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Revision Hip Arthroplasty Using a Modular Revision Hip System in Cases of Severe Bone Loss

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ABSTRACT

We sought to identify outcomes of the Restoration Modular Hip System in cases of severe femoral bone stock deficiency. We performed a retrospective review of 55 revTHAs with a mean follow-up of 32 months (24–60 months). Outcomes included the WOMAC and HHS. Preoperative bone loss was categorized as Paprosky 3A (n = 13), 3B (n = 14), and 4 (n = 17). Periprosthetic fractures were classified as Vancouver B2 (n = 6) and B3 (n = 5). 53 of 55 stems were in situ at time of final review. WOMAC improved from 46 ± 18 to 70 ± 22 and HHS improved from 47 ± 15 to 78 ± 15. Complications were identified in 9 patients, which included dislocation (3), subsidence (2), infection (2), and periprosthetic fracture (2). In cases of significant proximal femoral bone deficiency, this stem demonstrated improvement in clinical outcomes with good results at short-term follow up.

Total hip arthroplasty (THA) has provided countless people with pain relief and improved function. Despite the increasing survival rates of primary THA, revision total hip arthroplasty (revTHA) rates continue to increase [1,2]. Currently, revTHA accounts for 15% of all adult THA surgery [3]. Estimates indicate that the number of revTHAs will continue to grow [4]. Revision surgery can pose a significant challenge, specifically when these patients present with proximal femoral bone stock deficiency secondary to osteolysis, infection, or trauma. Compromised proximal femoral bone prevents the use of implants that rely on stable fixation in this part of the femur. Current options for these difficult revisions include distal diaphyseal stem fixation, allograft reconstruction of the proximal femur, proximal femoral replacement, or femoral impaction bone grafting.

Modular femoral stems can be useful in revTHA as they allow the surgeon to bypass a deficient proximal femur and achieve axial and rotational stability distally. As opposed to a monoblock stem, the surgeon has the ability to optimize leg length, offset and version of the proximal component. Distal fixation can therefore be addressed independent of offset restoration, leg length discrepancy, and hip stability, which are addressed with the proximal body. The Restoration Modular Revision Hip System (Stryker, Mahwah, NJ, USA) is one such example of a modular femoral stem that can be used for difficult hip revisions.

Holt et al reported favorable radiological outcomes in their review of this stem. 82% of their patients were classified as type I or II based on the AAOS classification of femoral defects [5]. Similarly, Restrepo et al reported favorable results in their review of this same stem. Reviewing their patient demographics, 86% of their subjects were classified as type I or II according to the Paprosky classification of femoral defects [6].

In our current study, we seek to evaluate the outcomes of revTHA in patients with significant femoral bone loss associated with infection, aseptic loosening (Fig. 1) or periprosthetic fractures (Fig. 2) treated with the Restoration Modular Revision Hip System. Specifically, in the current study, we sought to identify [1] clinical outcomes in short-term follow-up, and [2] complications associated with the use of this stem. We hypothesized that this stem would show improvements in clinical outcome scores compared to preoperative scores, as well as show good subjective and objective results at short-term follow up.

Methods

This study involved a retrospective review of data from our institutional arthroplasty database. Our institutional review board approved study design. Patients undergoing revTHA between December 2006 and October 2010 using the Restoration Modular Revision Hip System were considered for inclusion in this study. We excluded those that had incomplete clinical and radiographic data up to 24 months. Preoperative bone loss was categorized according to

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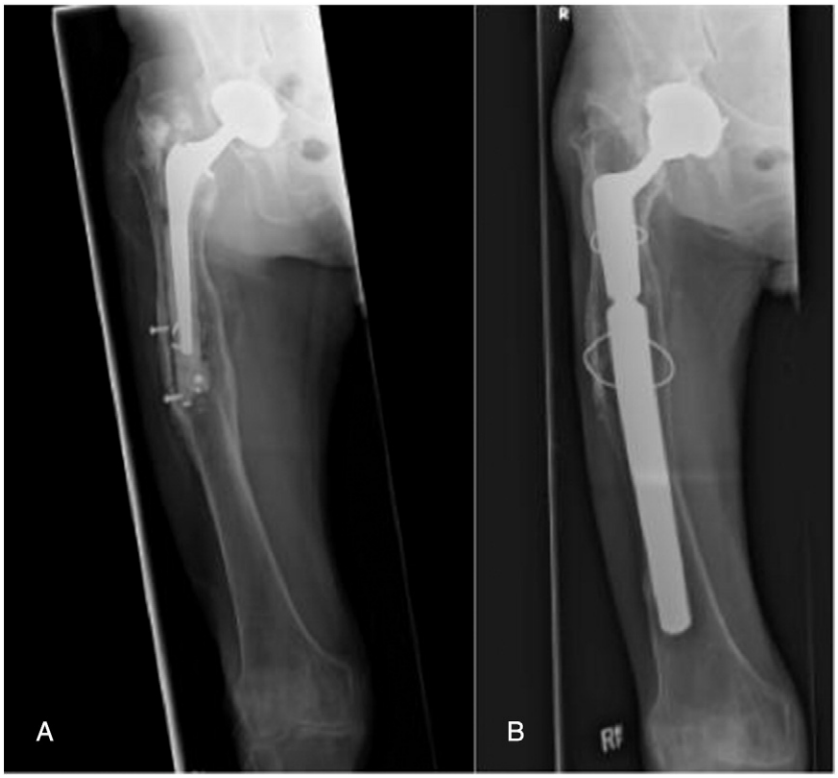

