Patella
Heel pad
Final stump showing heel skin just distal to the patella, and knee flexion of over 100°. Knee extension was normal and function was good.

(Fig. 1). The usual below-knee amputation would have left too short a stump. We therefore decided to amputate the bone, 6 cm below the knee, and turn up a section of the healthy distal tibia on a long posterior flap to lengthen the stump.

We excised the middle two-thirds of the tibia, with the anterior and lateral compartments, and disarticulated the foot at the ankle. A long posterior flap was fashioned to include all the posterior soft tissues down to and including the heel, with the distal 6 cm of tibia attached (Fig. 2a). This composite flap was turned up, and the two segments of tibia fixed together with wire (Figs 2b, c). The two disease-free portions of the tibia gave a below-knee stump of good length with the heel pad just below the patella (Fig. 3a). Bone union occurred and the stump functioned well, with flexion from 0° to 100° (Fig. 3b).

Discussion. The bone-flap technique which we describe can be used to make below-knee amputation possible when a large part of the proximal tibial diaphysis is lost or is to be excised for extensive osteomyelitis, trauma or tumour. In our case only wide en-bloc resection was likely to succeed. When the knee is intact and distal tissues are healthy, either the distal tibia or the bones of the foot can be used to lengthen the proximal segment (Sanders 1989) and avoid the need for an above-knee amputation or knee disarticulation.

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REFERENCE


THE SUBCAPSULAR APPROACH FOR LESIONS OF THE FEMORAL NECK

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Osteoid osteoma and enchondroma are examples of benign tumours which are often located in the proximal femur. Removal of such lesions often involves an intra-articular procedure and damage to the femoral neck which may require bone grafting. Serious complications can occur such as septic arthritis, avascular necrosis of the femoral head, postoperative limitation of movement due to capsular adhesions, and heterotopic calcification.

We present a method which allows an extracapsular approach to such lesions. Subperiosteal exposure of the femoral neck makes identification of the pathological lesion easier, and facilitates its complete excision and reconstruction. Excision of the lesion and exposure of the iliac crest as the bone-graft donor site may be performed through a single incision. A preliminary report of this technique has already been published (Robin, Margulies and Sucher 1986). We now describe a larger series of patients with a long follow-up.

Patients. Between 1984 and 1991 intracapsular lesions in the femoral neck were found in seven patients who complained of pain and limitation of movement in the hip. Six were male and one female and their ages ranged...
from 6 to 27 years. All of them had laboratory studies, radiography, technetium bone scans and CT. Four patients also had MRI.

In five patients the diagnosis was osteoid osteoma. One patient with possible enchondroma had undergone surgical exploration of the hip seven years earlier. The bone tissue obtained at that time was normal but there had been no improvement in symptoms. One patient had a Brodie's abscess.

**Surgical approach.** We use the anterior iliofemoral approach of Smith-Petersen. When the lesion is on the medial side of the femoral neck, the iliac part of the incision need extend only along the most anterior 3 to 4 cm of the iliac wing.

From the anterior superior iliac spine the incision passes in the direction of the lateral side of the patella for a distance of 10 to 12 cm. The lateral cutaneous nerve of the thigh is protected in the upper part of the incision, which is deepened to expose the insertion of the joint capsule on to the intertrochanteric ridge. This may be done between sartorius and tensor fascia lata for lateral lesions or in the interval between sartorius and rectus femoris for medially sited lesions.

The anterior reflexion of the synovium lies slightly proximal to the attachment of the ligamentous capsule (Fig. 1a) which can therefore be elevated from the intertrochanteric ridge, without opening the synovial cavity (Fig. 1b). The capsule is pushed proximally along the femoral neck with a periosteelelevator. The synovial reflexion blends with the periosteeum on the front of the femoral neck and the retinacular vessels lie in this synovioperiosteeal layer until they enter the femoral head at the edge of the articular cartilage. The vessels can therefore be protected during gentle elevation of this layer from the bone. The synovial cavity should not be opened, and since the synovium is not divided there is little bleeding. The exposure is wide enough to approach the medial, anterior and lateral parts of the neck almost as far proximally as the articular margin.

The bone lesion is excised under direct vision and, if grafting is necessary, iliac bone may be obtained through the same incision. The synovial fold is allowed to fall back to its original position, and the capsule is reattached to the intertrochanteric ridge by non-absorbable sutures.

Active hip movements are started 24 hours after the operation, but weakness of the bone after excision of a lesion may require a delay in resuming weight-bearing.

**Results.** This surgical technique was used in all seven patients, and there were no major complications. Patients left hospital after five to seven days and were all able to return to normal activities by eight weeks. All seven bone grafts incorporated within six months. At review, 9 months to 7 years after operation, all were symptom free with no recurrence of the original lesion.

![Fig. 1a](image1.png)  
**A**  

![Fig. 1b](image2.png)  
**B**

**Discussion.** The main advantage of this technique is the ability to expose the femoral neck without opening the joint. The risk of vascular damage, septic arthritis, and capsular adhesions is therefore minimised. Access is provided to the lateral, anterior and medial sides of the femoral neck from the intertrochanteric ridge almost to the articular margin of the femoral head. The exposure is large enough to allow easy recognition of local lesions and their surgical removal under direct vision.

Lesions on the back of the femoral neck cannot be reached by this method. We do not advise its use when there is suspicion of a malignant tumour, unless a projected limb-salvage procedure can be accomplished by an iliofemoral approach.

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**REFERENCE**