthroplasty: An Analysis of One Hundred Forty-Seven Revisions at a Mean of Five Years. J Arthroplasty 2016. [Epub ahead of print].

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Complex acetabular bone defects are challenging even for the most experienced hip reconstructive surgeons. Paprosky type IIIA and IIIB defects, which present both peripheral and cavitary deficiencies, can be managed with numerous options: high placement of porous-coated acetabular component; Burch-Schneider anti-protrusio cages; customized triflange cups; standard-size cemented or uncemented cups along with either bulk structural allograft, impaction grafting over a metal mesh, or metal augments and, more recently, tantalum trabecular-metal cups, frequently used as jumbo cups at our institution (with or without metal-porous augments). The idyllic reconstructive technique for the severely deficient acetabulum in revision total hip arthroplasty (THA) remains unsolved.

We believe that restoration of hip biomechanics, including reestablishment of the centre of rotation, is a must for achieving long-term survival in revision THA. In this sense, implantation of a high acetabular component is exceptional, reserved only for extreme cases of failed acetabular reconstruction in Hartofilakidis grade C dysplasia sequelae (1).

The use of rings and cages has dropped in the past decades due to concerns about long-term mechanical stability, implant fracture and heterotopic ossification (2,3); we nowadays may consider using such devices in cases of associated posterior column fracture in which solid fixation is essential.

As for custom-made triflange cups, we ponder them as auspicious alternatives that should be borne in cases of extreme bone loss, with structural absence of the ilium or both osseous columns (pelvic discontinuity). Nonetheless, their high dislocation rate, together with a lengthy time to manufacturing from a prior CT-scan navigation as well as an excessive production cost, threaten their ease in indication. Since overall revision rates are high (15–20%) with this technique, we reserve it for situations of catastrophic bone loss (4).

Literature is overwhelmed with data about good long-term outcomes of acetabular reconstruction with standard cups and either structural or impacted bone allografts. We have been using impaction-allograft technique for over two decades considering it a biological procedure, allowing for both restoration of bone stock and the use of conventional components as in primary surgery, with consequent reduction in costs (5). However, it is a time-consuming surgery requiring access to a bone bank and it demands a postoperative course with restricted weight-bearing until consolidation is radiologically assessed. Besides, it carries the risk of graft resorption, implant migration and disease transmission. In order to reach successful results, an experienced surgeon should preferably perform the surgery and an absolutely stable graft fixation must be obtained (6).

In those last years, we have been indicating tantalum highly porous cups for uncontained acetabular defects. With these implants, bony ingrowth can be successfully obtained even with less than 30% of residual host bone. Surgical technique is reproducible and restriction of weight-bearing is not a concern as in other kinds of reconstruction. It seems that trabecular metal implants are superior to other types of reconstructive methods in terms of re-revision rates due to aseptic loosening and/or infection (7). In the setting of incomplete proximal support, we encourage the use of tantalum augments. Tantalum trabecular metal augments (Zimmer) also admit impacted bone allografts inside them. Selection of the appropriate wedge relies on the size of the defect and the geometry of the adjacent pelvic bone. Sometimes, a minor mismatch exists and additional reaming of the acetabular bony bed is needed; if persistent, the wedge can be formatted with a rongeur.

The authors of the commented paper have retrospectively described excellent mid-term outcomes of tantalum wedges along with both cemented and cementless cups. They alleged that the combination of a cementing technique along with wedges is more advantageous since it is easier and needs less acetabular reaming. Additionally, they consider that an optimal positioning can be achieved effortlessly since no press-fit is mandatory. Conversely, we believe that uncemented trabecular metal shells might be preferable when using such augments, since some residual malpositioning (sometimes inevitable in the surgeon's will to completely cover the bony defect) can be compensated by the cementation of an independent polyethylene liner or a dual-mobility cup (in the presence of a damaged abductor system) in a more suitable orientation (8).

We have approached diverse tools that can be held in the reconstructive surgeon's armamentarium. Although some of them have proven their long-term efficacy, many procedures, including trabecular metal augments, still need a prospectively-followed long-term report. Trabecular metal implants clearly do not restore bone stock. Hence, strain, expressed as increased cross-sectional forces absorbed by the metal implant per millimetre of surface, may trigger the release of metal debris, jeopardizing the endurance of the fixation through the host bone interface. As in primary surgery, one of the main targets of hip revision surgery is bone preservation (especially in the very young patient), in order to facilitate an eventual future revision. If such eventuality occurs, then implants should ease in their extraction without causing additional bone loss, so exchange for new ones can be done by a simple manoeuvre. So far, trabecular metal cups and/or augments have not shown versatility, but forthcoming studies are encouraging.

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Footnote

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Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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