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SURGICAL ATLAS OF ORTHOPAEDIC ONCOLOGY

From Resection to Reconstruction

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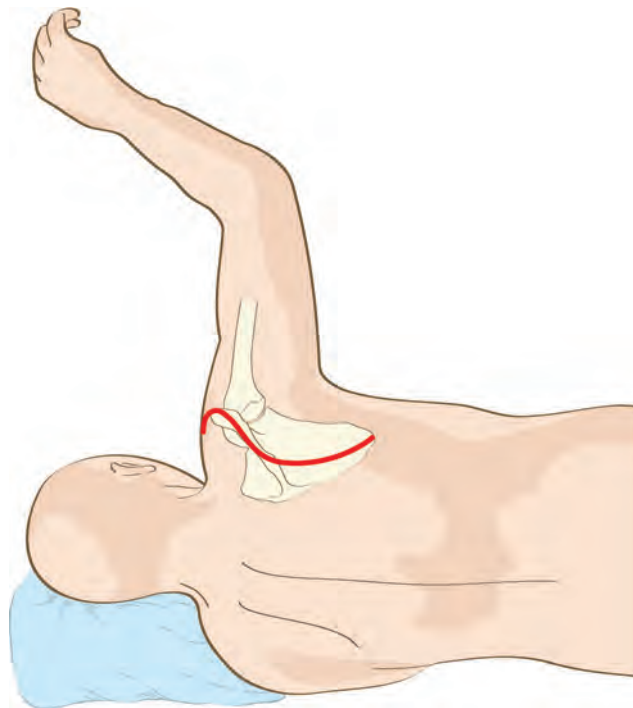


FIGURE 3 The incision should be a longitudinal, slightly curved one that starts anteriorly from the deltopectoral groove. It should extend over the clavicle and follow the acromion posteriorly toward the scapular spine. Then, it should turn distally to reach the inferior scapular angle

The trapezius and deltoid muscles are detached from the spine of the scapula, the acromion, and the lateral clavicle. The trapezius muscle is retracted medially, and the deltoid muscle is retracted laterally, so the deltoid and trapezius muscles are preserved, and the deeper muscles are exposed.

The latissimus dorsi is detached from the inferior angle of the scapula. The inferior angle and vertebral border of the scapula can be manually elevated to allow the surgeon to place his hand between the chest wall and the deeper muscles of the scapula (fig. 4). With gentle upward traction on the infe-

rior angle of the scapula, first the rhomboid major and minor and then the elevator muscles are resected at the medial border of the scapula. Starting from the inferior angle of the scapula, release the teres major and minor muscles from the lateral border of the scapula. Then, identify and ligate the posterior circumflex scapular artery between the teres major and minor muscles.

The serratus anterior muscle is usually preserved, but if there is any concern of tumor involvement, it should be included in the resection. The infraspinatus and supraspinatus muscles are released close to their hu-