Fig. 1. Preoperative (A) and postoperative (B) full length femur radiographs for a patient undergoing revision for aseptic loosening with the Restoration Modular Stem.

the Paprosky classification [7]. We excluded patients with Paprosky 1 and 2 bone loss, thus limiting our review to cases of severe bone loss. We identified 83 patients that received revision surgery using this particular implant during the study period. 24 patients were excluded for having less than 24 months follow-up. 4 patients were excluded for having Paprosky 2 bone loss.

We identified 55 revTHAs in 53 patients using the Restoration Modular Revision Hip System that met our criteria. There were 19 females and 34 males with a mean age of 73 ± 9 years. The mean body mass index (BMI) was 29 ± 6. Mean clinical follow up was 32 ± 10 months (range: 24–60 months). The preoperative diagnoses included aseptic loosening (n = 21), infection requiring two-stage revision (n = 20), periprosthetic fracture (n = 11), and femoral deformity from previous trauma (n = 3). An extended lateral approach to the hip was used in all but one of the revisions. An associated extended trochanteric osteotomy (ETO) was required in 13 of the revisions to assist in femoral exposure. Cortical strut grafts were used in one of the revision cases. Despite poor bone quality in the isthmus associated with Paprosky class 3 and 4 femoral defects, it was possible to achieve distal fixation using this stem. In all cases, it was

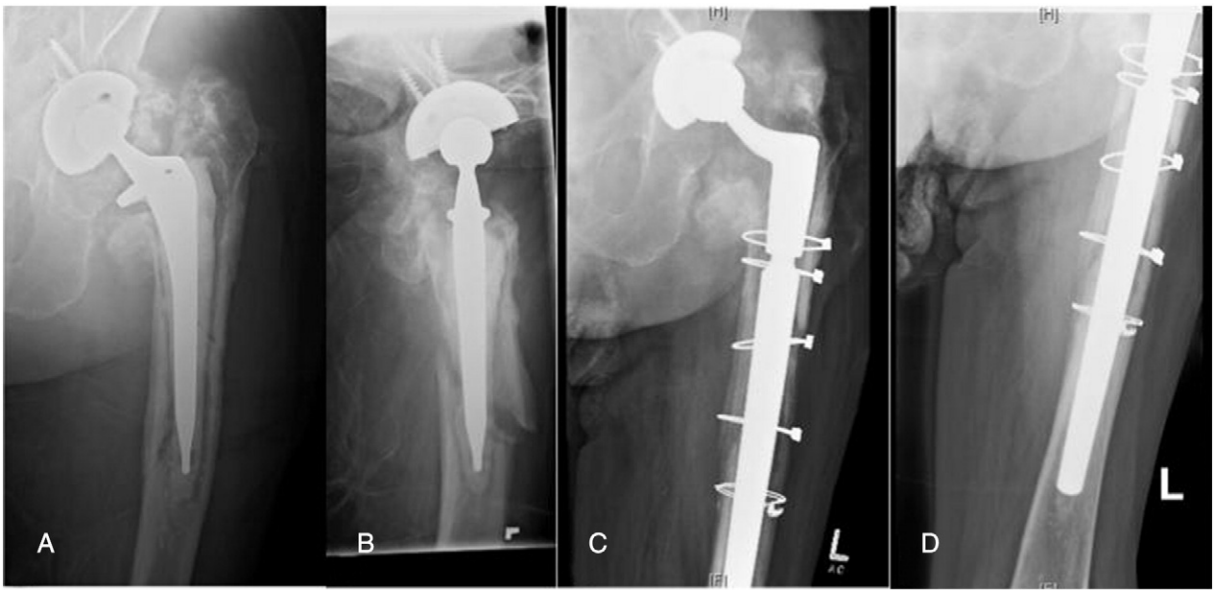

Fig. 2. Preoperative AP (A) and lateral (B) along with postoperative radiographs of the left hip (C) and femur (D) for a patient undergoing revision for a periprosthetic fracture.