

AMPUTATION

DR. N. K. BEHERA

Definition

Amputation is the intentional surgical removal of a limb or body part. It is performed to remove diseased tissue or relieve pain or due to Trauma.

Purpose

Arms, legs, hands, feet, fingers, and toes can be amputated. Most amputations involve small body parts such as a finger, rather than an entire limb. Amputation is performed for the following reasons:

- to remove tissue that no longer has an adequate blood supply
- to remove malignant tumors
- because of severe trauma to the body part

The blood supply to an extremity can be cut off because of injury to the blood vessel, hardening of the arteries, arterial embolism, impaired circulation as a complication of diabetes mellitus, repeated severe infection that leads to gangrene, severe frostbite, Raynaud's disease, or Buerger's disease.

Causes:

- Trauma
- Circulatory disorders
- Neoplasm
- Deformities
- Infection
- Athletic performance
- Legal punishment

Traumatic amputation

Traumatic amputation is the partial or total avulsion of a part of a body during a serious accident, like traffic, labor, or combat. Traumatic amputation of a human limb, either partial or total, creates the immediate danger of death from blood loss

Causes

- Amputations in traffic accidents (cars, motorcycles, bicycles, trains, etc.)

- Amputations in labor accidents (equipments, instruments, cylinders, chain saws, press machines, meat machines, wood machines, etc.)
- Amputations in agricultural accidents, with machines and mower equipments.
- Amputations from electric shock hazard
- Amputations from guns, weapons, and explosives, dynamite, bombs, fireworks, etc.
- Amputations from violent rupture of ship rope or industry wire rope.
- Amputations from ring traction (ring amputation, de-gloving injuries)
- Amputations from building doors and car doors.
- Amputations from other rare accidents.

Circulatory disorders

- Diabetic foot infection or gangrene (the most frequent reason for infection-related amputations)
- Sepsis with peripheral necrosis

Neoplasm

Transfemoral amputation due to liposarcoma

- Cancerous bone or soft tissue tumors (e.g. osteosarcoma, osteochondroma, fibrosarcoma, epithelioid sarcoma, Ewing's sarcoma, synovial sarcoma, sacrococcygealteratoma, liposarcoma)
- Melanoma

Deformities Deformities of digits and/or limbs (e.g., proximal femoral focal deficiency)

- Extra digits and/or limbs (e.g., polydactyly)

Infection

- Bone infection (osteomyelitis)
- diabetes
- frostbite

Athletic performance

- Sometimes professional athletes may choose to have a non-essential digit amputated to relieve chronic pain and impaired performance. Australian Rules footballer Daniel Chick elected to have his left ring finger amputated as chronic pain and injury was limiting his performance. Rugby union player JoneTawake also had a finger removed. National Football LeaguesafetyRonnie Lott had the tip of his little finger removed after it was damaged in the 1985 NFL season.

Legal punishment

- Amputation is used as a legal punishment in a number of countries, among them Iran, Yemen, Saudi Arabia, Sudan, and Islamic regions of Nigeria.

Types

Lower Limb Amputations

- amputation of digits
- partial foot amputation (Chopart, Lisfranc, Ray)
- ankle disarticulation (Syme, Pyrogoff)
- below-knee amputation or transtibial amputation
- knee disarticulation (Gritti or Gritti-Stokes)
- above-knee amputation (transfemoral)
- hip disarticulation
- hemipelvectomy/hindquarter amputation

Upper Limb Amputations

- Amputation of digits
- metacarpal amputation
- wrist disarticulation
- forearm amputation (transradial)
- elbow disarticulation
- above-elbow amputation (transhumeral)
- shoulder disarticulation and forequarter amputation
- Krukenberg procedure

Self-amputation

Even rarer are cases where self-amputation is performed for criminal or political purposes:

Precautions

Amputations cannot be performed on patients with uncontrolled diabetes mellitus, heart failure, or infection. Patients with blood clotting disorders are also not good candidates for amputation.

Surgical procedure

There are two types of surgical procedure for amputation. 1. Closed or flap amputation 2. Open or guillotine amputation. Amputations can be divided into minor and major. Minor amputations are amputations where only a toe or part of the foot is removed. A

ray amputation is a particular form of minor amputation where a toe and part of the corresponding metatarsal bone is removed. A forefoot amputation can sometimes be helpful in patients with more than one toe involved by gangrene. In this operation all of the toes and the ball of the foot are removed.

Major amputations are amputations where part of the leg is removed. These are usually below the knee or above the knee. Amputations through the knee joint or just above the knee joint (Gritti-Stokes amputation) can also sometimes be performed.

