

# **Plastic Surgery**

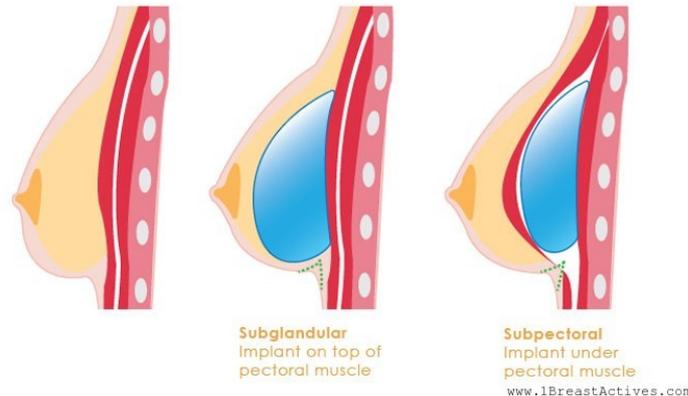
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# Plastic surgery

- is a surgical specialty involving the restoration, reconstruction, or alteration of the human body.
- **reconstructive surgery** - aims to reconstruct a part of the body or improve its functioning



- **cosmetic surgery** - aims at improving the appearance of it.



# Plastic surgery

## Sub-specialties

Aesthetic surgery

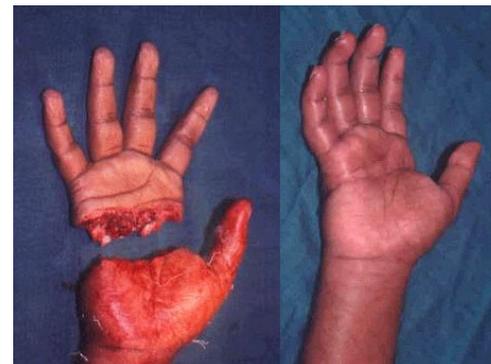
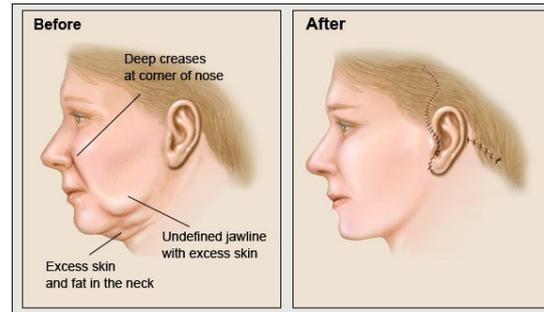
Burn surgery

Craniofacial surgery

Hand surgery

Microsurgery

Pediatric plastic surgery



# Plastic Surgery

- In the term "plastic surgery," the adjective *plastic* implies *sculpting* and/or *reshaping*, which is derived from the Greek πλαστική (τέχνη), *plastikē (tekhnē)*, "the art of modelling"
- This meaning in English is seen as early as 1598. The surgical definition of "plastic" first appeared in 1839, preceding the modern "engineering material made from petroleum" sense of plastic (coined by [Leo Baekeland](#) in 1909) by 70 years

# Plastic surgery

- **History**

- Treatments for the plastic repair of a broken nose are first mentioned in the **Edwin Smith Papyrus** (a transcription of an Ancient Egyptian medical text, one of the oldest known surgical treatises, dated to the Old Kingdom from 3000 to 2500 BC)
- Reconstructive surgery techniques were being carried out in India by 800 BC ( Sushruta)
- The medical works of both Sushruta and Charak, originally in Sanskrit, were translated into the Arabic language during the Abbasid Caliphate in 750 AD. The Arabic translations made their way into Europe via intermediaries.
- British physicians traveled to India to see rhinoplasties being performed by native methods