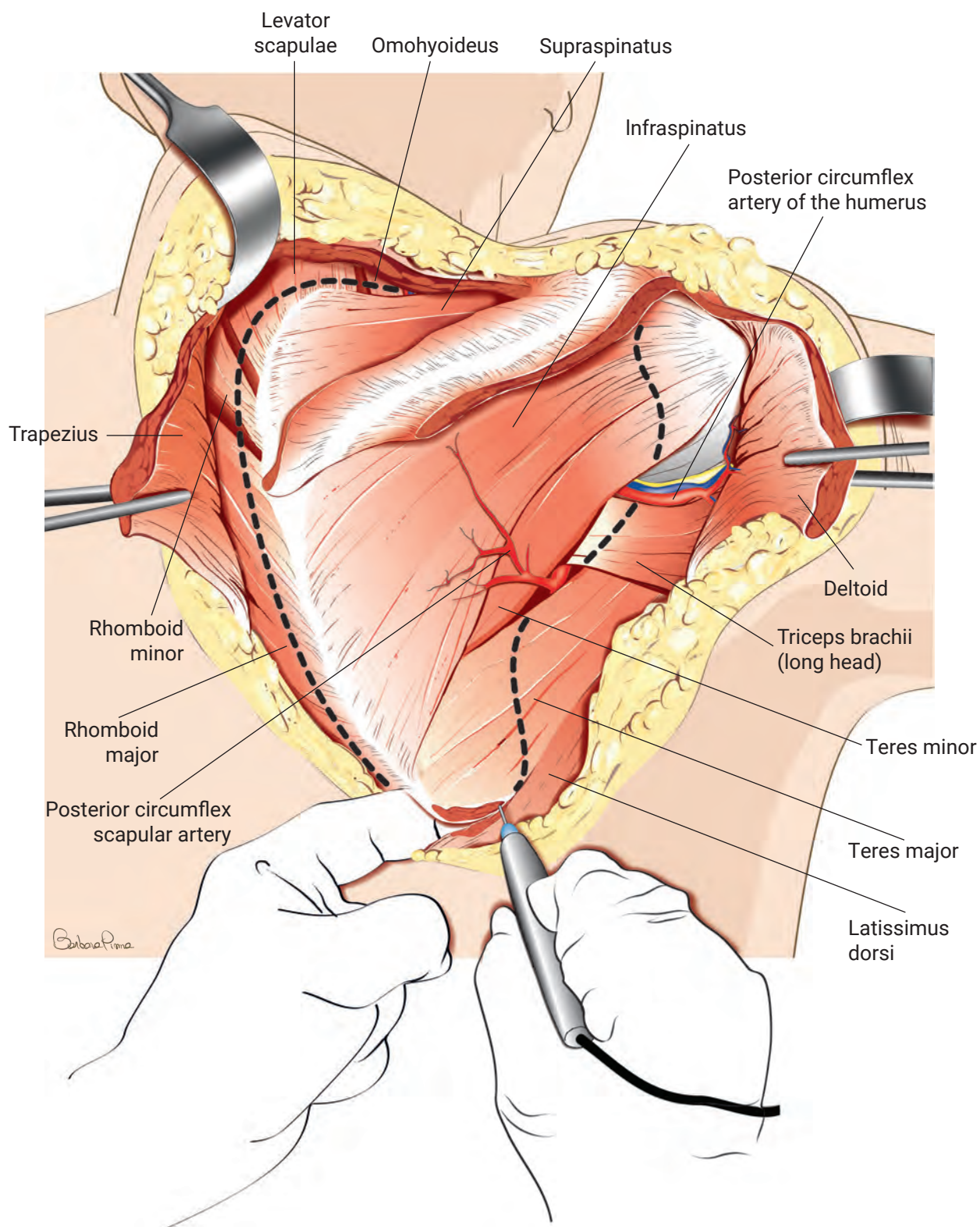
