

Case Report

Custom Made Prosthesis after Multiple Surgeries in Pelvic Discontinuity

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Abstract

We present the treatment of a prosthetic dislocation with a Paprosky IIIB bone defect using a customized acetabular implant, which allows the reconstruction of bone defects, including the prosthetic acetabulum, providing immediate postoperative stability. Customized implants enable precise adaptation and reconstruction of defects, ensuring their proper placement by using guides for fixation to the native bone. These custom implants contribute to a more accurate and stable reconstruction, enhancing overall surgical outcomes.

Keywords: Pelvic discontinuity; Paprosky classification; Custom made prosthesis

Case Presentation

A 54-year-old female patient presented to the Hip Unit with left hip pain and long-standing functional impairment, with marked limitations in daily activities.

Surgical chronology:

- 1997: total hip arthroplasty due to avascular necrosis.
- 2011: polyethylene replacement.
- 2021: acetabular revision due to polyethylene wear.
- 2022: two DAIR techniques due to total hip arthroplasty infection (*Escherichia Coli*).

All these procedures were performed in another institution.

Physical examination revealed mechanical-type pain throughout the range of hip motion, along with limping and muscle weakness.

To classify the patient's pathology, Postero-Anterior (PA) and axial hip radiographs, as well as 3D reconstructions of Computerized Tomography (CT) scans, were performed, revealing a pelvic discontinuity with Paprosky III-B acetabular bone loss (Figure 1) [1].

We went through an extended preoperative planification including 3D modelling, resin models for defect and customized implants, and computer validation, before building up the implant with a 3D laser melting printing manufacturing process.

First, acetabular cup extraction and verification of previously identified defects on the CT scan were performed. *In situ* checks were

carried out using a resin model, and under radiographic control, the implantation was performed (Figure 2). Subsequent postoperative control radiographs are shown (Figure 3). After 6 months of follow-up, the patient shows a significant improvement in pain and joint balance, as well as a marked decrease in limping.

Discussion

Pelvic discontinuity is an advance arthroplasty failure characterized by severe bone loss, more than 2 cm superomedial migration of the cup and both acetabular columns disruption, due to progressive bone resorption secondary to periprosthetic osteolysis [2]. There are multiple classifications of pelvic bone defects. The Paprosky classification, useful for assessing bone defects, does not include pelvic discontinuity as a specific type, but it is often detected in cases classified as III-A or III-B [1].

Only the AAOS and Saleh classifications include dislocation as a specific entity, classified as type IV in the AAOS and type V in Saleh [2]. Many treatments are available and demonstrate satisfactory outcomes. In cases of acute discontinuity, we can use compression techniques with plates and acetabular implant, because there is healing potential. If there is a Type III B chronic pelvic discontinuity with no healing potential, treatment options include: acetabular transplant, acetabular trabecular metal cup with augments, trifling acetabular cup or a custom-made implant.

Because of early outcomes (95% of implant survival rate), Hasenauer et al. [3] prefer acetabular distraction technique with or without the use of porous metal modular augments. A systematic review by Malahias et al. [4] reported a 91.9% survival rate of cup-cage construct (158 of 172 hips). The main reasons for revision were dislocation, infection, and aseptic loosening. A more recent systematic review by Wang et al. [5] presented similar results. Treatment with custom-made implants is a good option when aiming to address the disease and restore function quickly, as an alternative to the traditional Cup-Cage reconstruction [6].

A systematic review by Charloine et al. [7] analyzes the clinical and radiographic results of custom-made prostheses, showing satisfactory outcomes in the medium term. The implant survival rate varies between 86.5% and 100%, with a reintervention rate of 24.5%. Malahias et al. [4] systematic review reported a 95.8% of survival rate

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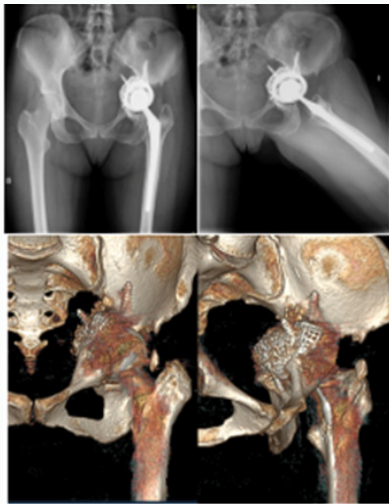


Figure 1: PA and axial hip radiographs and 3D reconstructions.

