

CLOSED REDUCTION OF A HIP DISLOCATION FOLLOWING TOTAL FEMORAL REPLACEMENT USING A TRACTION TABLE: A CASE REPORT

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ABSTRACT

Hip dislocations are relatively common complications following arthroplasties. In majority of cases closed reduction is the first option for treating this significant complication. Regular reduction techniques place a great strain on the surgeon physically and also significant strain on the implants. We present an easier option for closed reduction with traction table under image guidance that may be useful in difficult cases.

A 72 year old, obese lady presented with an infected distal femoral replacement and had a total femoral replacement. This was done in two stages 12 weeks apart. An unconstrained liner was used. She suffered recurrent hip dislocations (4 episodes) afterwards within 5 months of the surgery. Each episode was reduced successfully by closed reduction using a traction table under C arm guidance. With physiotherapy and better patient education she is currently community ambulant with a walking stick and has not dislocated in the last 27 months.

Reduction of hip dislocation especially following an arthroplasty or femoral replacement can be effected successfully using a traction table. This can be one of the options for closed reduction of dislocation following arthroplasty.

Key words: Total femoral replacement, Closed reduction, Traction table

INTRODUCTION

Hip dislocation is a well described event that occurs either following a high energy trauma or post-operatively after arthroplasties that involve the hip replacement's Total Hip Arthroplasty (THR), Proximal Femoral Replacement (PHR) and Total Femoral Replacement (TFR) (1). Dislocations are usually classified according to the direction of the translation of the distal articulating part, in this case the femoral head, which is relative to the acetabulum (1).

While anterior dislocations do occur, by far the most common dislocations are posterior dislocations of the hip. There are several methods described for reduction of the posterior dislocation of the hip (2). Anterior hip dislocation is usually reduced by inline traction and external rotation, with an assistant sometimes pushing on the femoral head or pulling on the femur laterally to assist reduction (2). Many of these reduction manoeuvres place great stress on the surgeon and place strain on the implants, thereby causing a

dislocation, following the need for an arthroplasty of the affected hip joint (1). Following these procedures, dislocation is the second commonest complication, following aseptic loosening. The initial treatment technique for this is a closed reduction (3).

Complication rates following non oncological total femoral replacements can be as high as 50% with a 33% infection rate; hip dislocations are relatively common (10). However the increasing use of dual mobility cups and constrained acetabular liners are addressing these surgical issues (11). The drawback is that if dislocation occurs with a constrained liner then a closed reduction procedure is often not an option. Despite these constrained liners, dislocations still occur in total femoral replacement. Berend *et al.* (5) had 7 dislocations out of 59 patients with non-oncological TFR representing almost 12%. Dislocation rates can be higher when unconstrained liners are used (6). Toepfer *et al.* (6) recorded dislocations in 5 out of 18 patients analysed. However closed reduction

can be done when unconstrained liners are used (5,6). Another drawback of constrained liners is that it tends to increase the wear of the implants and leads to higher rates of aseptic loosening. It also leads to more impingement and reduced range of movement. Hence it should be used more in cases of reduced life expectancy and salvage for instability (7).

We present a case of total femoral replacement with an unconstrained liner that had dislocation following surgery and this was reduced satisfactorily with a traction table. Dislocations of the hip even following arthroplasty are reduced by one of the several methods which put strain on the surgeon (2). There are very few reports of reduction of traumatic hip dislocations using a traction table and the authors found no report of traction table use in reduction of dislocations following arthroplasty or total femoral replacement (7).

CASE REPORT

This is case report of a 72-year-old lady presented with an infected right distal femoral prosthesis with bone resorption. The clinical diagnosis indicated the need for a right total femoral replacement as an option. She previously had a bilateral total knee arthroplasty conducted nine years earlier. During the course of the surgery, the left knee was operated on first, then the right, all within a few weeks of each other. The right side failed early and she underwent a two stage revision two years using a constrained knee (Stanmore). She had a fall at home one year later sustaining a peri-prosthetic right femoral shaft fracture. She underwent a single stage right distal femoral replacement (this was linked to the *in situ* tibia component) same year after which she developed pain and a discharging sinus a year later. This was 5 years prior to current presentation. She had gradually worsening mobility. At presentation she could only hobble with a frame within her room due to pain. She was a well-controlled hypertensive but had no other background medical problems. She had no spine deformities or prior spine fixation nor other non-orthopaedic surgeries.