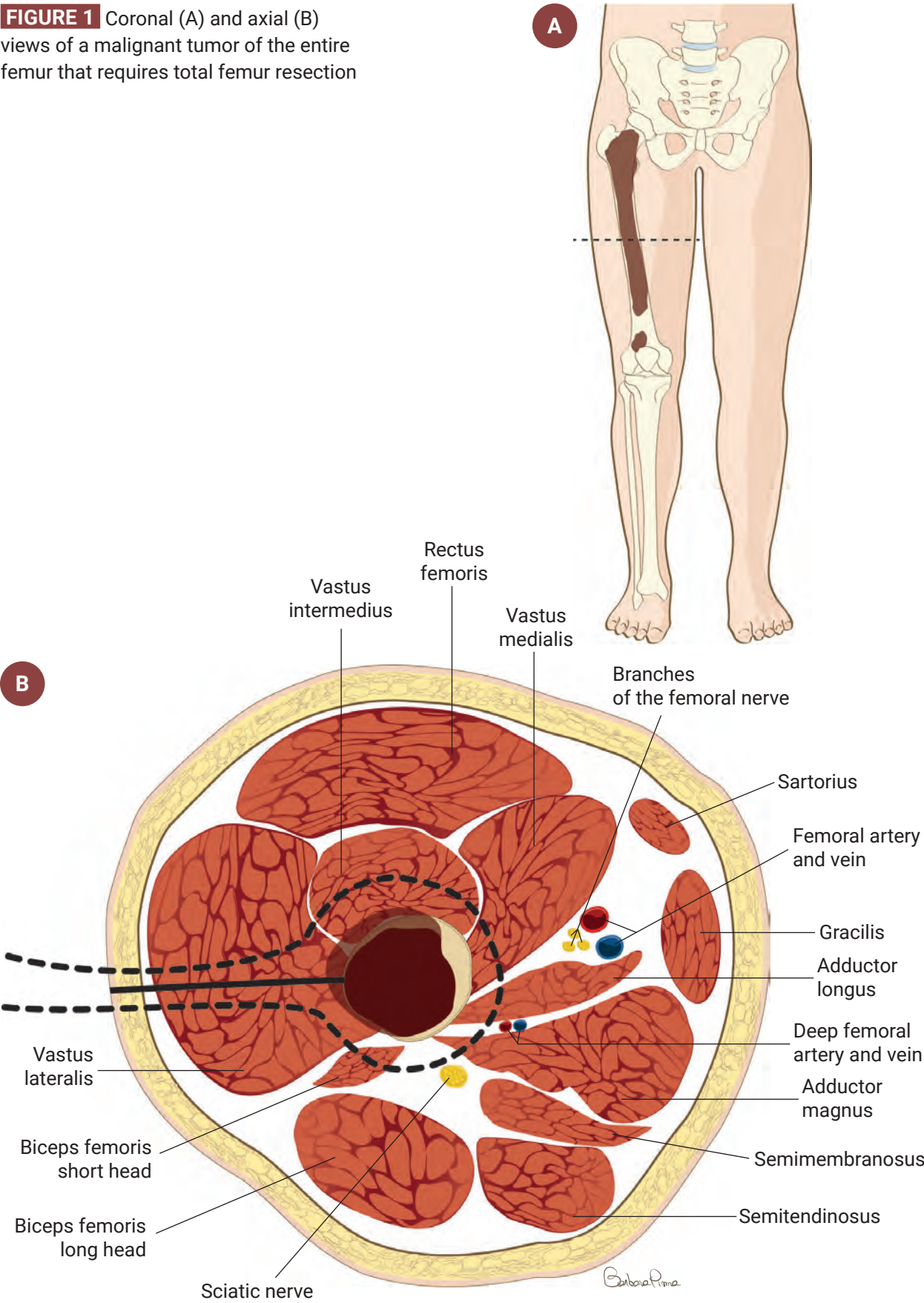