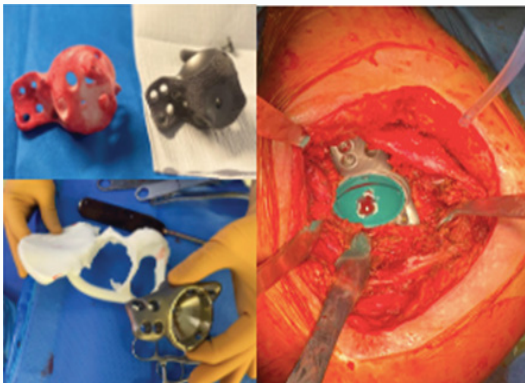


Figure 2: Intraoperative image of the resin model and definitive acetabular implant.

(91 of 95 cases). Main reasons for reoperation were dislocation and infection.

Conclusion

Pelvis discontinuity is an infrequent but serious complication that poses a challenge for orthopedic surgeons. Acetabular reconstruction using a custom-made prosthesis is a good alternative in patients who have undergone previous revision arthroplasties and present significant acetabular defects. This strategy allows reconstruct bone stock deficits and provides postoperative stability.

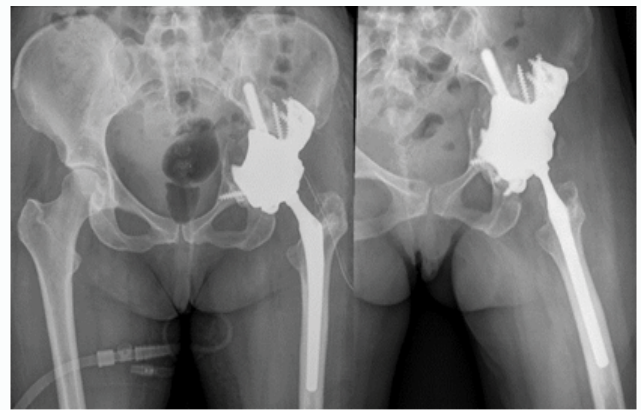


Figure 3: Post-operative control radiographs.

References

1. Telleria JJM, Gee AO. Classifications In Brief: Paprosky Classification of Acetabular Bone Loss. *Clin Orthop Relat Res.* 2013;471(11):3725-30.
2. Ballester A, Jose J, Sueiro-Fernández J, Bermudez JFD, Lanau JV, Zubimendi PA. Treatment of periprosthetic pelvic discontinuity. *Rev S and Traum y Ort.* 2012;29(1/2):73-88.
3. Hasenauer MD, Paprosky WG, Sheth NP. Treatment options for chronic pelvic discontinuity. *J Clin Orthop Trauma.* 2018;9(1):58-62.
4. Malahias MA, Ma QL, Gu A, Ward SE, Alexiades MM, Sculco PK. Outcomes of acetabular reconstructions for the management of chronic pelvic discontinuity: a systematic review. *J Arthroplasty.* 2020;35(4):1145-53.e2.
5. Wang CX, Huang ZD, Wu BJ, Li WB, Fang XY, Zhang WM. Cup-cage solution for massive acetabular defects: a systematic review and meta-analysis. *Orthop Surg.* 2020;12(3):701-7.
6. Vega CA, Moruno F, Garavano E, Sued M, Prado EP. Treatment of Paprosky type IIIA-B acetabular defects and pelvic discontinuity with custom 3D implants: Medium-term results. *Rev Asoc Argent Ortop Traumatol.* 2023;88(5):511-9.
7. Chiarlone F, Zanirato A, Cavagnaro L, Alessio-Mazzola M, Felli L, Burastero G. Acetabular custom-made implants for severe acetabular bone defect in revision total hip arthroplasty: a systematic review of the literature. *Arch Orthop Trauma Surg.* 2020;140(3):415-24.