

What is the most optimal surgical treatment for patients with a chronic pelvic discontinuity?

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Response/Recommendation

A number of surgical options are available for patients with pelvic discontinuity that includes acetabular distraction technique (for chronic discontinuity), cup-cage reconstruction, and custom made triflange acetabular reconstruction. The asymmetric acetabular component with iliac fixation also appears to offer encouraging mid-term results. The type of pelvic reconstruction offered to patients with pelvic discontinuity needs to take into account patient-specific considerations and surgeon's experience.

Level of Evidence: Moderate

Rationale:

A systematic review of the available literature was conducted with the intention of determining the outcome of various acetabular reconstruction for patients with pelvic discontinuity. We did not identify any prospective studies related to this topic. All publications were retrospective case series, most of which originated from centers performing relatively high volume of complex acetabular reconstruction.

The cup-cage construct uses a highly porous coated trabecular metal shell to bridge the discontinuity while a cage is placed over the shell to provide initial mechanical stability of the construct. The outcome of this reconstructive options has been promising with excellent survivorship in mid-term. A review of four retrospective studies comprising of 135 patients with a mean follow-up of 3.8 to 6.3 years revealed a good outcome for cup-cage reconstruction[1–4]. Patient reported outcomes improved significantly, with the Harris Hip Score increasing from 29-36 points preoperatively to 72 points postoperatively. Despite the promising clinical results, the overall complication rate of

cup-cage reconstruction appeared to be relatively high at 29%, that included definitive radiographic aseptic loosening (7.5%), dislocation (10%), nerve injury (3%), and periprosthetic joint infection (8%)[1–4]. In another study, a technique where the screw fixation of the cup is deferred until after the cage has been positioned was evaluated, allowing for optimal adjustments during surgery[5]. This study included 30 patients, with a median follow-up of 6.6 years. Kaplan-Meier survivorship free of aseptic loosening or component migration was 100% at 9.6 years. The ability to adjust the position of the acetabular construct resulted in reduced dislocation (7%)[5]. The half cup-cage construct, a modification of the full cup-cage, eliminates one of the flanges (typically the ischial flange) to simplify the insertion process while maintaining stability. In a study with 30 full cup-cage and 27 half cup-cage, both constructs significantly improved the Harris Hip Score from 36 to 72 points at a minimum of 2 years follow-up. Early construct migration occurred in 4 patients, stabilizing in all but one. Incomplete, nonprogressive acetabular radiolucencies were observed in 7% of full and 22% of half cup-cage constructs. The short-term survivorship free from re-revision was 83% for full and 96% for half cup-cage constructs[4].

Custom made triflange acetabular components (CTAC) is another option for reconstruction of acetabulum in patients with pelvic discontinuity. This reconstructive option is intended to optimize the degree of prosthesis-native bone contact and reduce the need for intraoperative manipulation of the construct and decision-making. The disadvantage of this reconstructive option is the need for a long manufacturing time and relatively high cost of the implant. A review of four retrospective case series with a mean follow-up of 2 to 15.2 years revealed a survivorship between 89 to 95% in the mid to long-term[6–9]. The overall complication rate was high at 49%, with need for reoperation in 6.1 to 37.5% of patients. The rate of periprosthetic joint infection was also relatively high at 5.7 to 12.2% [6–9].

Acetabular distraction techniques was recently described as an option for reconstruction of acetabulum in patients with chronic pelvic discontinuity. This technique involves the

use of a porous tantalum acetabular component with or without modular augments to create controlled distraction. In review of studies involving 96 hips, the overall complication rate was 8 to 29%, and the survivorship of the construct was 90 to 100% at a mean follow-up of 2 to 4.8 years[10–12]. The long term results of this reconstructive option remains unknown as this point.

Lastly, the traditional method to reconstruct acetabulum with pelvic discontinuity involved the use of cage alone with or without plating of the acetabulum. These options included ilioischial and non-ilioischial spanning cages, and pelvic plating with a hemispherical shell. The ilioischial spanning cages showed a survivorship of 66.7% at a follow-up of approximately 2.9 to 13.5 years[13–16]. Non-ilioischial cages, such as reinforcement rings, demonstrated a survivorship of 60.6% with a follow-up ranging from 4.5 to 6.2 years[14,15,17]. The complication rates for these methods were notably high. Ilioischial cages presented a relatively high rate of aseptic loosening (18.4%), dislocation (7.9%) and periprosthetic joint infection (6.1%). Non-ilioischial cages had a higher rate of aseptic loosening at 39.4%, dislocation at 15.2%, and PJI at 9.1%. Pelvic plating with a hemispherical shell had a survival rate of 72.7%, with complications including aseptic loosening (10.6%), PJI (9.1%), periprosthetic fracture (7.6%), and dislocation (7.6%)[18].

Another novel approach for reconstruction of pelvic discontinuity involves using an asymmetric acetabular component with intramedullary and extramedullary iliac fixation. In a retrospective study of 49 patients, the 5-year implant survival was 91%, with an overall revision rate of 16%. The mean Harris Hip Score improved from 41 preoperatively to 79 postoperatively. The overall complication rate was 28.6%, with common issues including periprosthetic joint infection (8%) and dislocation (12%)[19].

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