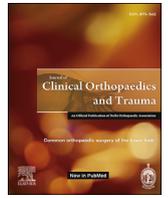




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## Technical tip for removal of broken cephalomedullary reamer tip in cases of proximal femoral nailing

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## ABSTRACT

Instrumentation breakage around hip joint can pose a challenging situation considering its vicinity to several vital structures. Broken fragments carry the risk of migration and thus should be removed as early as possible. A case of successful retrieval of broken tip of cephalomedullary lag screw reamer of a cephalomedullary nail, in basicervical region of femoral neck, during fixation of a subtrochanteric femoral fracture has been reported. Literature review has been done to suggest techniques to tackle similar situations using simple and commonly available instruments.

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### 1. Introduction

Intraosseous and intra articular breakage of instruments and implants around the hip joint, pose a challenging situation to every orthopaedic surgeon. Although, such cases have been reported in the literature, the actual incidence remains unknown.<sup>1–4</sup> Cephalomedullary nails are commonly used in management of proximal femoral fractures. Among one of the commonly used cephalomedullary nail using single cephalic lag screw is the Zimmer proximal femur natural nail (ZNN). We report a case of successful retrieval of broken tip of cephalomedullary lag screw reamer of ZNN (Fig. 3), in basicervical region of femoral neck, during fixation of a subtrochanteric femoral fracture.

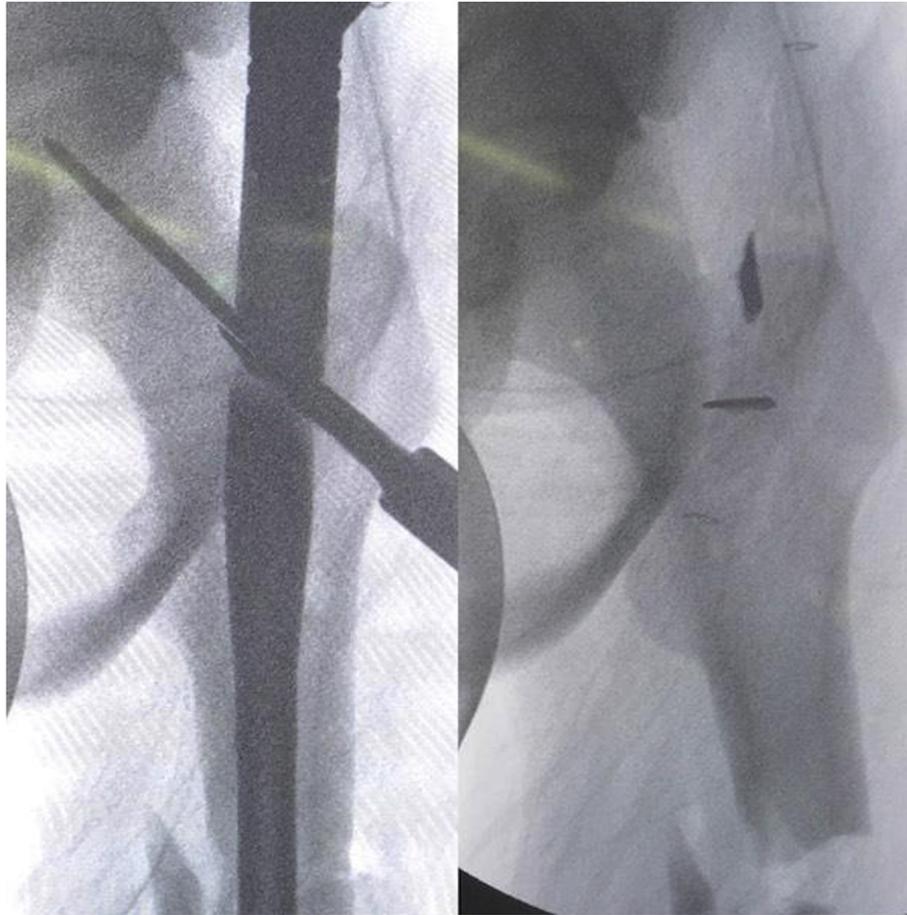
### 2. Case report

A 35 year old male patient suffering from closed subtrochanteric fracture on left side femur after a road traffic accident presented to our level 1 trauma centre. The patient was hemodynamically stable and was planned for the fracture fixation using Zimmer Natural

Nail® System Cephalomedullary Nail (ZNN). Under image intensifier guidance, closed reduction was achieved on fracture table. After making appropriate entry point at greater trochanter, guide wire was inserted and serial reaming of femoral canal was done. An appropriately sized proximal femur ZNN nail was inserted. After positioning of the nail appropriately, the threaded cephalomedullary guidewire was inserted, under image guidance, up to the subchondral region of femoral head using the attached zig and appropriate sleeves and was found to be satisfactorily placed. This was followed by drilling over the guidewire with cephalomedullary reamer for lag screw placement. During this process, a metallic clunk was heard and under image intensifier control, it was found that the reamer tip was broken into two fragments in basicervical region with one fragment protruding just medial to the lag screw hole (Fig. 1). Keeping in mind that any further rotational force could displace the broken fragments, we extracted out the reamer using gentle blows with hammer without any rotation. After removal of the reamer, the guide wire was removed gently with slow anticlockwise turns. A small curette was used to scoop out the medially protruding fragment back into the lag screw hole of the nail. The other fragment was already seated inside the lag screw hole inside the nail. The nail was then pulled out of the femur. By this technique we were able bring one fragment back to the level of the nail entry point and the other fragment slightly inferior to that but within the femur itself (Fig. 1). The proximal fragment was subsequently removed under direct vision. The inferior fragment was scooped

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**Fig. 1.** Intraoperative image intensifier pictures showing broken cephalomedullary lag screw reamer tip fragments.

out using a slightly larger sized curette upto the nail entry point but it was not easily extractable using a curette (Fig. 2). Contemplating falling back of the fragment into the canal again, we blocked the lower part of femoral medullary canal using a bone punch through the lag screw track already created. Following this, the fragment was removed using Kocher forceps under C arm control without much fear of pushing the fragment in to the femoral medullary canal while taking hold of the fragment. The nail was reinserted and another lag screw reamer was used and a lag screw was inserted. This was followed by distal locking after achieving correct rotational alignment of femoral cortices at fracture site.

