Total hip arthroplasty (THA) in proximal femoral deformity represents a relatively uncommon challenge. Proximal femoral deformity is classified depending on the etiology and location and geometry of the deformity. Classification by etiology includes developmental processes, previous trauma, or previous surgery (osteotomy or THA). The latter, previous surgery, is the most common cause of femoral deformity.

DEVELOPMENTAL PROCESSES

Typically, developmental processes include coxa vara and developmental dysplasia of the hip. In both conditions, the femur is seldom deformed enough to need correction of the deformity. However, in cases of coxa vara where the trochanter overlays the femoral canal, a transtrochanteric approach might be necessary to gain access to the femoral canal. In cases of developmental dysplasia with high dislocation, shortening, derotational osteotomy, or both of the femur might be necessary to address the deformity.

PRIOR SURGERY

Intertrochanteric Osteotomy

Total hip arthroplasty after a previous femoral intertrochanteric osteotomy has been associated in the literature with a longer operative time, increased incidence of technical problems, increased incidence of need for trochanteric osteotomy in the approach, and an increased infection rate. Occasionally, in the past, special prostheses have been necessary.

We reviewed the Mayo Clinic experience with conversion of previous intertrochanteric osteotomy to THA. In a series of 215 THAs performed after osteotomy and followed for >10 years, the incidence of technical difficulties and intra- and postoperative approach was high.

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tive complications at THA was high. In addition, the femoral revision rate was high and the loosening rates, particularly on the stem side, were significant. The statistical likelihood of failure at 10 and 15 years was high.

We learned from this review that if osteotomy is indicated, it must be carried out paying particular attention to disturb minimally the anatomy of the proximal femur. In addition, hardware used for fixation of the osteotomy should be removed after the osteotomy has healed.

From a technical standpoint, two suggestions might be of value. In a prior varus osteotomy at the time of conversion, trochanteric osteotomy must be considered for the approach. It is advisable to leave enough bone on the lateral aspect of the femur to be able to do a satisfactory trochanteric reattachment. Another point to be made is that at times, particularly when hardware is firmly and deeply embedded into the bone or covered with bone, it might be wise to discuss the possibility of a two-stage procedure, the first one for hardware removal and after healing has occurred, definitive THA (Figure 1).

### Subtrochanteric Osteotomy

In this instance, fortunately not presenting very often, the deformity is such that often a osteotomy with correction of the previously created deformity is necessary to perform a satisfactory replacement. When this type of procedure is undertaken, preoperative templating is essential to determine the need for corrective osteotomy, the amount of correction necessary, and whether the correction is to be made in one or two planes. In general, the simplest possible osteotomy at the apex of the deformity is the best alternative.

If uncemented long stemmed prostheses are used for fixation, the stem of the prosthesis serves as an osteotomy intramedullary fixation device. Periosteal stripping must be avoided, and the addition of cancellous graft at the osteotomy site is recommended. Experience with simultaneous THA and femoral osteotomy is limited, and experience shows that incidence of complications, including delayed union and nonunion, is high. Thus, these procedures cannot be undertaken lightly.

### Joint Replacement

Deformity of the femur after THA can occur because of bone remodeling, malunion of an intraoperative fracture, or a pre-existing deformity that was distal to a prosthesis. No “cookbook approach” to this problem exists. In each case, the deformity must be treated individually. Figure 2 shows a significant deformity with expansion of the proximal femur, which was corrected by a V-osteotomy of the proximal femur in an anteroposterior direction followed by closing of the proximal femur with wires (collapsing the femur over the revision prosthesis).

### CONCLUSION

The surgical attitude when considering THA in proximal femoral deformity can be to eliminate the deformity, adapt to it, or correct it. If the deformity is very proximal, it can easily be eliminated and ignored. Sometimes the deformity is small enough that it can be adapted by slightly modifying the surgical technique or using a different type of prosthesis. However, if the deformity is severe no alternative may exist but to correct it simultaneously with THA.

Thus, a good preoperative plan is needed, one must be familiar with multiple different approaches to the hip, two-stage procedures might be occasionally necessary, and uncemented fixation usually is preferred.

### REFERENCES