FIGURE 4 To enable the surgeon to slide a finger under the scapula, the insertion of the latissimus dorsi muscle at the lower part of the scapula is detached. With gentle upward traction on the inferior angle of the scapula, the rhomboid major and minor muscles, as well as the elevator muscles, are first resected at the medial border of the scapula. Starting from the inferior angle, release the teres major and minor muscles from the lateral border

FIGURE 1 Coronal (A) and axial (B) views of a malignant tumor of the entire femur that requires total femur resection



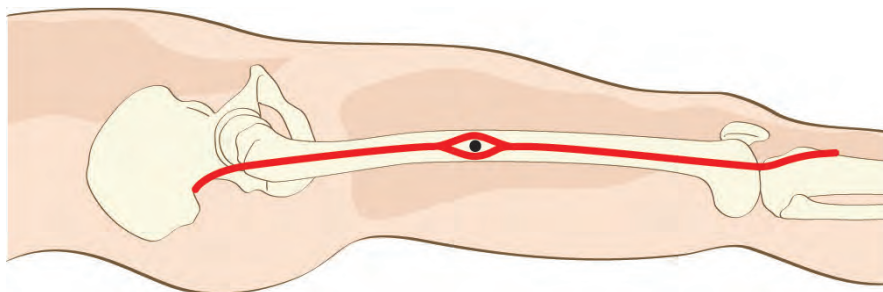


FIGURE 2 A lateral surgical approach, including a biopsy incision, should begin 3 cm proximal to the greater trochanter. Then, the skin incision should extend distally along the femur, following the lateral border of the patella, ending at the tibial tuberosity