### 3. Discussion

Instrumentation breakage around the hip joint especially guidewires and drill bits, has often been reported.<sup>1–8</sup> The reason could be loss of torsional strength and deformation of the instruments due to repeated usage. It is always important to use instrumentation specific methods accurately to prevent such situations. Guide pins should be discarded after single use. Care must be taken while using cannulated devices over guide pin. Multiple fluoroscopic views should be checked to confirm the direction of cannulated device kept parallel to guidepin. Feeling of increased resistance while passing cannulated device over guide pin should alert the surgeon of mismatch between the direction of guide pin and cannulated device. Small diameter K wires and guide pins, being more susceptible to breakage, should be avoided in large

bones. There have been few case reports in the literature describing techniques for successful retrieval of such broken fragments.<sup>1–8</sup> However, to the best of our knowledge, intraosseous breakage of lag screw cephalomedullary reamer has not been reported till now. Unlike guide wires, the broken fragments of the reamer are non-threaded and therefore carry a higher risk of migration. Being located in the vicinity of several vital structures, migration of these fragments around hip joint can be catastrophic. Therefore, such fragments should be removed in the first sitting itself. There has not been any specific technique in the literature to retrieve such broken fragments. We used curettes to scoop out the fragments as they have wide bowl like surface which has more chances of coming in contact with the margins of the broken fragments. Pointed instruments like artery forceps can further push the fragments away. Wide tipped forceps and graspers can come handy when there is ample space available to operate them but can also pose difficulty in opening of their jaws in limited space. Intraosseous breakage of instrumentation can pose a challenging situation owing to the difficult direct or indirect access in a limited space and any attempt to create more space could weaken the bone.<sup>9</sup> For retrieval, such instruments should be selected which allow contact with the far edge of the broken fragments without disturbing near edge. Pituitary forceps, basket forceps, graspers, Kerrison rongeur and arthroscopic flipcutter are such commonly available instruments and have been successfully used for retrieval of broken fragments.<sup>7,9,10</sup> Our technique provides a simple, effective and safe solution to retrieve such broken fragments, even in places with

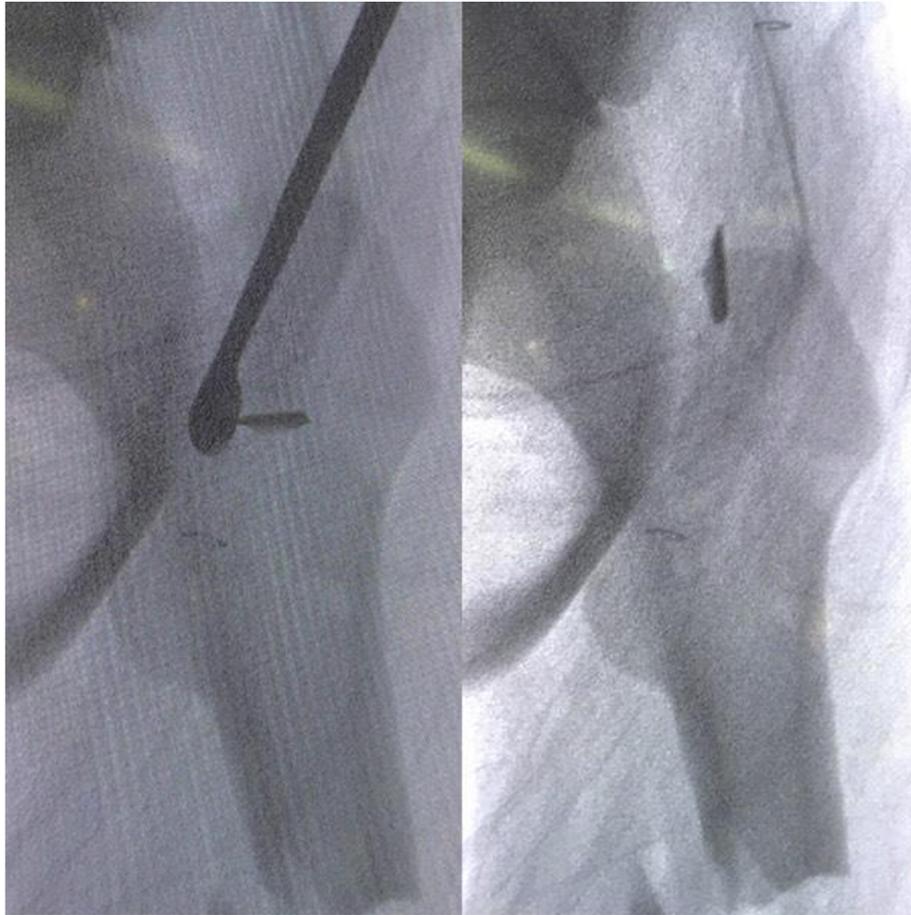


Fig. 2. Intraoperative image intensifier pictures showing the inferior fragment being scooped out towards the nail entry point using a curette.



Fig. 3. The broken cephalomedullary lag screw reamer along retrieved broken fragments.

limited resources. We also believe that there should be some manufacturer specific predefined usage limits for instruments like drill bits and reamers which are going to be used multiple times in developing countries, so complications related to their breakage could be prevented.

#### Conflicts of interest

None.

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