# Plastic Surgery

- **History**

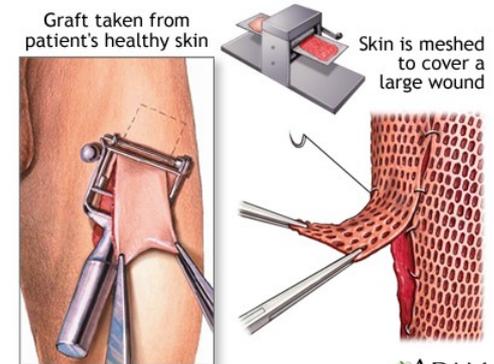
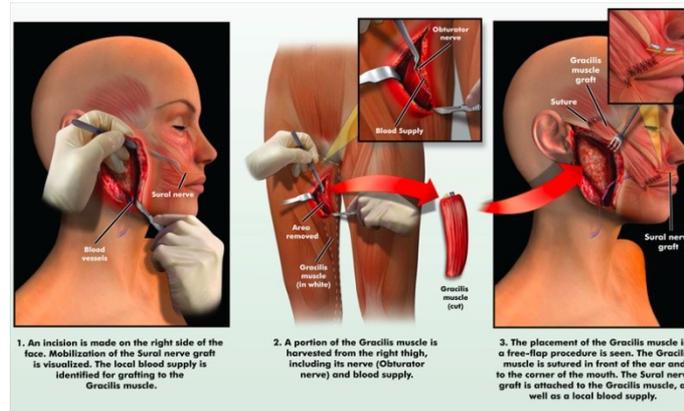
- Up until the use of anesthesia became established, surgeries involving healthy tissues involved great pain.
- In 1793, François Chopart performed operative procedure on a lip using a flap from the neck
- In 1896, James Israell, a urological surgeon from Germany, and in 1889 George Monks of the United States each described the successful use of heterogeneous free-bone grafting to reconstruct saddle nose defects
- WWI and WWII – huge progress in surgical procedures



# Plastic Surgery

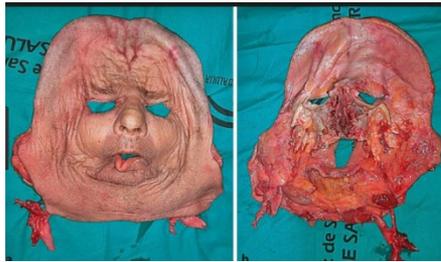
## Techniques and procedures

- In plastic surgery, the transfer of skin, fat, muscle or bone tissue (grafting) is a very common procedure. Skin, muscle, fat or bone grafts can be derived from the recipient or donors:
- **Autografts** are taken from the recipient. If absent or deficient of natural tissue, alternatives can be cultured sheets of epithelial cells *in vitro*



# Plastic Surgery

- Allografts are taken from a donor of the same species.