The fascia lata insertion on the Gerdy tubercle can be detached, and the vastus lateralis muscle can be retracted superiorly to expose the lateral intermuscular septum. Then, the lateral intermuscular septum of the thigh is opened to access the posterior compartment. This allows the fibers of the biceps femoris muscle to be detached from the femur and dislocated posteriorly, which protects the common fibular nerve. Next, the lateral gastrocnemius and popliteus muscles are detached from the posterior lateral femoral condyle. This allows the femoral vessels to be isolated and dislocated posteriorly after ligation of the geniculate vessels of the knee. Usually, part of the vastus lateralis muscle fibers and intermedius muscle fibers are left to cover the tumor. The remaining vastus lateralis muscle fibers are dislocated and gently detached from the lateral intermuscular septum as the dissection moves proximally. This allows the patella to be dislocated medially (fig. 4).

Next, section the capsule of the knee joint close to the tibial insertion, leaving the me-

nisci with the distal femur. The medial and lateral collateral ligaments, as well as the cruciate ligaments, are transected close to the tibial insertion. The remaining medial muscle attachments to the distal femur can then be transected. The adductor magnus and longus are dissected from the medial surface of the femur, and care should be taken to avoid injuring the femoral vessels within the adductor canal. Once the intermuscular septum is incised, the posterior compartment structures can be dislocated posteriorly. Finally, the medial gastrocnemius can be safely detached from the posterior femoral condyle (fig. 5).

Proximally, the gluteus medius and minimus muscles are divided at their insertion into the greater trochanter. The plane under the gluteus maximus is entered and fully opened. This divides the gluteus maximus tendon from the femur and cuts the distal fibers of the muscle from its insertion on the lateral surface of the femur. With the hip internally rotated, the short external