Significant examination findings include the following;

- Morbid obesity (BMI of 44).
- Discharging sinus in the anterior and lateral aspects of the knee.
- Painful thigh movements but no obvious deformity of the thigh.
- Distal neurovascular status was intact.

Important investigation findings include;

- Anaemia
- Elevated infection markers [C Reactive Protein (CRP), Erythrocyte Sedimentation Rate (ESR), Full Blood Count (FBC)].
- X rays showed a loose femur component with evidence of bone infection and lysis of parts of the proximal femur (Figures 1 to 4).
- Tibia component of the distal femoral replacement appeared intact and the tibia appeared normal (Figures 8 and 9).

Figure 1

Pre - operative X-ray of the proximal femur, showing the proximal part of the distal femoral replacement

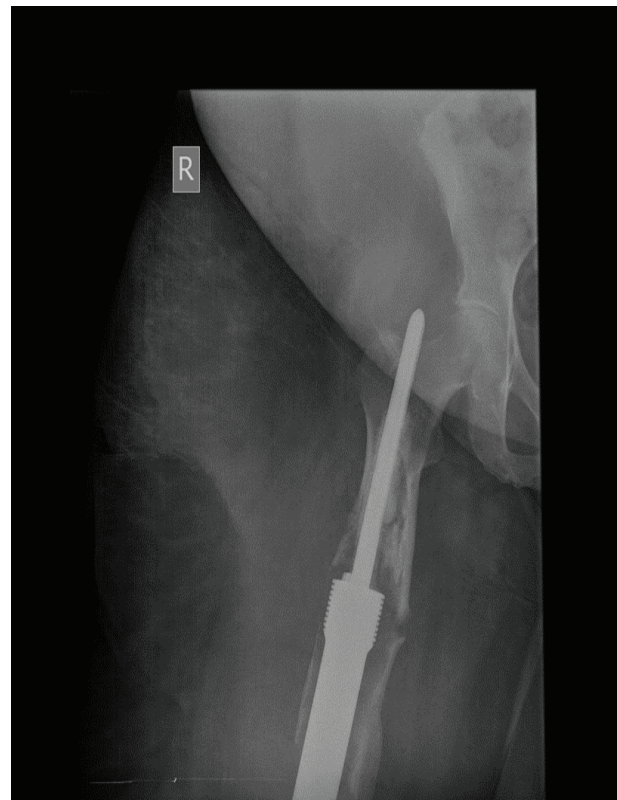


Figure 2

Pre-operative X-ray of the proximal femur, showing the proximal part of the distal femoral replacement

