



A novel method for the removal of distal part of broken intramedullary femoral nail

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We describe a new technique for the removal of the distal part of a broken intramedullary interlocking femoral nail. The distal part of the nail is pushed outward with the help of a antegradely driven new nail. This method is simple, less time consuming and requires only a Kuntscher's nail and a guidewire which are easily available in the operating rooms.

Key words: Fracture; intramedullary nailing; femur fracture; implant removal.

Interlocking intramedullary nailing is a widely used treatment method for long bone fractures. With their increasing use for unstable fractures, such as comminuted fractures and proximal or distal end fractures, the rate of delayed union or nonunion also increases, which in turn increases the rate of nail breakage. The nail breaks usually at the level of the fracture in unstable fractures^[1] or at interlocking screws holes in proximity to fracture site.^[2]

We describe a new technique that we used on a patient for the removal of the distal part of a broken intramedullary interlocking femoral nail.

Technique

The patient who had a femoral nonunion and nail breakage was placed in a lateral decubitus position. Proximal and distal interlocking screws were removed first. A smooth guide wire was passed into the nail from its entry portal at greater trochanter till its end abutted against the cortex of anterior part of intercondylar notch of distal femur. Proximal part of nail was then removed

with the nail extractor. Knee joint was kept hyperflexed to take the patella away from guide wire abutting site. A small longitudinal incision was made over the quadriceps tendon and a window was opened in the femoral cortex where the guide wire was abutted. Guide wire was advanced until it protruded through this window (Figure 1a).

A thin and longer Kuntscher's nail was advanced from trochanteric entry into the medullary canal with the guide wire in its slot. The distal fragment of broken nail was pushed out on guide wire through the window by gentle hammering of the Kuntscher's nail (Figure 1b). Once the tip of the nail appeared in the knee incision, it was caught with a forceps and pulled out (Figure 1c). The Kuntscher's nail was extracted back with its extractor. Reamed exchange nailing of fracture was done without opening the fracture site (Figure 2a-d).

Discussion

Removal of distal fragment of a broken nail poses a great

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Fig. 1. (a) Guidewire with the broken nail protruding through the window in the anterior part of intercondylar notch of distal femur. (b) Kuntscher nail was inserted on the guidewire. (c) Removal of the nail the forceps. [Color figure can be viewed in the online issue, which is available at www.aott.org.tr]

challenge.^[1,3] Many techniques have been described in literature. These include use of custom made hook^[1,4,5] smaller size nail,^[6] olive tipped guide wire,^[7,8] ball tipped guide wire,^[9,10] guide wire with wasser,^[11] encercilage wire^[12] groove in tip of guide wire,^[13] corkscrew extractor.^[9]

Removal of nail with hook may be problematic because it may not provide adequate grip and may not be able to engage nail tip in subchondral bone.^[11]

A small sized nail may not exactly fit in hollow of the broken nail and grip will also be poor in this case. Olive or ball tipped guide wires may not pass through the



Fig. 2. (a) Distal part of nail was broken near the distal screw hole. (b) Lateral radiograph of the broken nail. (c) Lateral radiograph after exchange nailing. (d) Antero posterior radiograph after exchange nailing.



Fig. 3. (a) Guide wire was passed through the distal fragment of broken nail and its distal tip abutted against cortex of anterior part of intercondylar notch of distal femur. A window was opened at this site for removal of nail fragment by pushing it anterogradely with the Kuntscher's nail. (b) Guide wire and Kuntscher's nail which were used. Removed nail with its broken distal part. [Color figure can be viewed in the online issue, which is available at www.aott.org.tr]

nail hallow because of bone formation in canal of nail or mismatch of inner diameter of nail and guide wires. For guide wire and wasser technique, it is very difficult to drill from articular surface of distal femur to exactly in nail hallow even with the help of c-arm.

The unsuccessful removal attempts create new complications. During retrograde removal attempt the proximal tip of the distal part may be caught within the fracture line.

In our method we have pushed the distal fragment distally over the guide wire leading to its removal through the window which was made at the site of guide wire abutting the anterior cortex of femur. Our method does not require any special instrument. Guide wires and Kuntscher's nails are universally available in orthopedic operation theaters (Figure 3a, b).

No extraordinary skills are required. Operative time is considerably less and radiation exposure is also minimal. But this technique is contraindicated in infected cases, where there will be a risk of spread of infection

into the joint. Anterior knee pain and stiffness are possible complications of this technique.

Conflicts of Interest: No conflicts declared.

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