Implant removal is a recognized mandatory procedure for the treatment of infected total hip arthroplasty (THA). After the implant removal, the surgeon has two surgical options; one-stage exchange arthroplasty or two-stage exchange arthroplasty. However, Girdle stone resection arthroplasty becomes the reasonable surgical option when a patient is considered to be able to tolerate both operations aforementioned but with bone stock inadequate for reconstructive surgery.

Trochanteroplasty is a procedure, usually used in septic infant hips to salvage femoral-pelvic articulation, to redirect the cartilage of the trochanteric apophysis and provide a substitute for the absence of a femoral head, in the expectation that the greater trochanter will remodel to the shape of the acetabulum.

Dobbs et al. concluded that trochanteroplasty can provide a stable, painless, functional hip, with improved gait and less leg-length discrepancy than predicted when no reconstructive effort is attempted.

The authors describe a case of revision THA performed 4 years after trochanteroplasty for uncontrolled infected THA in a 65-year-old male patient, and provided a review of pertinent English literature. The patient was informed that his case data would be submitted for publication, and provided consent.

**Case Report**

A 65-year-old male with a history of both THAs and two left hip revision surgeries due to an infection presented for left hip THA conversion. In brief, he had previously undergone both THAs at another hospital 7 and 8 years ago (Fig. 1A). However, an infection developed in the left THA site and the implant was removed. After curettage, an antibiotic loaded acrylic cement (PROSTALAC) prosthesis was inserted at our hospital (Fig. 1B). However, the infection, which was due to methicillin resistant staphylococcus (MRSA), had not been eradicated 4
months later. Accordingly, we performed revision surgery involving PROSTALAC removal, curettage, debridement, and trochanteroplasty (Fig. 1C). Proximal half of greater trochanter was exposed after stripping of gluteus medius and was inserted into the acetabulum. Postoperatively, a double splint (anterior and posterior) was applied in abduction position and then have kept for 2 weeks.

Four years after trochanteroplasty, a physical examination revealed leg length shortening of 1.5 cm, and range of motion limitation; flexion 60°, internal rotation 0°, external rotation 30°, abduction 45°, and adduction 10°. A laboratory examination performed at the time revealed a WBC count of 7000/ mm³, ESR at 25 mm/hr, and CRP at <0.5 mg/dl. These lab findings were sustained for about one year before revisional THA without any other signs or symptoms of infection. Radiographs of the hip (AP and lateral views) obtained at this time showed that bone quality of the proximal femur and of the acetabular side were much improved (Fig. 1D) to the extent that revision THA was possible. The patient favored revisional THA surgery to improve function, and thus, surgery was scheduled.

To approach the surgical field, we performed greater trochanter osteotomy and confirmed the absence of infection by frozen biopsy. To reconstruct the acetabulum, we used an acetabular roof reinforcement ring with a hook (ARRRH; Zimmer, Baar, Switzerland) and a cementless conical stem to reconstruct the femoral side (Cone prosthesis; Zimmer, Winterthur, Switzerland). A cavitory bone defect was present in the acetabular side, and thus, we used a morcellized allograft and an ARRH. In the femoral side, we decided that bone stock was sufficient to allow stable fixation with a cementless stem. Subsequently, we reattached the great trochanter distally to improve abduction lever arm. The patient was followed up for 3 years (Fig. 1E). His blood laboratory findings at last follow up were WBC of 7600 /mm³, ESR at 12 mm/hr and CRP at <0.5 mg/dl. There were no signs or symptoms of infection and the patient was able to walk without additional support.

**DISCUSSION**

The aims of revisional THA are to extract the failed prosthesis, implant new components to provide long-term stable fixation, and manage bone loss by augmenting deficient bone. If an infection is present, a two-stage procedure is usually performed to eradicate infection and then to implant the new components and reconstruct deficient bone.  

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**Fig. 1.** (A) Preoperative anteroposterior radiograph of the left infected THA showing acetabular cup loosening. (B) Immediate postoperative radiograph of the left hip showing implant removal with extended trochanteric osteotomy and PROSTALAC insertion. (C) Immediate postoperative radiograph showing trochanteroplasty and poor proximal femur bone stock. (D) Radiograph at 4 years after trochanteroplasty showing radiographically much improved bone quality of the proximal femur and acetabulum. (E) Postoperative radiograph at 3 years after revisional THA showing good bony ingrowth on the femoral stem.
To treat the infected THA in our patient, we also chose two stage reconstruction\(^4\), but after the first stage surgery, the infection was sustained and MRSA was found to be the causative organism, and thus, the PROSTALAC was removed. At this stage, there was insufficient bone stock for revisional THA, because of a prolonged femoral stem infection. In this situation, the Girdlestone operation provides another treatment option, but it may result in nearly useless pseudarthrosis or ankylosis and marked shortening of the affected extremity. Accordingly, we considered trochanteroplasty a good option in our patient, because it can provide a more stable joint and less leg shortening than the Girdlestone operation.

Trochanteroplasty was first described by Colonna\(^5\) and was popularized by others\(^1,6,7\). Although it was first performed in adult patients, it was gradually regarded as a typical salvage procedure in infants with complete destruction of the femoral head and neck. The rationale for adopting trochanteroplasty in children is as follows; (1) the greater trochanter is viable, and therefore, has growth potential, and (2) when hyaline cartilage covering the trochanter is placed inside the acetabulum, the trochanter tends to form a globular femoral head-like shape\(^8\). However, no report has been issued on trochanteroplasty in adults, which is somewhat surprising because we believe that it can also increase proximal femur bone quality in adults. In the described case, we performed trochanteroplasty as described by Colonna\(^5\), and at last follow-up, 4 years after the procedure, bone quality had substantially improved.

Gerber A et al.,\(^9\) found that in patients treated by acetabular revision using an ARRRH, the periacetabular bone stock was reconstituted and good clinical and radiographic results were obtained in cases with adequate ring fixation during surgery. Because acetabular bone quality is improved after trochanteroplasty, sufficient stability can be obtained using an ARRRH and allograft. If the bone stock on the acetabular side is too poor to achieve sufficient stability using an ARRRH, then the more difficult acetabular reconstruction option using an impacted bone graft and metal mesh and a morcellized allograft can be adopted. In the femoral side, we used a cementless cone-shaped stem because of deformation of the proximal femur and calcar portion. In a very poor proximal femoral bone stock, an impaction bone graft in the femoral side can also be considered, but the procedure is more difficult and poses a greater risk of infection.

Revisional THA for a septic hip is usually difficult because of secondary loss of bone stock. Trochanteroplasty performed in the described patient successfully improved bone quality of the femur and the acetabulum. We considered that trochanteroplasty could be considered as a salvage procedure in patients with an uncontrolled THA infection and as an interim procedure prior to revisional THA.

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전자 성형술은 주로 영아 화농성 고관절염에서 쓰이는 구제술 중 하나이며, 하지부동을 줄이고, 안정적이며, 통증이 적으므로, 기능적인 수술로 알려져 있다. 저자들은 인공 고관절 치환술 후 난치성 감염이 발생한 65세 남자 환자에서 전자 성형술을 시행하고, 4년 후 재치환술을 시행한 증례를 보고하고자 한다. 이러한 술식은 심한 대퇴골 근위부의 골결손을 동반한 성인 난치성 고관절 감염증에서 하나의 치료법으로 사용될 수 있을 것으로 생각되며, 문헌 고찰을 시행하였다.

색인단어: 감염, 전자 성형술, 인공 고관절 치환술