Impaction Grafting for Acetabular Revision: Bringing Back the Bone

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Impaction grafting has been widely promoted on the acetabular side by Schreurs et al., with associated bone grafting and a cemented cup.

The objectives of impaction grafting are to: 1) transform segmental defects into cavitary defects, 2) obtain a full compaction of the graft, 3) achieve primary stability of the cup, which is anatomically located in the acetabulum, and 4) restore bone stock. This technique can be combined with the use of inner-medial or rim mesh according to the type of defect.

Impaction grafting can be used in cementless fixation with morsellized bone graft and a hemispherical cup.2,3 However, in some cases, primary stability of the cementless cup requires oversized jumbo cups or a higher hip center, which may cause additional bone loss, increased forces on the acetabular component, or decreased forces of the abductor muscles.

Problems regarding cementless fixation are significant bone loss, segmentary and cavitary defects, and significant migration of the acetabular component.5 It is important to preserve the relocation of the center of rotation and to obtain primary stability with press-fit and additional screw fixation when using impaction grafting in cementless fixation.

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Surgical Technique

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**Figure 1:** Preoperative radiograph of the right hip showing a major protrusion. **Figure 2:** Postoperative 5-year radiograph showing reconstruction of the acetabulum using impaction grafting and cementless reinforcement ring.
The surgical technique requires larger bone chips, and the hook of the cementless ring must be placed at the level of the teardrop. Full compaction of the graft on the cup and host bone is important.

**RESULTS**

At follow-up, the mean Harris hip score was 88 points (range: 47-100 points). The mean leg-length discrepancy postoperatively was 6 mm. In 67% of cases, no radiographic interface was seen between the host bone and graft. The mean abductor ratio was 0.69. The center of rotation was located in anatomic position medially in 66% of cases and in the craniopodal plane in 44%.

Complications included three dislocations requiring open reduction, one femoral fracture, and two trochanteric nonunions. Two acetabular components were revised for loosening, one aseptic and one septic.

**DISCUSSION**

Impaction grafting may be limited when bone loss affects the posterior column and requires a custom cementless reinforcement ring or an extended superior flange. However, in such cases, the best solution is to combine structural and impaction grafting while using a cage with a cemented socket. New technology, such as trabecular metal, looks promising for the future in such indications, and can also be used with impaction grafting.

Clinical experience has shown that impaction grafting restores bone stock and can be used with various cup designs.

When the cup is press-fit, additional screw fixation is necessary in the ilium but also at the dome (Figures 1 and 2). This technique was performed in 103 patients using a cementless reinforcement ring and impaction grafting. Average follow-up was 7.3 years. The preoperative average Harris hip functional score was 53 points (range: 26-86 points).

**REFERENCES**