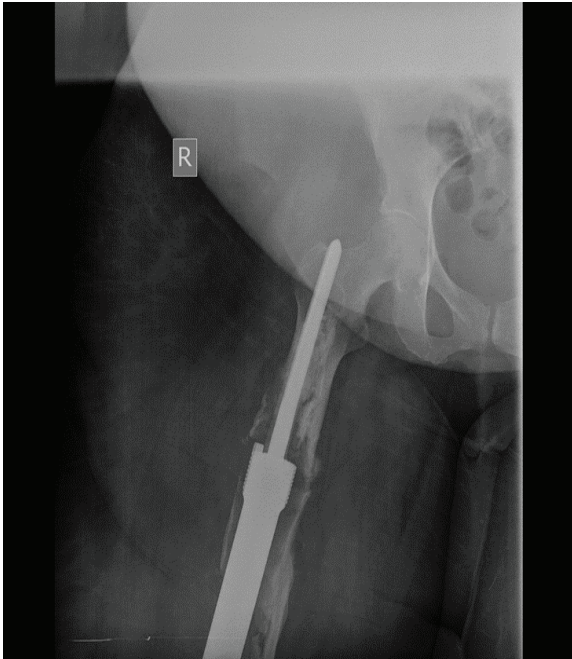


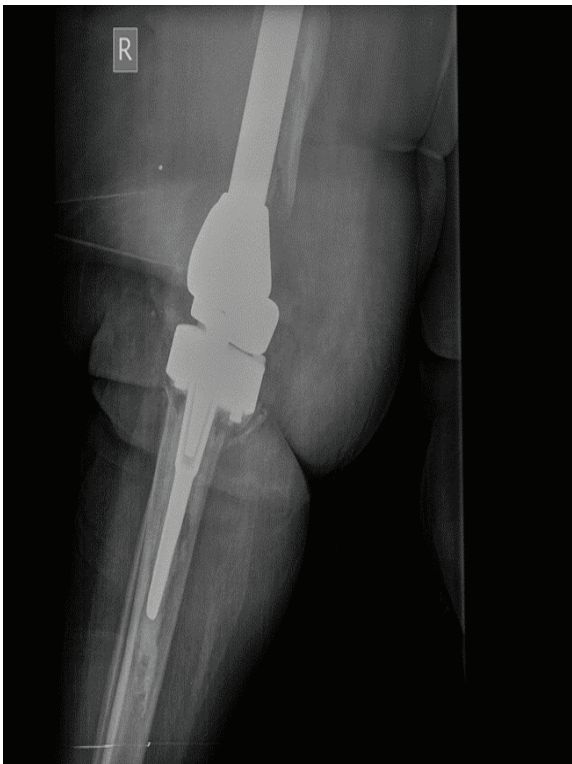
Figure 4

Lateral view of the knee showing distal femoral reconstruction



Figure 3

X-ray (anterior posterior view) of the knee showing distal femoral replacement with distal femur showing osteolysis and bone resorption



The reduction technique by the use of traction table was chosen because of the patient's size. Her thigh was too large for a surgeon to hold effectively in any regular reduction technique. We therefore opted to use a traction table and image guidance. Once the patient was under general anaesthesia with full muscle relaxation, we placed the patient on a traction table and assessed the relative positions of the components of the hip. We were then able to apply traction and avoid significant friction between the femoral head and acetabular cup by combinations of rotation and adduction until the head "cleared" the cup. The limb was then externally rotated and abducted to gently guide the head into the acetabular cup. Image guidance was used at all times to aid and also to confirm reduction. Average reduction time was about 15 minutes.

While Figure 5 and Figure 6 show the typical X-ray findings after weach dislocation, Figure 7 and Figure 10 show the typical X-ray finding after reduction using traction table.

She was offered different options of treatment including an amputation. The risks and benefits discussion was held with the patient and her family. She was worked up for surgery and had a 2 stage total femoral replacement done three months apart. The hip component of the surgery was via a posterolateral approach.

Important findings at surgery were;

- Deficient and lax soft tissue around the hip.
- Infected femoral component with evidence of chronic osteomyelitis.

First stage was a debridement and removal of all implants and infected material and a cement spacer was inserted. Second stage was done after clinical and laboratory conditions were favourable. She had a total femoral replacement. She had silver treated Stanmore implants coupled on table.

Surgery and immediate post operative care were routine. Although there has been no evidence of recurrence of infection after surgery, within the first 5 post-operative months, she dislocated 4 times (3 dislocations were within the first 3 months) while making unsupervised movements. With better patient education and physiotherapy however, patient has not dislocated for the last 27 months and she has been making more confident and better movements. She is now community ambulant with a walking stick.

Figure 5

Lateral view of hip showing post-op dislocation following a total femoral replacement

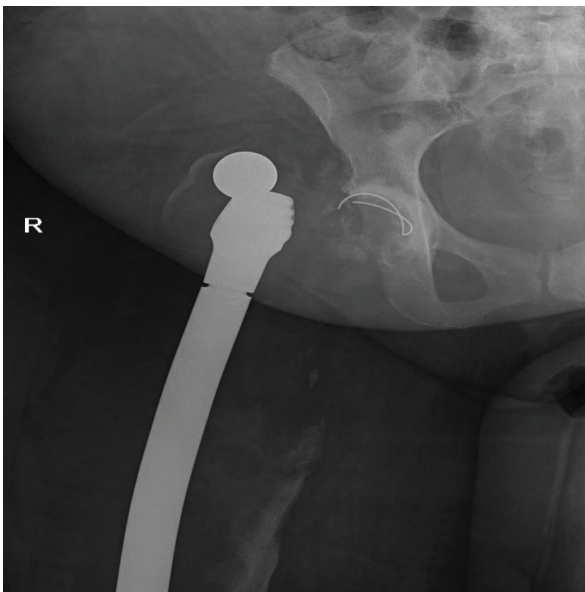


Figure 6

Anterior posterior view of the hip showing post-op dislocation following a total femoral replacement

