TECHNICAL NOTE

Corrective Femoral Osteotomy in Revision Total Hip Arthroplasty – Technical note

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Revision THR is done routinely, however few issues still make this a specialized surgery. Large void is left in femur after the primary prosthesis is removed. This is a long and cylindrical space extending well below the original implant till the cement plug. The present revision stems solves the problem of the cylindrical fill and fit as that is the configuration of the stem. The curvature of the femur adds to the difficulty in the placement of the femoral stem. Insertion of straight long stemmed revision implants may cause complications like inside out reamer penetration; inside out prosthesis penetration. This is best addressed by doing a transverse corrective osteotomy of the femur at the point of curvature immediately below the tip of original prosthesis. After the cut, the proximal and the distal end of the femur can be well reamed without the doubt of where the canal is so that the penetration of the femoral canal with the reamers is avoided. This also facilitates cement removal. The absolute indication for osteotomy is all revision hip surgeries requiring femoral stem exchange, other relative indications include loosening of both components[1], loose hemiarthroplasty, loosening of femoral component and periprosthetic fracture.[1,2]

We present our technique of doing the transverse femoral osteotomy in a case of revision Total hip replacement (Figure 1)

Figure 1: Pre operative and post operative radiographs

Technique – Patient is positioned in lateral position and lateral approach is taken (Figure 2 a). Skin, superficial fascia, iliotibial band are cut to expose the proximal femur (Figure 2b). Short rotators are cut flush to the femoral bone and hip is dislocated. The cement around the femoral stem is loosened with help of osteotome so as to facilitate the implant removal (Figure 2d). Cement mantle from proximal part is removed using sharp long osteotomies, long nose pliers (figure 3 a). A bulls eye lamp or arthroscopy cord of cold light can be used to visualize the medullary canal thus facilitating cement removal. Another tip here is to achieve adequate soft tissue and cement clearance from the proximal femoral especially in the piriformis fossa (Figure 2c,3a,3b). This too improves visibility of the femoral canal for cement removal and may decrease any chances of iatrogenic fractures secondary to blind hammering. The corrective osteotomy[1,2] is planned approximately 5mm distal to the tip of the prosthesis. This is judged by the preoperative planning, and intraoperative measurement of length of the removed implant stem. Dissection is carried out along the posterior border of vastus lateralis and spikes are put around the femoral shaft to expose the osteotomy site. A transverse notch is made at the site of osteotomy using an osteotome. This helps in anchoring the saw blade and prevents damage by blade slippage. A vertical

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marking is made along the long axis of femur which helps in maintaining the proximal and distal fragments in proper anatomic rotation during the reduction and implant insertion (Figure 3c). The osteotomy is completed by using a power saw dividing the femur into proximal and distal halves (Figure 3d). Both the proximal and the distal femur are reamed separately. Generally the osteotomy is through the cement plug and the bony cortex and cement can be differentiated easily. Reaming of the cement plug may require predrilling with a 4.5mm drill bit (Figure 4a). Increasing size of the drill bits are used for the expansion in the medullary cavity using 1 mm increments in the drill sizes using powered drill. The reaming is done till the medullary canal is wide enough to hold the revision femoral stem (Figure 4b,c). Generally reaming till 14mm is required and is checked by using the trial prosthesis (figure 4d). Reaming of the distal fragment is always done first (Figure 4a).The distal fragment is slightly narrower than the proximal fragment which is now wider after primary surgery and cement removal. It is important to base the size of the stem based on the reaming of distal fragment to achieve good diaphyseal fit. After adequate reaming, the ends of the osteotomy are held together in approximation using bone clamps (Figure 5a). The revision stem is then inserted from the proximal femur and is hammered down the femur medullary canal (Figure 5b). When the stem passes the osteotomy site the clamps are removed and further hammering is done to advance the stem. This also achieves compression at the osteotomy site.