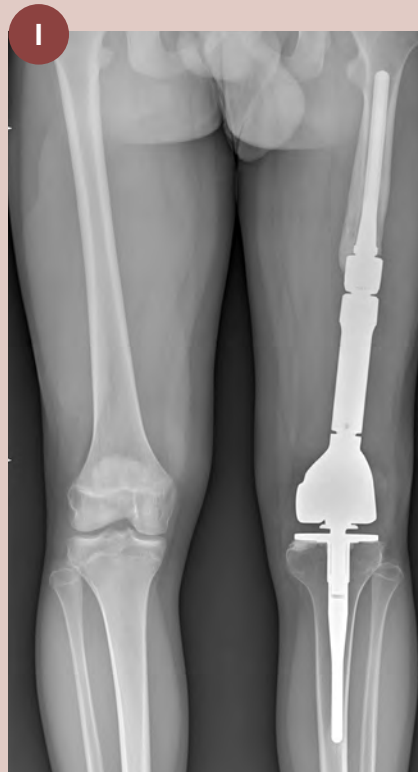
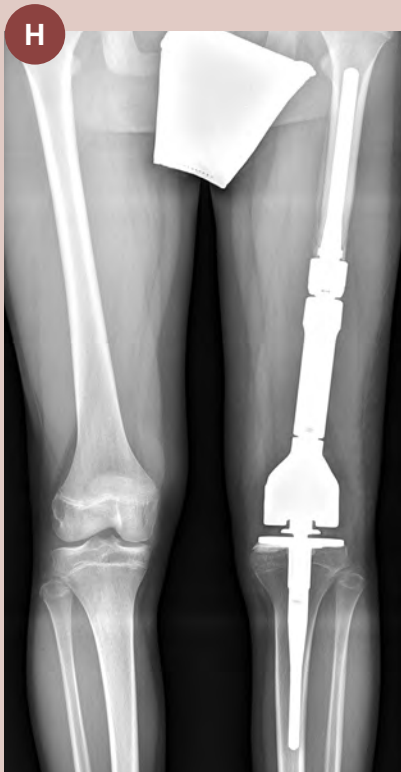
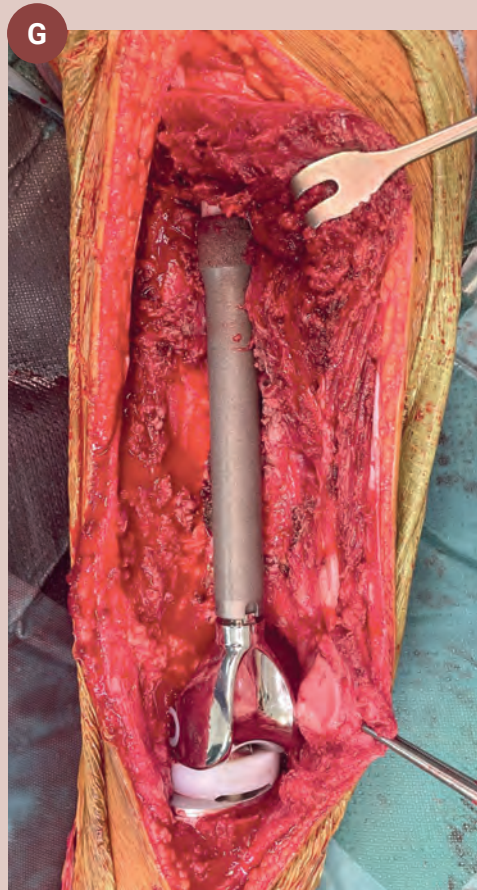
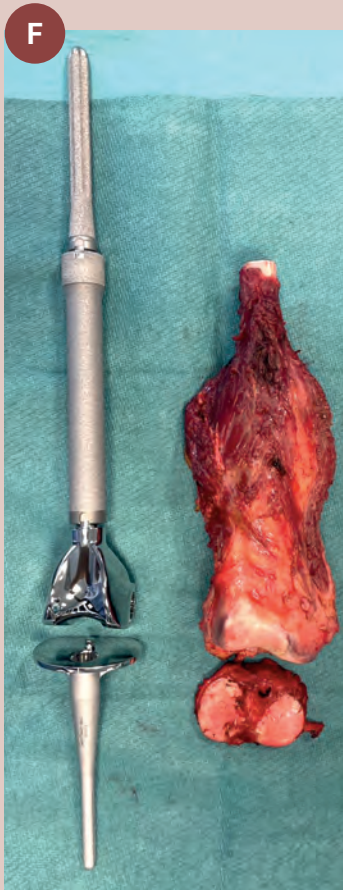
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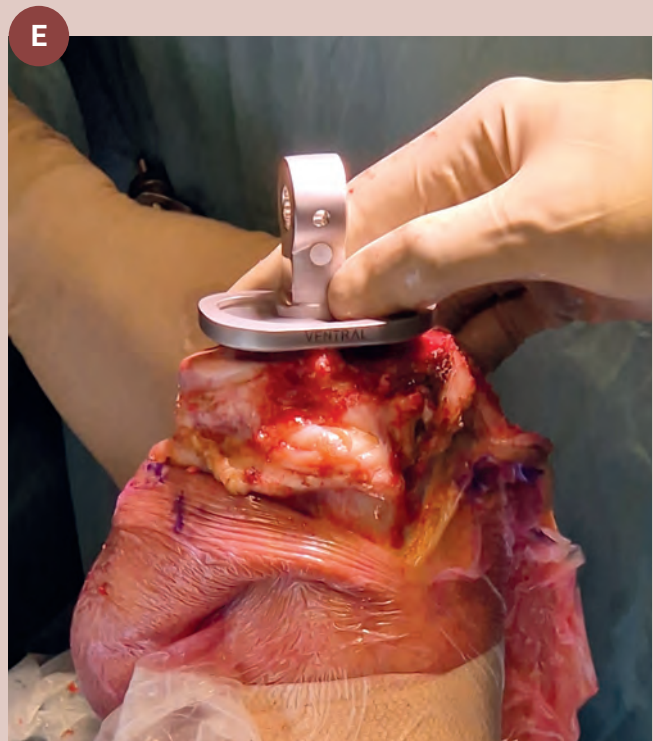
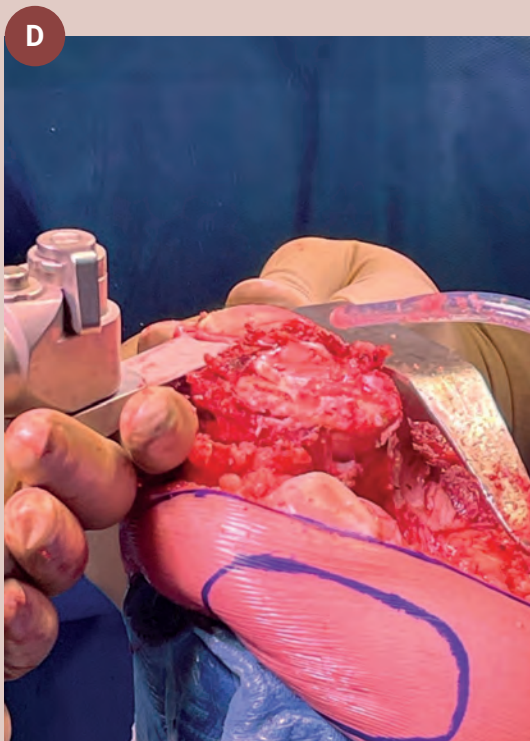
FIGURE 14 Schematic reconstruction of the distal femur with a modular prosthesis (A). →



