

# Surgical stabilization of per-trochanteric proximal femur fracture with birmingham hip resurfacing implant in-situ

## Abstract

This case demonstrates the successful surgical stabilization of a traumatic per-prosthetic proximal femur fracture with a mature metal-on-metal Birmingham hip resurfacing implant in-situ. To our knowledge no such fracture fixation has been documented in the literature using a dynamic hip screw device.

**Keywords:** Birmingham hip resurfacing, Periprosthetic, Fracture, Trauma, Stabilization, Resurfacing, Surgeon, Cerebrovascular, Sigmoid colectomy

Volume 5 Issue 6 - 2016

Thomas Laios,<sup>1</sup> Tarek Boutefnouchet,<sup>1,2</sup> Lenneta Boyce,<sup>1</sup> Gunaratnam Shyamalan<sup>1</sup>

<sup>1</sup>Department of trauma and orthopaedic surgery, Heart of England NHS Foundation Trust, UK

<sup>2</sup>Department of trauma and orthopaedic, University Hospital Coventry, UK

**Correspondence:** Thomas Laios, Department of trauma and orthopaedic surgery, Heart of England NHS Foundation Trust, Bordesley Green East, Birmingham, B9 5SS, UK, Tel 44(0)7872652727, Email ortho4bone@gmail.com

**Received:** October 07, 2016 | **Published:** October 07, 2016

**Abbreviations:** AP, anteroposterior; BHR, Birmingham hip resurfacing; DHS, dynamic hip screw; NICE, national institute for health and clinical excellence

## Introduction

Femoral neck fractures following Birmingham Hip Resurfacing have a prevalence of 1.1% according to a large cohort follow-up study from the original designing centre.<sup>1</sup> It has been also shown that the vast majority of fractures occur early in the learning curve of the surgeon and within the first six to eight weeks after implantation of the prosthesis.<sup>1,2</sup> The principal technical risk factors have consisted of notching of the bone and varus alignment of the femoral component.<sup>3</sup> Nevertheless, the true incidence of this complication has not been fully established across other centres.

## Case report

85 years old male patient was admitted with a right-sided per-Trochanteric proximal femur fracture following a mechanical fall onto his right side sustained at home. This was an isolated and closed injury with no associated neurovascular deficit. He had previously undergone a Birmingham hip resurfacing (Smith & Nephew®) to his right hip 12 years previously. This had been an uncomplicated surgery with no adverse outcomes. Prior to his fall, he mobilized with a frame due to generalized reduced mobility and imbalance. The gentleman had a past medical history of atrial fibrillation, previous Cerebrovascular accident five years ago with some residual right-sided weakness, and large bowel carcinoma treated successfully with sigmoid colectomy and adjuvant chemotherapy four years ago.

Standard investigations were performed and the patient was managed using the hospital proximal femur fracture pathway according to National Institute of Health and Clinical excellence (NICE) recommendations. The radiographs (Figure 1 & 2) show the type and location of fracture with a well-seated prosthesis. It was felt the prosthesis did not show any radiological evidence of loosening; the bone stock appeared of good quality. The patient had been asymptomatic and well functioning to date, the decision was

made to fix the fracture rather than revise the implant. The surgical options considered were either intramedullary fixation using a long cephalomedullary nail or extramedullary device using a dynamic hip screw (DHS) device. Given the patient's medical frailty and anesthetic risks, the decision was made to perform the shortest and safest procedure possible, thereby choosing a DHS.



**Figure 1** AP pelvis plain radiograph showing original right hip resurfacing implant position.



**Figure 2** AP pelvis plain radiograph showing a per-trochanteric proximal femur fracture with right hip resurfacing implant in-situ.

He underwent surgical fixation of the fracture within 36 hours of his admission. The fracture was reduced by closed technique using image intensifier guidance and a traction table. Through a direct lateral approach a guide wire was inserted into the femoral head under image guidance using a 135° guide until resistance from the inner surface femoral resurfacing was met. The guide wire could not be placed perfectly central due to the positioning of the femoral prosthesis stem. The guide wire was then triple reamed under direct imaging control. A four holes 135° dynamic hip screw plate (Synthes®) was applied with good cortical screws fixation to the shaft of the femur. Figures 3 & 4 depict the intraoperative final position of the fracture and the DHS plate and screws. The patient was instructed.



