Introduction: Hip fracture fixation surgery in patients with below-knee amputations poses a challenging problem to the surgeon in terms of obtaining traction for reduction of the fracture. The absence of the foot and part of the leg in these patients makes positioning on the fracture table difficult. We highlight this difficult problem and suggest techniques to overcome it.

Case presentation: A 73-year-old man with bilateral below-knee amputations presented with a history of fall. Radiographs revealed an inter-trochanteric fracture of the femur. A dynamic hip screw fixation was planned for the fracture but the dilemma was on how to position the patient on the fracture table for the surgery. Special attention was needed in positioning the patient and in surgical fixation of the fracture.

Conclusion: Hip fracture fixation in patients with below-knee amputations poses a special problem in positioning for fracture reduction and fixation. In this case report, we share our experience and suggest techniques to use when encountering this difficult problem.
his lower limbs for mobility. Radiographs of his pelvis and right hip revealed an undisplaced inter-trochanteric fracture of the femur. A dynamic hip screw fixation was planned for the fracture but the dilemma was how to position the patient on the fracture table for the surgery.

The patient was positioned on a fracture table with a perineal post and the affected limb supported on a radiolucent leg support (Figure 1). The opposite below-knee stump was strapped securely to a leg support with the limb placed in abduction to allow easy access for the image intensifier (Figure 1). As the fracture was undisplaced, fixation of the fracture was performed with rotation of the hip by the assistant. The procedure was completed satisfactorily and postoperatively the patient was mobile with full weight-bearing after fitting prostheses to his lower limbs.

Discussion
Inter-trochanteric fractures of the femur are quite common in the elderly. Management of these fractures is essentially surgical and the various techniques used include dynamic hip screw fixation, intramedullary nailing and dynamic condylar screw fixation [1-4]. Patients with bilateral below-knee amputations with inter-trochanteric fractures pose a special problem as positioning them on the fracture table is difficult due to the absence of the foot and part of the leg. There is little information in the literature on techniques to deal with this problem. We describe a few methods that can be used when this rare and unusual problem is encountered.

If the fracture is undisplaced or minimally displaced, the limb can be placed on a radiolucent leg support (Figure 1) with the opposite hip kept abducted to allow access for the image intensifier. Traction and rotation of the hip can be performed by an assistant. An alternative is to fit the patient's prosthesis onto the stump and secure the foot of the prosthesis to the boot on the traction table (Figure 2). A radiolucent leg support should be placed under the limb for safety. These techniques cannot be used when the fracture is displaced and more traction is needed.

If the fracture is displaced and greater traction is anticipated, the method of shortening the traction arm and inverting the boot to accommodate the flexed knee (Figure 3) and stump, as described by Al-Harthy et al. [5], can be used. A standard boot should be used and the stump should be 12 cm or more (below the tibial tuberosity). If the stump is long, the boot tongue can be inverted for the stump to protrude. Upper tibial skeletal traction can be used if the stump is short but this method has some drawbacks. The skeletal pins may 'cut out' of the bone, which is usually osteoporotic, on applying traction. The other option is to use a distal femoral skeletal traction which would assist in traction.

Conclusion
Hip fracture fixation surgery in patients with below-knee amputations is a difficult and challenging problem for the surgeon. The dilemma is on how to provide the traction and rotation required for reduction of the fracture. We believe that the techniques mentioned here to overcome this problem are safe and give the surgeon various options to handle this situation.
Competing interests
The authors declare that they have no competing interests.

Consent
Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Authors’ contributions
UR was involved in collecting patient details, reviewing the literature and drafted the manuscript as the main author. RSY was involved in reviewing the literature and proofreading of the manuscript. AS was involved in critically revising the manuscript for important intellectual content. TKR was involved in conception of the study and revising the manuscript. All authors have read and approved the final manuscript.

References
1. Fogagnolo F, Kfuri M Jr, Paccola CA: Intramedullary fixation of pertrochanteric hip fractures with the short AO-ASIF proximal femoral nail. Arch Orthop Trauma Surg 2004, 124:31-37.
2. Hardy DC, Descamps PY, Krallis P, Fabec L, Smets P, Bertens CL, Delince PE: Use of an intramedullary hip-screw compared with a compression hip-screw with a plate for intertrochanteric femoral fractures. A prospective, randomized study of one hundred patients. J Bone Joint Surg Am 1998, 80:618-630.
3. Sadowski C, Lubbeke A, Saund M, Rian N, Stern R, Hoffmeyer P: Treatment of reverse oblique and transverse intertrochanteric fractures with use of an intramedullary nail or a 95 degrees screw-plate: a prospective, randomized study. J Bone Joint Surg Am 2002, 84A(3):372-381.
4. Valverde JA, Alonso MG, Porr Ju, Rueda D, Larrain PM, Soler JJ: Use of the gamma nail in the treatment of fractures of the proximal femur. Clin Orthop Relat Res 1998, 350:56-61.
5. Al-Harthi A, Abed R, Campbell AC: Manipulation of hip fracture in the below-knee amputee. Injury 1997, 28:570.