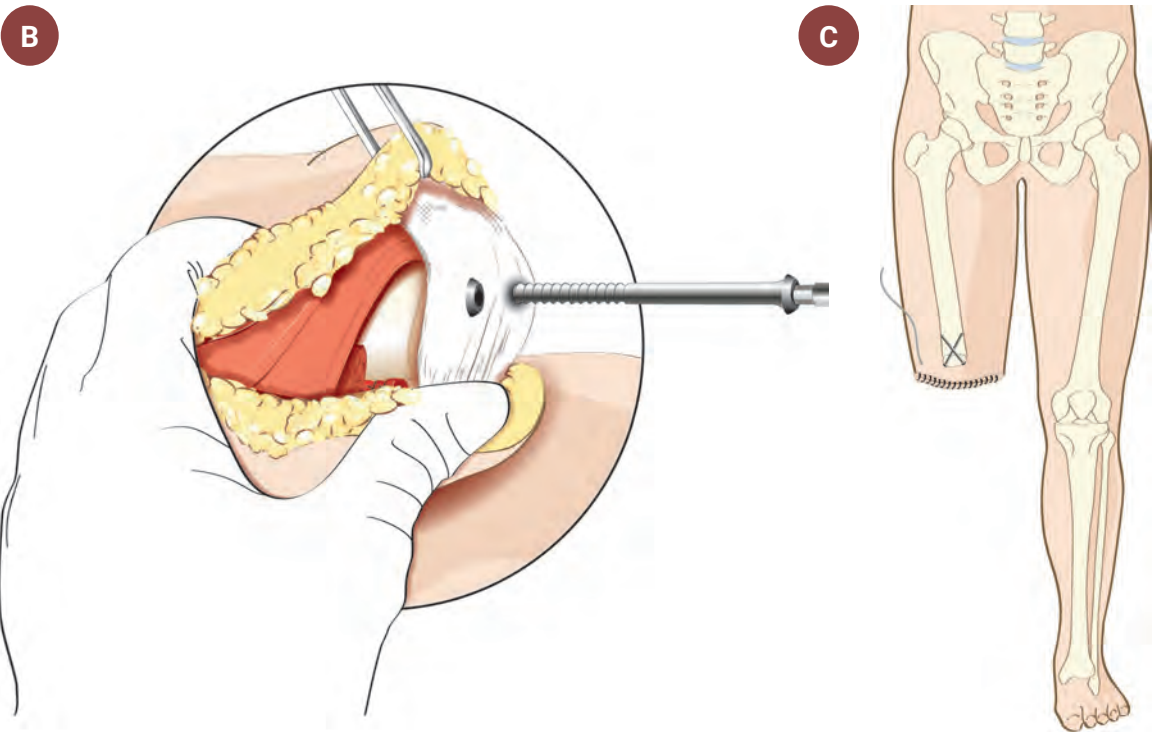
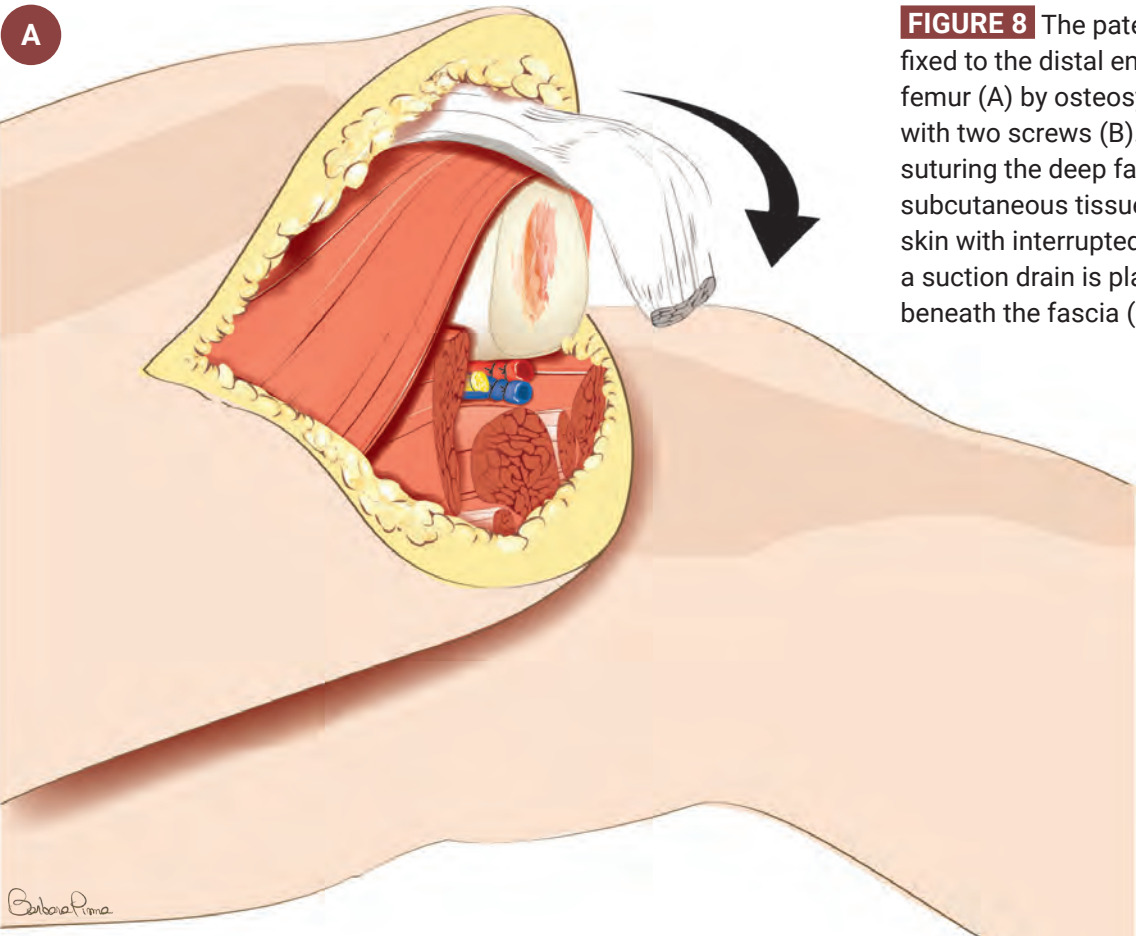
→ Anteroposterior (B) and lateral (C) radiographs, T1 coronal (D) and T2 sagittal (E) magnetic resonance imaging scans of the left distal femur in a 13-year-old boy with osteosarcoma. →