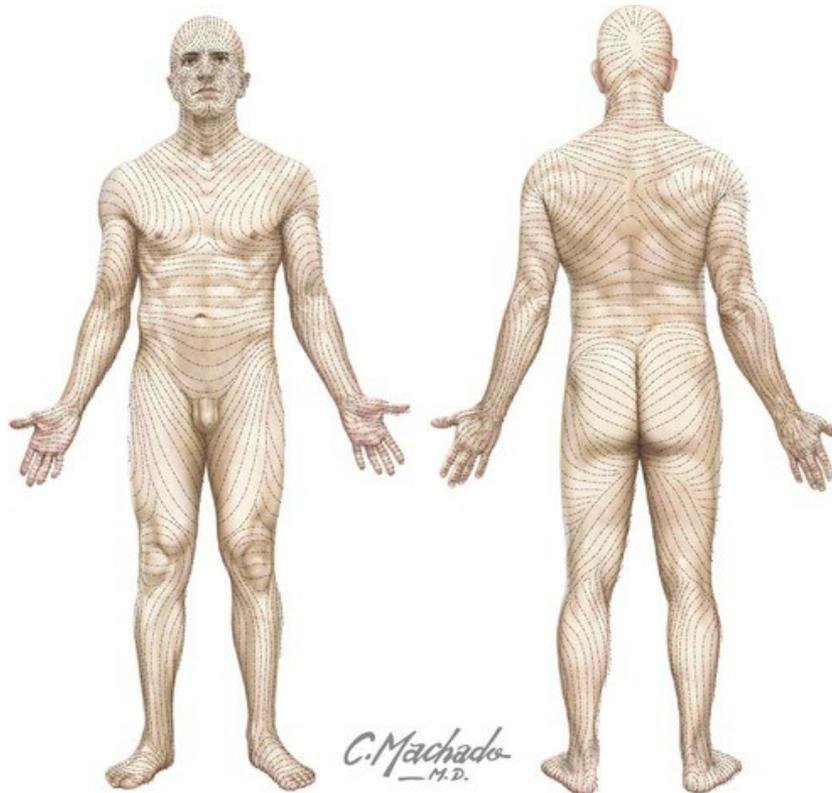


- Xenografts are taken from a donor of a different species



# Plastic Surgery

- Usually, good results would be expected from plastic surgery that emphasize careful planning of incisions so that they fall within the line of natural skin folds or lines, appropriate choice of [wound closure](#), use of best available suture materials, and early removal of exposed sutures so that the wound is held closed by buried sutures



