METHOD OF INSERTING THE SMITH-PETERSEN GUIDE WIRE

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Numerous methods have been advocated for the accurate placing of a guide wire in treating fractures of the neck and femur with the Smith-Petersen nail. In many parts of Great Britain, mechanical assistance has been abandoned in favour of the simple procedure advocated by Watson-Jones (1943). A stiff two-millimetre guide wire is passed into the neck of the femur by the sense of touch and, if the position is not satisfactory, a second wire is passed while the first is still in position to give the direction in which correction is required. This method has the advantage over elaborate mechanical methods in depending solely upon skill; and as skill is acquired with practice, a consistent level of accuracy can be achieved. Mechanical devices, designed to eliminate the element of skill, are prone to erratic results from factors, such as X-ray parallax, which the operator may not fully understand.

In the technique of Watson-Jones it is difficult to pass the second wire at a very small angle to the first, because the part of the wire which projects from the bone is often deflected by the chuck holding the second wire; when the chuck is removed, the second wire is found to spring into a quite unexpected direction. At each new venture the wire tends to re-enter the original track. The simple instrument here described eliminates this source of error, without removing the element of skill.

![Cannulated screw with tapering thread, and long-handled box-spanner](image.png)

**Fig. 1**
Cannulated screw with tapering thread, and long-handed box-spanner fitting the hexagonal head.

*Technique*—The instruments required are: 1) a cannulated screw with a tapering thread, and 2) a long-handled box-spanner to fit the hexagonal head of the cannulated screw (Fig. 1).

The fracture is reduced, and the trochanter is exposed. At a point three-quarters of an inch to one inch below its lower margin, a three-sixteenth inch hole is made through the cortex of the femur in the estimated direction of the axis of the femoral neck; that is, towards a point one inch cephalad to the opposite anterior-superior iliac spine with the affected thigh abducted about 10 degrees. The cannulated screw, mounted in the long-handled spanner, is thrust into the drill hole in the same direction and parallel with the floor; and the spanner is rotated until the tapering thread is gripped in the hole. The spanner is then detached and a guide wire is driven down the central cannula. Radiographs are taken in two planes. If it is necessary to alter the direction of the wire an estimate of the correction required is made by eye. The wire is withdrawn and the spanner is carefully reattached to the hexagonal head.
head of the screw. The spanner, and with it the screw, is now forcibly deflected into the new direction and rotated so that the screw-threads grip the cortex in the new direction. The spanner is detached, the two-millimetre wire is again inserted and the new position is checked by radiographs. Three or four attempts would be possible before all the screw-threads became engaged, but in the author’s experience it has never been necessary to make more than two attempts.

Measuring the length of the nail required—The required length of nail may be calculated from the antero-posterior radiograph if this includes the whole length of the shadow of the cannulated screw. The tube should be centred slightly lateral to the femoral neck to avoid excessive magnification of the screw in the lateral rays of the tube. By measurement of the shadow of the three-inch screw on the radiograph, the magnification is determined. The length of the nail required is estimated by making direct measurements on the magnified shadow of the femoral neck and reading off the correct length from a chart (Fig. 2).

![Fig. 2 Chart for converting magnified into real dimensions and vice versa (Fig 2). The sketch representing a wet radiograph (Fig. 3) shows two steps in calculating the required length of nail: the first step is to find the magnification of a known length, the second to convert the optimal (magnified) length to real dimensions.](image)

![Fig. 3 Chart showing the steps in calculating the required length of nail.](image)

**Technique**—The caliper is set to the length of the shadow of the screw on the wet radiograph (Fig. 3). This dimension is then compared with the chart where the magnifications are indicated by the vertical lines. Supposing the caliper corresponds to magnification B, then all subsequent measurements are confined to this vertical line. The caliper is reapplied to the wet film, this time to span the optimal length of head and neck to be gripped by the nail. The caliper is now transferred to the chart. One leg of the caliper is placed on the base line at the foot of the vertical line B and the other leg will touch one of the oblique lines designated 31/2", 33/4", 4" (etc.). This will be the length of nail required.

These instruments and copies of the calibration chart have been made for me by Messrs Charles Thackray Ltd., Leeds.

REFERENCE