→ The patient underwent resection and reconstruction with a modular prosthesis (F). Intraoperative photographs show the reconstruction of the distal femur with a modular prosthesis (G). Anteroposterior radiographs show the reconstruction of the distal femur with modular prosthesis after the surgery (H) and at 2-year follow-up (I)



→ Anteroposterior radiograph (B) of the left distal femur in a 12-year-old boy with osteosarcoma. The patient underwent resection using a 3D printed cutting guide and reconstruction with a modular prosthesis (C). Intraoperative photographs show the cartilage surface resection of the proximal tibial epiphysis using a saw to allow the preservation of the proximal tibial physis (D) and the implantation of the tibial articular component with a press-fit tibial smooth stem (E). →



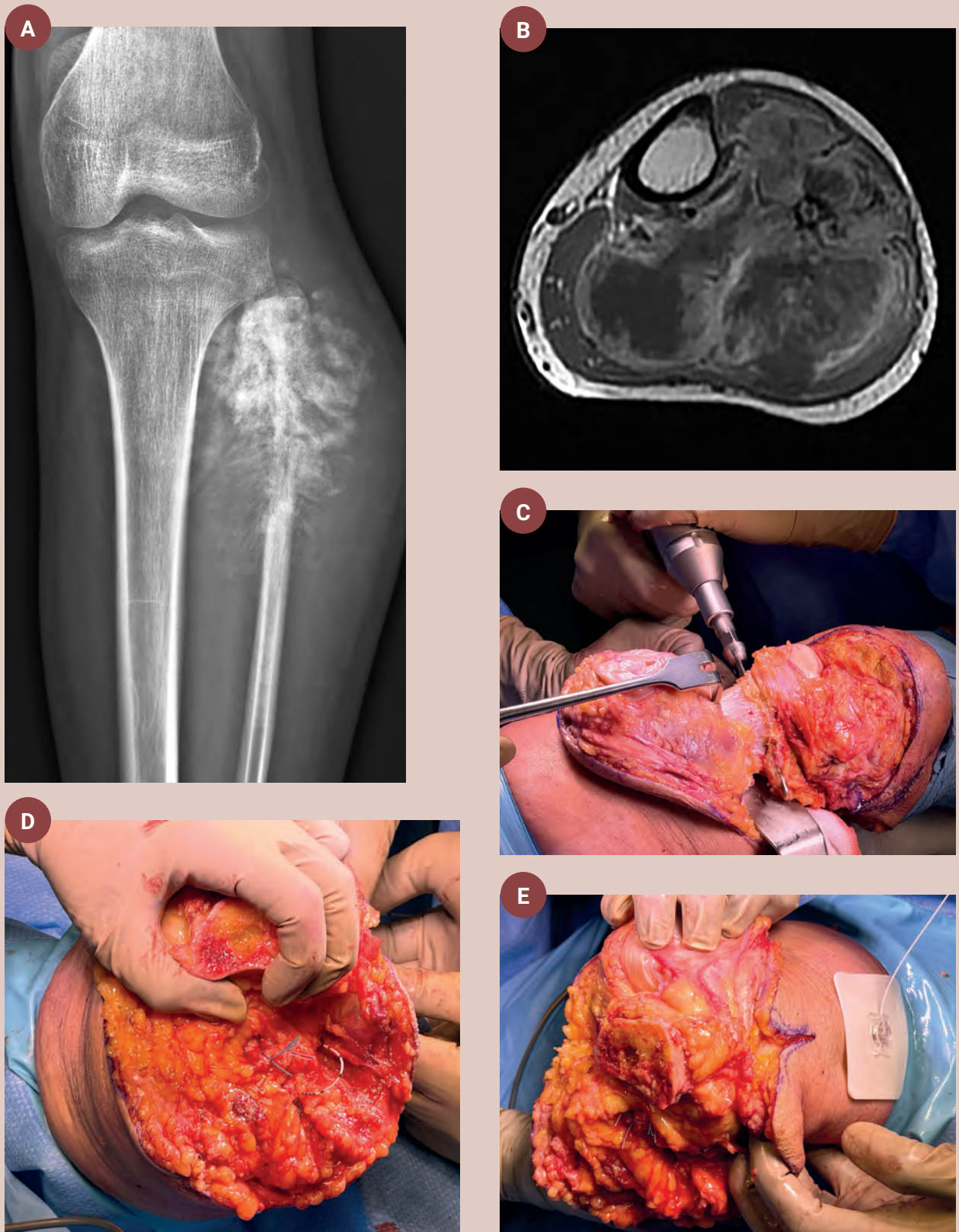


FIGURE 9 Anteroposterior radiograph (A) and T1 axial magnetic resonance imaging scan (B) of the proximal right fibula of an 18-year-old boy with osteosarcoma, treated with supracondylar amputation (C). Intraoperative photographs show the insertion of a small catheter into the transected sciatic nerve and its emergence from the lateral surface of the thigh via a percutaneous approach (D-E). →