Amputations can be either planned or emergency procedures. Injury and arterial embolisms are the main reasons for emergency amputations. The goal of all amputations is twofold: to remove diseased tissue so that the wound will heal cleanly and to construct a stump that will allow the attachment of a prosthesis or artificial replacement part. The surgeon makes an incision around the part to be amputated. The part is removed, and the bone is smoothed. A flap is constructed of muscle, connective tissue, and skin to cover the raw end of the bone. The flap is closed over the bone with sutures (surgical stitches) that remain in place for about one month. Often, a rigid dressing or cast is applied that stays in place for about two weeks.

Complications

- Blood loss
- Infection
- Hematoma
- Necrosis
- Contractures
- Neuromas
- Phantom limb pain
- Psychological difficulties
- Insomnia
- Concentration impairment
- Trembling
- Speech impediments

Post operative care

After amputation, medication is prescribed for pain, and patients are treated with antibiotics to discourage infection. The stump is moved often to encourage good circulation. Physical therapy and rehabilitation are started as soon as possible usually within 48 hours. In addition, psychological counselling is an important part of rehabilitation. Phantom limb syndrome where they feel as if the amputated part is still in place. They may even feel pain in the limb that does not exist.

Management:

- Consultants in Rehabilitation Medicine.
- Prosthetists
- Physiotherapists
- Occupational therapists
- Clinical psychologist
- Counsellor
- Health care assistant
- Administrative/secretarial staff

after amputation varies greatly, depending on which body part is amputated and what amputation level is involved. In the early stages of rehabilitation following amputation, the most important considerations are to control pain and swelling and to avoid infection. Cold treatments, such as cold packs with or without compression, cause blood vessels to become smaller, helping to control excess bleeding and swelling of soft tissues. often combine various cold treatments with electrical stimulation.

Positioning of the stump after amputation is very important to prevent swelling & deformity. The tendency of patient is to keep limb in flexion. No pillow should be kept under the knee in case of BK amputee. Above knee amputee usually develops flexion and abduction deformity. Keep the part in elevation to prevent oedema. Posterior slab may be used in case of BK amputation, use stump board while sitting in wheelchair. One must lie in prone to prevent hip flexion deformity. Static stump exercises can be initiated once the drain is removed and dynamic stump exercises start after stitch removal. One can attend the gym for strengthening of upper limbs, opposite lower limb and trunk. Exercises to improve sitting balance, standing balance should be given. One must learn the Hopping. Rigid POP dressing, intermittent

pneumatic compression devices, immediate post operative prosthetic fitment, crape bandaging etc are used to prevent edema. Regarding lower extremity amputations, walking exercises (gait training) with the use of a temporary prosthesis are often indicated and started when appropriate. A temporary prosthesis allows a predetermined amount of weight to be placed on the involved limb and enables the individual to progress with exercises while the size of the residual limb stabilizes, allowing a permanent prosthesis to be fitted.

If extremity pain is severe and persists for extended periods of time, (TENS) may be helpful. Desensitization by tapping helps in relieve of neuroma pain. Stump is the sensory and motor end organ. It must have adequate strength sensation, mobility and free from complication for functional use of prosthesis.

Epidemiology

- In the, in 1999 there were 14,420 non-fatal traumatic amputations according to the. Of these, 4,435 occurred as a result of traffic and transportation accidents, and 9,985 were due to labour accidents. Of all traumatic amputations, the distribution percentage is 30.75% for traffic accidents, and 69.24% for labour accidents.
- The population of USA in 1999 was about 300,000,000, so, the conclusion is that there is one amputation per year per 20,804 persons. In the group of labour amputations, 53% occurred in labourers and technicians, 30% in production and service workers, 16% in silviculture and fishery workers.

Prevention

Amputations are usually traumatic experiences. They can reduce the quality of life for patients in addition to being expensive. Methods in preventing amputation depend on the problems that might cause amputations to be necessary. Chronic infections, often caused by diabetes or decubitus ulcers in bedridden patients, are common causes of infections that lead to gangrene, which would then necessitate amputation. There are two key challenges: first, many patients have impaired circulation in their extremities, and second, they have difficulty curing infections in limbs with poor vasculature (blood circulation). Crush injuries where there is extensive tissue damage and poor circulation also benefit from. The high level of oxygenation and revascularization speed up recovery times and prevent infections.

Prognosis

The individual may experience psychological trauma and emotional discomfort. The stump will remain an area of reduced mechanical stability. A large proportion of amputees (50–80%) experience the phenomenon of; they feel body parts that are no longer there. These limbs can

itch, ache, burn, feel tense, dry or wet, locked in or trapped or they can feel as if they are moving.

Due to technologic advances in prosthetics, many amputees live active lives with little restriction. Organizations such as the have been developed to give amputees the opportunity to be involved in athletics and adaptive sports such as amputee soccer