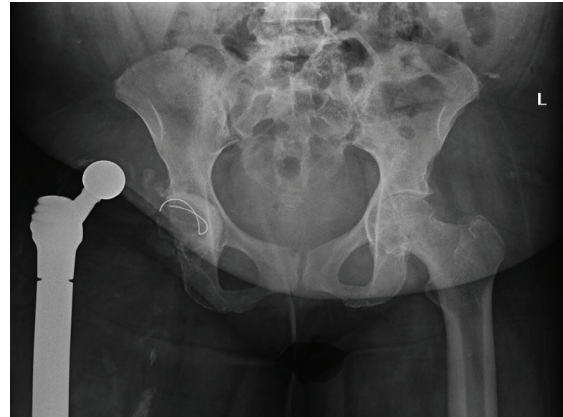


Figure 7

Lateral view after reduction of dislocation using a traction table

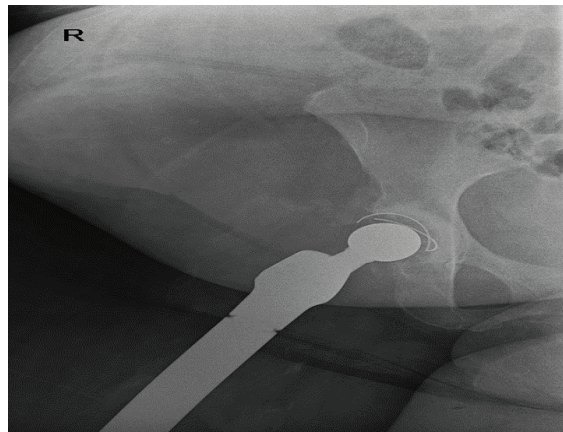


Figure 8

Lateral view of the knee distal femur, post-op

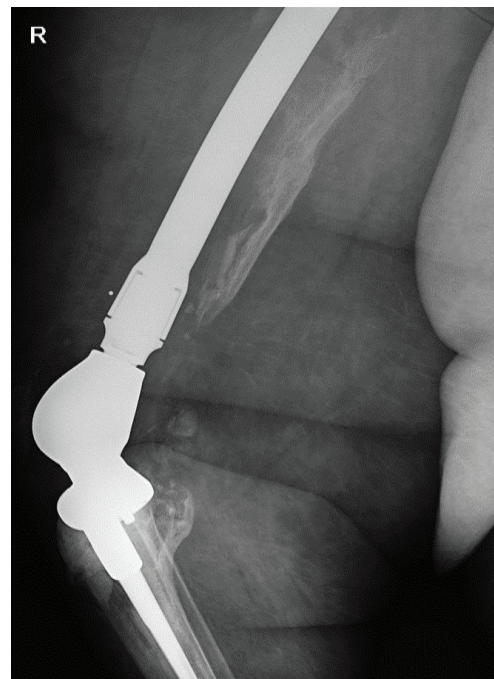
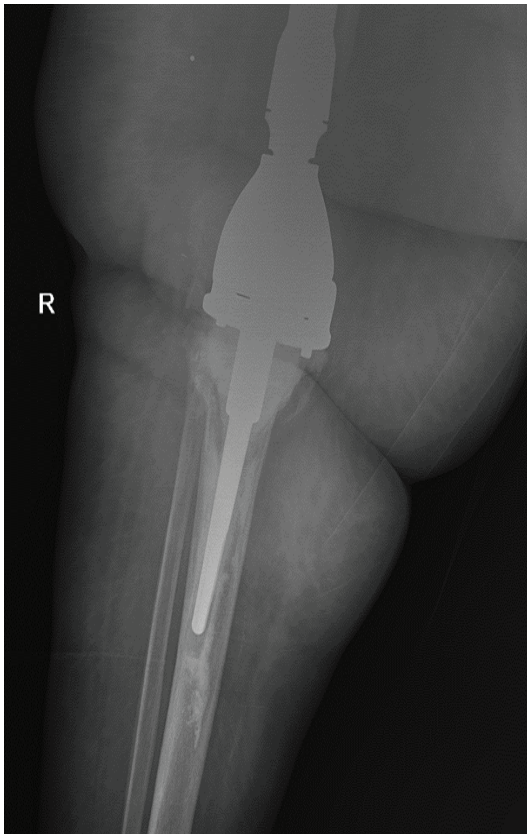
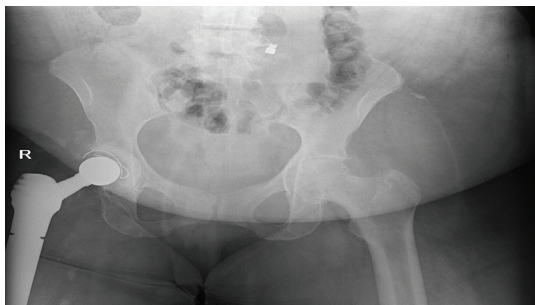


