

Bones:

There are two bones to divide and shape in the transtibial amputation, the tibia and the fibula. Occasionally, in certain cases, one should consider a modification to the standard transtibial amputation that involves bone reconstruction using one of several bone bridging techniques (provide link to bone bridging for TTA).

In the traditional amputation, as described by Burgess, the periosteum is divided at the level of bone transection, as far proximal resection or elevation of periosteum can decrease the vascular supply to the bone. Also, leaving extra periosteum distal to the bone cut can leave tissue that may calcify and develop new bone formation.

1. Tibia – the tibia is typically divided at the level of the anterior skin incision.
 1. The tibia is initially transected perpendicular to its long axis. Just before closure, the tibia is shaped with an anterior bevel to better accommodate prosthetic fitting.
 2. The tibia is triangular in shape, and the anterior corner can be quite sharp and lead to a painful bone prominence at the distal and anterior aspect of the amputation site.
 3. A tibial bevel is created to re-shape the tibia and remove the anterior 1/3 of the tibia. I prefer to cut from the transected surface of the bone, starting just anterior to the medullary canal and beveling up at 45° to a point approximately one cm proximal to the original cut. The edges of the tibia are then smoothed and shaped with either the saw blade, a rasp, or the rongeur.
2. Fibula– the fibula is typically divided between 1 and 2 cm proximal to the level of the divided tibia. It is typically cut perpendicular to its long axis. If the fibula is long or at the same level as the tibia, it frequently feels long to the patient and prosthetists and can create a bone prominence that can cause increased pressure, pain, and skin breakdown.
 1. There are exceptions to this traditional fibular bone cut level of 1 to 2 cm shorter than the tibia.
 2. First – if bone bridging techniques are used, most surgeons recommend having the tibia and fibula at either equal levels, or with the fibula a very slight amount shorter than the tibia (appr. .5 to 1cm shorter than the tibia).
 3. Second – in the ultra short transtibial amputation, the fibula is quite frequently removed by careful dissection on the fibular side of the proximal tibia/fibula joint to preserve the capsule of the joint in the tibial side. The fibular collateral ligament and the biceps femoralis tendon (often confluent) which attach to the proximal tip of the fibula are carefully dissected off the fibula and then reattached with suture to the tibia via the tibia/fibula joint capsule.
 4. In trauma situations, the surgeon has to be aware that the zone of injury may extend proximally and the syndesmotic membrane and even the proximal tibia/fibula joint may be disrupted. If this is the case, then the joint needs to be reduced and the fibula stabilized to the tibia proximally, distally, or in both locations.
 5. The fibula also needs to be shaped to smooth the anterior corner, the outer or lateral edge. Care also needs to be taken to look for a posterior spike of bone of periosteum that can lead to development of a small bone spur
3. Bone bridging reconstruction is not performed in the traditional reconstructive posterior flap transtibial amputation as described by Burgess.

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