Figure 3 AP intraoperative image.

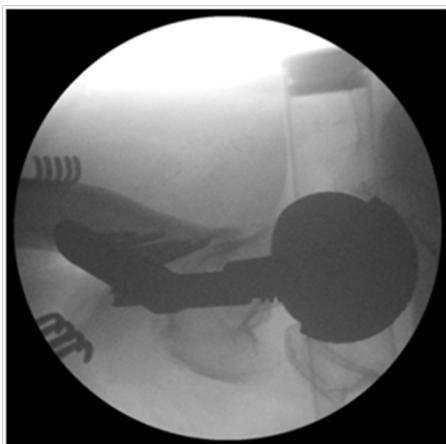


Figure 4 Lateral intraoperative image.

The patients made a good postoperative recovery and mobilized comfortably. His hospital stay was prolonged after developing a urinary tract infection and a new diagnosis of Parkinson's disease. He was discharged after 20 days. There had been no post-operative complications.

## Discussion

Femoral neck fractures are a well recognized mode of failure following hip resurfacing with a reported prevalence around 1% with the majority occurring early after the primary surgery.<sup>1,2</sup> The majority

of documented peri-prosthetic fractures related to the Birmingham hip are sub capital fractures. Where the acetabular component is well fixed, it is usual practice to revise the femoral stem alone however they have also been successfully treated non-operatively.<sup>3</sup> Fortunately, intertrochanteric periprosthetic fractures are not as frequent; to our knowledge only four other cases have been reported in literature.<sup>4-7</sup> Nevertheless these fractures pose both a challenging and technically difficult management dilemma. Our concern in this case was the correct and suitable placement of the lag screw into the femoral head given the presence of a centrally placed femoral resurfacing stem and also the metal implant obscuring the intraoperative image intensifier images. Stabilizing the fracture allows preservation of bone stock and allows future revision surgery to remain an option should it be required or indicated at a later date.

## Conclusion

A standard dynamic hip screw can be reasonably considered in treating Intertrochanteric and precisely per-prosthetic fractures, in the presence of a Birmingham hip resurfacing implant, such as the one we described here. Great care and attention to surgical technique need to be of the upmost and of course patient factors such as age, pre-morbid function, bone quality and stability of the implant should always be considered fully first.

## Acknowledgements

The authors have all contributed to the work. Patients consent obtained and can be provided upon request. No financial gain was made from the present work.

## Conflicts of interest

None.

## References

1. Matharu GS, McBryde CW, Revell MP, et al. Femoral neck fracture after Birmingham hip resurfacing arthroplasty. *Journal of Arthroplasty*. 2013;28(1):1147–1153.
2. Shimmin AJ, Back D. Femoral neck fractures following Birmingham hip resurfacing. *J Bone Joint Surg (Br)*. 2005;87(4):463–464.
3. Cumming D, Fordyce MJ. Non-operative management of a peri-prosthetic subcapital fracture after metal-on-metal Birmingham hip resurfacing. *J Bone Joint Surg (Br)*. 2003;85(7):1055–1056.
4. Macdonald J, Robinson A, Brown I. Fixation of a periprosthetic intertrochanteric hip fracture below a Birmingham hip resurfacing. *Case Reports in Orthop*. 2014(2014):393984.
5. Weusten AJ, Khan SK, Bonczek SJ, et al. Internal fixation of a traumatic fracture around a hip resurfacing arthroplasty using the proximal femoral locking compression plate. *Acta Ortho Bel*. 2012;78(5):688–693.
6. Weinrauch P, Krikler S. Proximal femoral fracture after hip resurfacing managed with blade-plate fixation. *J Bone Joint Surg Am*. 2008;90(6):1345–1347.
7. Aning J, Aung H, Mackinnon J. Fixation of a complex comminuted proximal femoral fracture in the presence of a Birmingham hip resurfacing prosthesis. *Injury*. 2005;36(9):1127–1129.