Figure 9

Anterior posterior view of the knee after total femoral replacement

**Figure 10**

Anterior posterior view after reduction of hip dislocation



Each episode of dislocation was reduced (close reduction) successfully with general anaesthesia/LMA and traction table. Each reduction was done within 12 hours of dislocation. General anaesthesia was preferred because the patient was quite obese and also for quick reversal of anaesthesia/relaxation. A careful assessment of the patient's X-rays revealed that the acetabular cup was optimally placed. We preferred to allow time for optimal muscle healing rather than a

revision to a constrained liner with the attendant risk of infection.

DISCUSSION

Most common hip dislocations following arthroplasties involving the hip (THR, PFR and TFR) are posterior dislocations and closed reduction techniques employed are usually employed to relocate the hip. The closed reduction technique has drawbacks as follows:

It puts a physical strain on the surgeon (2); If not well done it can put a strain on the prosthesis or even damage the prosthesis (1); It may be difficult or ineffective especially with very large patients.

We know that morbid obesity increases dislocation risk following hip arthroplasty especially for BMI above 40. This patient's BMI was 44. So this may have contributed to her early post-operative instability (7).

In this case, we found the patient rather too obese (BMI of 44) for an effective closed reduction technique using any of the usual manoeuvres. We therefore opted to use a traction table and image guidance. There are very few reports in the literature on the use of traction table for hip reduction. This is surprising given the relative ease of this method compared to other methods especially in these kind of patients and also given the myriad of reduction techniques written on for hip dislocations (2). Mathews *et al.* (9) wrote about use of traction table for reduction of post traumatic hip dislocations. There are few case reports of reduction using traction table after dislocation following hemiarthroplasty (8). We found no report on its use for dislocations following total arthroplasties involving the hip and also non following total femoral replacement.

We also note that without the use of a constrained acetabular liner, dislocations are more likely in a total femoral replacement due to the tenuous reattachment of the hip muscles whose natural attachments are taken off with the native femur. (Toepffer *et al.* (6) reported 27% dislocation rates with regular cups). This may have partly accounted for the recurrent dislocations this patient had within the first few months post op. She also had poor pre-operative ambulation and her muscles had become lax. She needed

significant physiotherapy to strengthen them. With more healing and fibrosis around the joint and muscle strengthening she has not dislocated for the last 27 months and is now community ambulant with a walking stick. Constrained liners however reduce range of motion, are associated with impingement, dislocation rates can be up to 29% and have higher mid to long term failure rates (9). When dislocation occurs with a constrained liner in place open reduction is often needed (1). We therefore opted not to use it for this patient.

General anaesthesia was preferred because of the short duration of the procedure. Spinal anaesthesia may increase the risk of immediate post reduction re-dislocation in our view because the muscles will be kept relaxed for too long. In this case the patient's obesity and discomfort from the dislocation also would make positioning for spinal anaesthesia a challenge. General anaesthesia has better control of relaxation and reversal and is recommended in similar cases.

Given previous difficulties with previous hip dislocations, one gratifying advantage of this manoeuvre is the absence of physical strain on the surgeon. None of the manoeuvres requiring exertion is done by the surgeon (adduction, rotation, abduction or traction). We could not flex the hip with this manoeuvre and hip flexion is part of many techniques of reduction of posterior hip dislocations (2). However, we found hip flexion not necessary for reduction in this case.

The use of image guidance was also a very useful tool to avoid unnecessary friction and strain on the implants in reductions of dislocations post arthroplasty. This also affords the surgeon the opportunity to assess the stability of the implants and the stability of the reduction. A decision can be taken on a possible revision (at a later date or) if dislocation becomes recurrent following this observation.

CONCLUSION

The orthopaedic traction table is a useful option to adopt in the reduction of hip dislocations especially in difficult situations. It may have advantages if the hip dislocations follow arthroplasties involving the hip. It also spares the surgeon the physical strain

that comes with traditional reduction manoeuvres. We recommend its incorporation as an option to use in reduction of hip dislocations in certain situations.

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