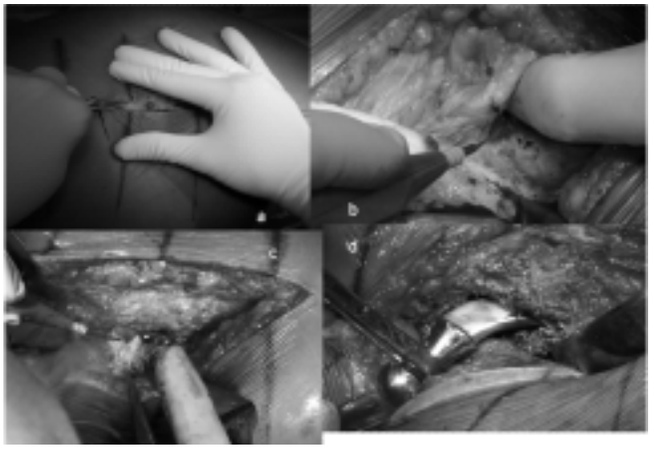

Figure 2 : a)skin markings and incision b)splitting of iliotibial band
c) soft tissue removal d)original implant removal

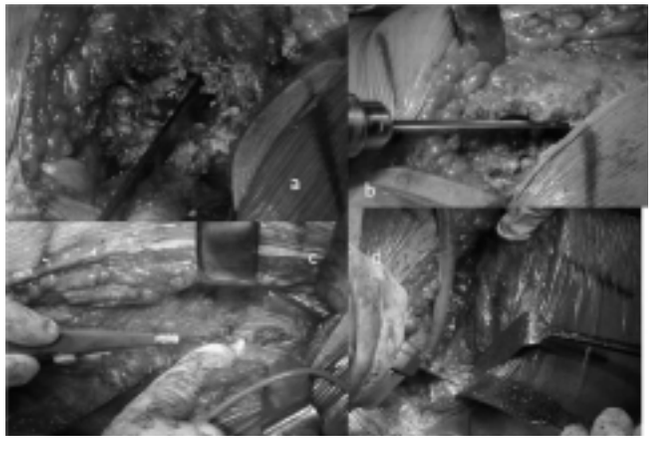

Figure 3: Cement clearance with a) long osteotomes and b) reamers
c) marking of osteotomy site d) osteotomy with saw blade

Figure 4 : a)predrilling of distal fragment b),
c) serial reaming of distal fragment
d)trial stem insertion first into distal fragment

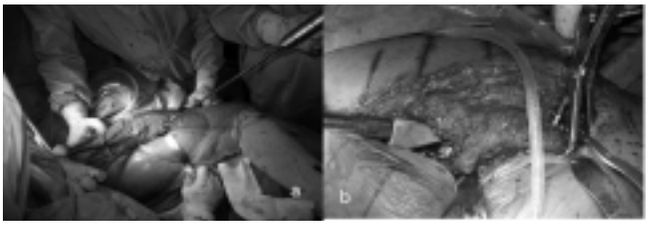

Figure 5 a) reaming of proximal fragment b) long stem insertion into proximal fragment

Revision of the femoral stem is based on the concept of proximal fill and distal fit. By the above procedure adequate distal fit is achieved. In most of the revision cases due to loosening or other causes the proximal femur is generally ballooned and it is difficult to achieve the proximal fill. This void can be filled up with bone cement and this provides initial improved stability and helps in early mobilization of the patient. Distally the fit can be improved by using hydroxapatite and tricalcium phosphate crystals in the ratio of 40: 60 which also help in the union of the osteotomy. Closure is done in three layers with interrupted sutures, capsule and muscles sutured with 1 number absorbable vicryl,

superficial layers sutured with 2-0 vicryl and skin is sutured 2-0 ethilon. A negative suction single drain is used.

Post operative protocol begins with in bed exercises like isometrics, muscles strengthening, active or passive straight leg rising and hip abduction are started. Quadricep exercises are started with bed side reclined position. Toe touch weight bearing started at the end of first week and full weight bearing started depending upon the union of osteotomy site based on radiographs.

Conclusion: This is a simple procedure and can avoid many complications associated with long stem revision THR. Adherence to the above mentioned steps will ensure safe surgery with good results.

REFERENCES:

1. Lachiewicz PF, Soileau ES. Changing indications for revision total hip arthroplasty. J Surg Orthop Adv. 2005 Summer;14(2):82-4.

2 Fink B, Grossmann A. Modified transfemoral approach to revision arthroplasty with uncemented modular revision stems. Oper Orthop Traumatol. 2007 Mar;19(1):32-55.

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