INSERTING THE DISTAL SCREWS IN A LOCKED FEMORAL NAIL

C. J. M. KNUDSEN, G. P. GROBLER, R. E. W. CLOSE

From Princess Alice Orthopaedic Hospital, Cape Town

We describe a simple method of inserting the distal screws in a locked femoral nail. The method requires no aiming device and no assistant. The only equipment needed is a 3 mm Kirschner wire and an air drill.

The interlocking femoral nail, by providing both rotational and longitudinal stability, has significantly widened the scope for intramedullary fixation of femoral fractures. However, insertion of the distal screws is difficult, so that the patient and surgical team may be exposed to excessive radiation. We have evolved a simple technique of distal screw insertion which requires no aiming device and no assistant. The only equipment needed is a 3 mm Kirschner wire and an air drill.

Technique. The femoral nail is inserted with the patient supine and the image intensifier is positioned to display a lateral image of the femur. A lateral incision about 6 cm long is sited directly over the two distal screw holes; brief screening is essential to aid accurate location. The fascia lata, vastus lateralis and periosteum are divided in the line of the wound to expose the lateral femoral cortex. The position of the C arm of the image intensifier is then adjusted until the two screw holes are seen as perfect circles (Fig. 1). The air drill is loaded with the 3 mm Kirschner wire and the tip of the wire is placed in contact with the lateral femoral cortex. The wire is held at an oblique angle to the femur in order to facilitate imaging and then moved proximally or distally, anteriorly or posteriorly, until the tip of the wire is located within the centre of the more proximal of the two screw holes (Fig. 2). This point is the exact lateral location of the screw hole and the wire is drilled into the cortex to a depth of 2 mm to mark the site. The C arm is then rotated into the anteroposterior plane and the distal femur is screened, ensuring that the Kirschner wire is positioned perpendicular to the femoral nail (Fig. 3). The tip of the wire is still in the original site and only the alignment of the Kirschner wire is altered. The Kirschner wire is then driven through the lateral cortex, screw hole and medial cortex in the same plane of the C arm which showed the screw holes as perfect circles. Thereafter, the drill is removed leaving the Kirschner wire in situ and placement is checked in both planes with the image intensifier (Fig. 4).

Once it is confirmed that the proximal Kirschner wire is correctly sited, a second Kirschner wire is inserted into the most distal screw hole using a similar technique. The proximal Kirschner wire is then removed and replaced with the definitive drill bit. The correct entry point on the lateral cortex can be seen and the line of passage is given by the distal Kirschner wire. Correct orientation is confirmed with the image intensifier. The procedure is then repeated for the more distal screw hole.

DISCUSSION

We have used this method to lock 20 femoral nails (Grosse-Kempf and AO) and have successfully placed the screws in all patients. There have been no complications related to the distal femoral incision and the improved exposure facilitates screw insertion. MacMillan and Grosse (1988) emphasised that if the first penetration of the femoral cortex is made with a drill or an awl and is incorrectly sited, then subsequent efforts to drill a second hole in the correct position are significantly hindered by the first off-centre hole, into which the drill tends to slip. In addition the bone may be weakened by the creation of a large defect. A Steinmann pin or 3 mm
Kirschner wire avoids these problems but is sufficiently strong to pass through the femoral cortex without bending.

We have found that if the Kirschner wire is incorrectly sited, a second wire will follow its own path and does not slip into the previously made path. In addition, it is technically easier to pass a smaller diameter wire through a screw hole than a drill. Graham and Mackie (1988) reported difficulty in using the AO aiming device and therefore modified the technique; however, an assistant was then essential. We use no aiming device and thus no assistant is required. Inserting the second Kirschner wire before removing the proximal one, aids definitive drill insertion (Dobozi 1987) and a cannulated drill is not required. We agree with the measures recommended by Levin, Schoen and Browner (1987) and Sugarman, Adam and Bunker (1988) to decrease radiation exposure. The use of protective gloves further protects the surgeon’s hands from radiation. We did not measure the radiation time during insertion of the distal screws, which took between 15 and 20 minutes, even though we have no image memory mode and the technique was being performed by several surgeons who were learning the method. In conclusion, we believe this technique is simple, safe, reproducible and relatively rapid, reducing both radiation and operative time.

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REFERENCES