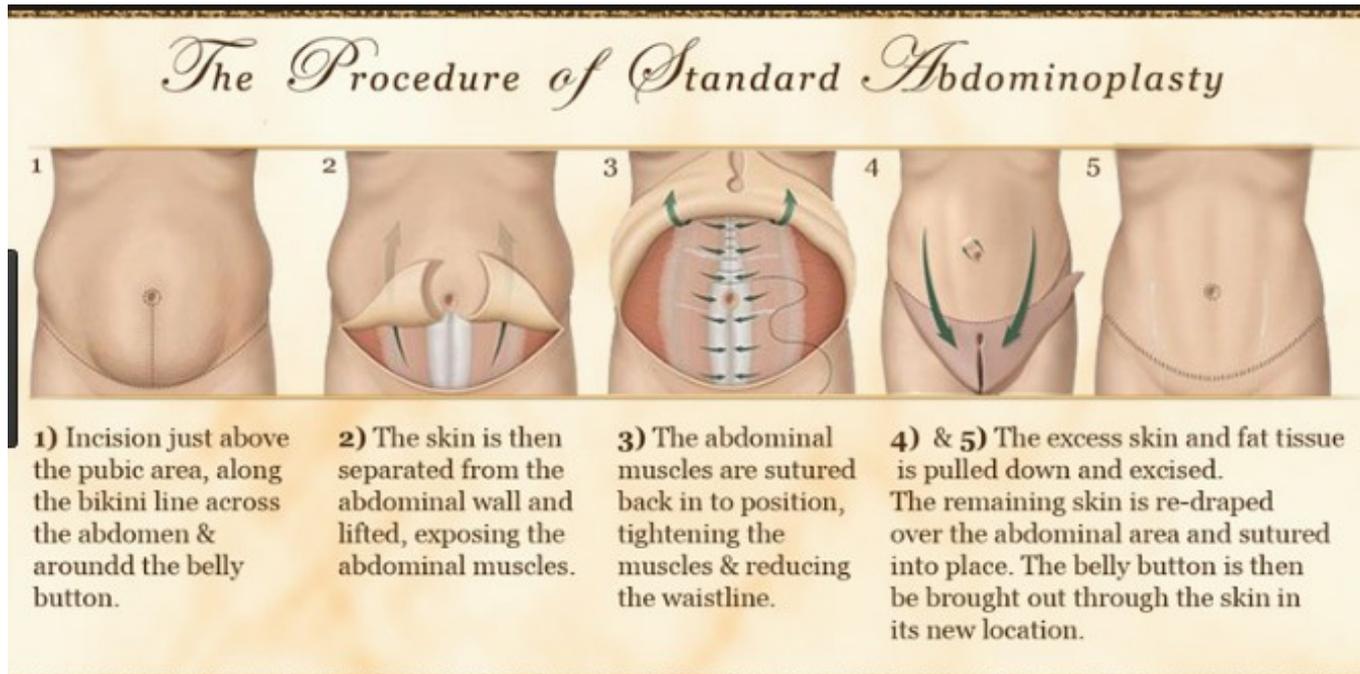
# Plastic Surgery

- **Aesthetic surgery**

- Aesthetic surgery is an essential component of plastic surgery and includes facial and body aesthetic surgery. Plastic surgeons use cosmetic surgical principles in all reconstructive surgical procedures as well as isolated operations to improve overall appearance.
- Cosmetic surgery is an optional or elective surgery that is performed on normal parts of the body with the only purpose of improving a person's appearance and/or removing signs of aging
- In 2014, nearly 16 million cosmetic procedures were performed in the United States alone. [\[21\]](#) The number of cosmetic procedures performed in the United States has almost doubled since the start of the century

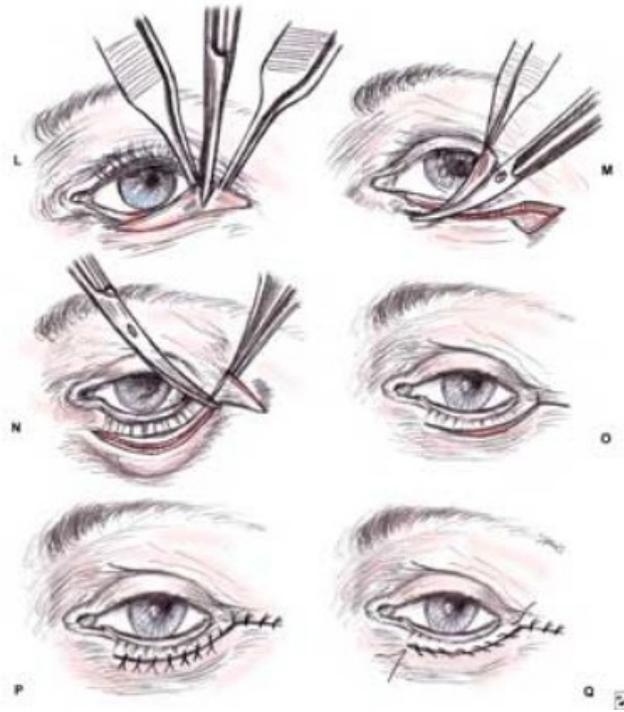
# Plastic Surgery

- Abdominoplasty ("tummy tuck"): reshaping and firming of the abdomenn



# Plastic Surgery

- Blepharoplasty ("eyelid surgery"): reshaping of upper/ lower eyelids



# Plastic Surgery

- **Mammoplasty:**
- **Breast augmentations**("breast implant" or "boob job"): augmentation of the breasts by means of fat grafting, saline, or silicone gel prosthetics, which was initially performed to women with micromastia
- Reduction mammoplasty ("breast reduction"): removal of skin and glandular tissue, which is done to reduce back and shoulder pain in women with gigantomastia and for men with gynecomastia
- Mastopexy ("breast lift"): Lifting or reshaping of breasts to make them less saggy, often after weight loss (after a pregnancy, for example). It involves removal of breast skin as opposed to glandular tissue

# Plastic Surgery

## Methods of Breast Reduction Surgery



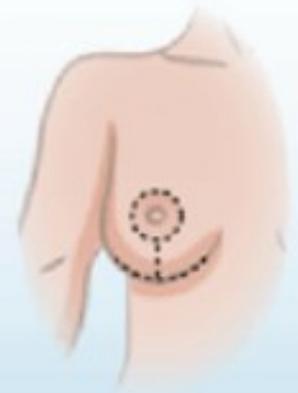
**1.** Incisions outline the area of the excess tissue to be removed.



