Amputation is performed at the most distal point that will heal successfully. The site of amputation is determined by two factors: circulation in the part and functional usefulness (that is, it meets the requirements for the use of a prosthesis).

The extremity’s circulatory status is evaluated through physical examination and diagnostic studies. Muscle and skin perfusion is important for healing. Doppler flow studies with duplex ultrasound, segmental blood pressure determinations, and transcutaneous oximetry (TcPO$_2$), which provides local measurement of skin oxygen tension, are valuable diagnostic aids. Angiography is performed if revascularization is considered an option. The objective of surgery is to conserve as much extremity length as needed to preserve function and to achieve a good prosthetic fit. Ideally, knee and elbow joints are preserved. (See illustrations).

Most amputations involving extremities can be eventually fitted with a prosthesis. The amputation of toes and portions of the foot causes minor changes in gait and balance. A Syme amputation (modified ankle disarticulation amputation) is performed most frequently for extensive foot trauma. It produces a painless, durable extremity that can withstand full weight-bearing. Below-knee amputation (BKA) is preferred to above-knee amputation (AKA) because of the importance of the knee joint and the energy requirements for walking. Knee disarticulations are most successful with young, active patients who can develop precise control of the prosthesis. When AKAs are done, all possible length is preserved, muscles are stabilized and shaped, and hip contractures are prevented for maximum ambulatory potential. Most people who have a hip disarticulation amputation must rely on a wheelchair for mobility. Upper extremity
Amputations are performed with the goal of preserving the maximum functional length. The prosthesis is fitted early for maximum function.

A staged amputation may be used when gangrene and infection exist. Initially, a guillotine amputation (that is, nonclosed stump) is done to remove the necrotic and infected tissue. The wound is debrided and allowed to drain. Sepsis is treated with systemic antibiotics. In a few days, after the infection has been controlled and the patient’s condition has stabilized, a definitive amputation with skin closure is done.

Complications that may occur with amputation include hemorrhage, infection, skin breakdown, phantom limb pain, and joint contracture. Because major blood vessels have been severed, massive bleeding may occur. Infection is a risk with all surgical procedures but increases with contaminated wounds after traumatic amputation. Skin irritation caused by the prosthesis may result in skin breakdown.

Phantom limb pain is caused by the severing of peripheral nerves. Joint contracture is caused by positioning and a protective flexion withdrawal pattern associated with pain and muscle imbalance.

**Medical management**

The goal of treatment is amputation wound healing, resulting in a nontender residual limb (stump) with healthy skin for prosthesis use. Healing is enhanced by gentle handling of the residual limb, control of residual limb edema through rigid or soft compression dressings, and use of aseptic technique in wound care to avoid infection.

A closed rigid cast dressing is frequently used to provide uniform compression, to support soft tissues, to control pain, and to prevent joint contractures. Immediately after surgery, a sterile residual limb sock is applied to the residual limb. Felt pads are placed over pressure-sensitive areas. The residual limb is wrapped with elastic plaster-of-Paris bandages while firm, even pressure is maintained. Care is taken not to constrict circulation.

For the patient with a lower extremity amputation, the plaster cast may be equipped to attach a temporary prosthetic extension (pylon) and an artificial foot. This rigid dressing technique is used as a means of creating a socket for immediate postoperative prosthetic fitting. The length of the prosthesis is tailored to the individual patient. Typically, early minimal weight bearing on the residual limb with a rigid cast dressing and a pylon attached produces little discomfort. The cast is changed in 10 to 14 days. Elevated body temperature, severe pain, or a loose-fitting cast may necessitate earlier replacement.

A removable rigid dressing may be placed over a soft dressing to control edema, to prevent joint flexion contracture, and to protect the residual limb from unintentional trauma during transfer activities. This rigid dressing is removed several days after surgery for wound inspection and is then replaced to control edema. The dressing facilitates residual limb shaping.

A soft dressing with or without compression may be used if there’s significant wound drainage and you need to inspect the residual limb (stump) often. An immobilizing splint may be incorporated in the dressing. Stump (wound) hematomas are controlled with wound drainage devices to minimize infection.