

A Simple New Technique to Remove a Bent Kuntscher Nail

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ABSTRACT

We present our technique to remove a bent intramedullary femoral nail in a 26 year-old man admitted with an abnormally angulated right thigh within 3 days. His right femoral shaft was broken by a traffic accident 2 months ago. This fracture was treated with a Kuntscher nail fixation by the open method.

For the operative techniques, the fracture site was exposed using a previous incision at the lateral thigh. After dissecting soft tissue and periosteum from the fracture site, we increased the varus deformity of the femur including the nail inside the medullary canal until the nail formed the "V shape" and extracted the nail simultaneously. A limited corticotomy was conducted to allow more space for the nail to escape. After removal of the bent nail, the fracture was stabilized with a 12×360 mm. static interlocking nail (Grosse-Kempf).

Keywords: Bent intramedullary femoral nail, removal technique, increase deformity, nail extraction

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A 26-year-old male patient was admitted with an abnormally angulated right thigh, which was observed for a period of 3 days. Two months earlier, he had suffered a break in his right femoral shaft that had occurred during a motorcycle accident. He was treated by open reduction and internal fixation with a Kuntscher nail. Immediately after the operation, he could use his leg on full weight without any kind of assistance or protective device.

Two months later, a deformity in the affected area appeared. Upon physical examination it was noted that his right thigh showed signs of varus deformity. An X-ray revealed that his right femur had a non united fracture with a bent Kuntscher nail at 30°-angulation in the medullary canal (Fig 1).

In the operating room, the patient was transported to a radiolucent table and placed in the left lateral decubitus position. The fracture site was exposed using an incision along the posterolateral incision from the previous operation. During the procedure, soft tissue and periosteum were dissected for about 7cm both proximally and distally from the fracture site to allow movement of the proximal and distal femur.



Fig 1. Preoperative clinical pictures and radiographic findings.

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Fig 2. Intraoperative procedures, A: Nail removal, B: Removed bent nail.

First, we began to increase the varus angle of the fracture site. At this point, a Kuntscher nail extractor was hooked to the apex of the bent nail. As the extractor was removed an assistant simultaneously increased the varus angle of the femur until the nail formed a "V-shape" (Fig 2). A limited corticotomy (Fig 3) was conducted to allow more space for the nail to escape. After removal of the nail, the fracture was stabilized with a 12×360 mm. static interlocking nail (Grosse-Kempf) (Fig 4). No bone graft was added at the fracture site.

The most recent follow-up condition of the patient was performed at 1 year after the second operation. The fracture was healed and he was able to walk normally without any complication.

DISCUSSION

The Kuntscher nail is one of the most useful devices to treat a fracture of the femoral shaft¹. The nail is inexpensive and is available in most provincial hospitals.

A bent or broken nail can be caused by poor weight protection² or the reoccurrence of a fracture from a new accident³. There are several documented examples of techniques to remove a bent Kuntscher nail. Nicholson⁴ removed a bent interlocking intramedullary nail by opening the fracture site and cutting the nail. The distal part of the nail was removed through the fracture site and the proximal part was removed through the greater trochanter. Singh⁵ opened the fracture site, then cut and removed the Kuntscher nail, both proximal and distal part, via the fracture site. Ohtsuka⁶ and Al Maleh⁷ made a mini-open lateral skin incision. The nail was then drilled on the lateral side, straightened and removed using the standard method. Sivananthan³ removed the

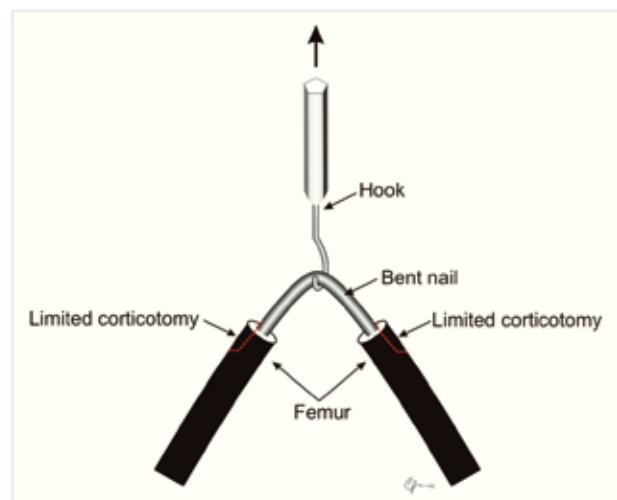


Fig 3. Diagram showing nail extraction.



Fig 4. Postoperative fixation with a Grosse-Kempf intramedullary nail, A: Lateral view, B: AP view.

proximal part via the greater trochanter then pushed a guide wire through to the distal part thus forcing the smaller size nail into the distal area. Distal locking screws were removed and the smaller nail, including the distal nail section, were pulled out together. Apivatthakakul⁸ used the percutaneous technique to weaken the bent nail and straightened it before removal.

All of these methods are effective in removing bent or broken Kuntscher nails. However, drilling or cutting the nail produces metal debris and puts the bone at risk of necrosis from heat⁷. The percutaneous technique requires an image intensifier that may not be available in most provincial hospitals in Thailand.

Our method is a simple procedure which can be performed in any hospital. It requires only basic orthopedic instruments and no need for an image intensifier. Furthermore, no metal debris is created and the act of increasing the nail's deformity is easier than straightening it. Finally, using this open method allows us to re-fix the fracture during the same procedure.

The method has two cautions. First, there is risk of injury to the neurovascular bundle so extensive soft tissue dissection should be done. Second, an intraoperative fracture can occur. To minimize the risk, a careful and limited corticotomy should be performed.

This technique may offer an alternative method for the removal of a bent Kuntscher nail in the hospitals where sophisticated medical equipment may not be available.

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