**2.** Excess skin and fat are removed. The nipple and areola are then moved to a new and higher position.

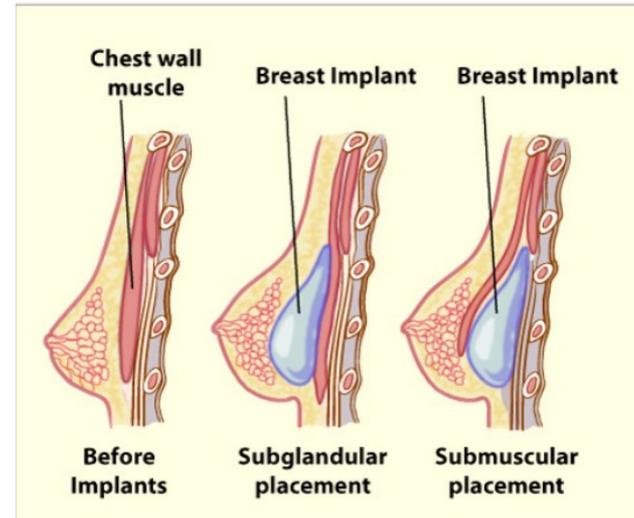
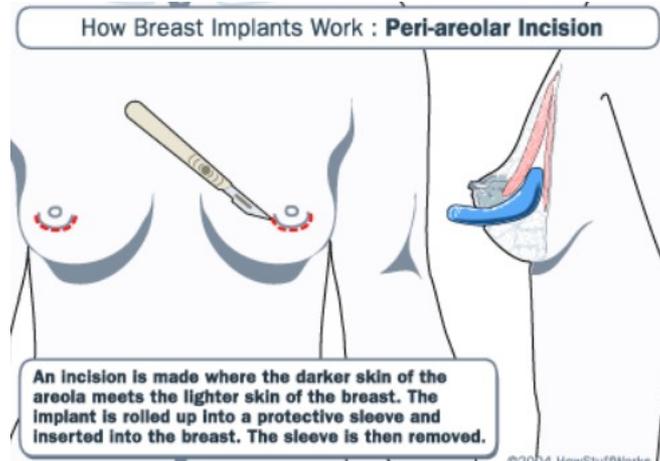
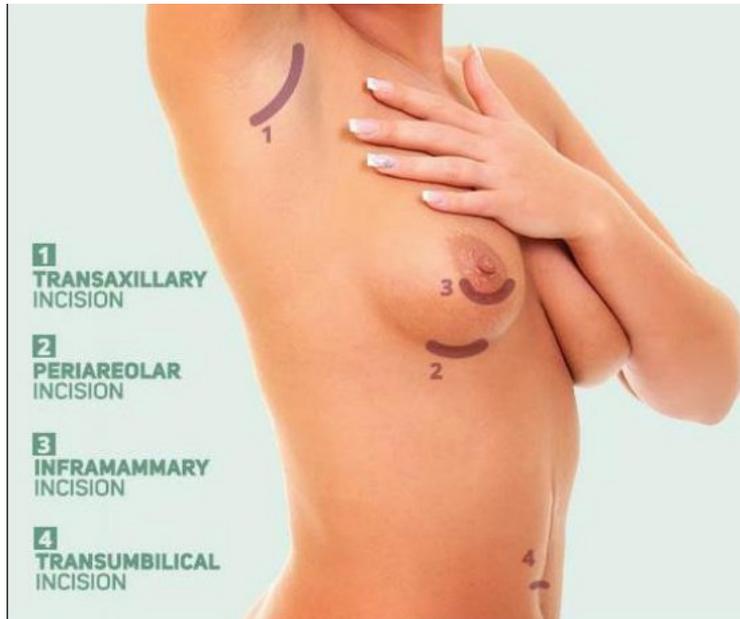


**3.** The incisions are brought together to reshape the now smaller breast.



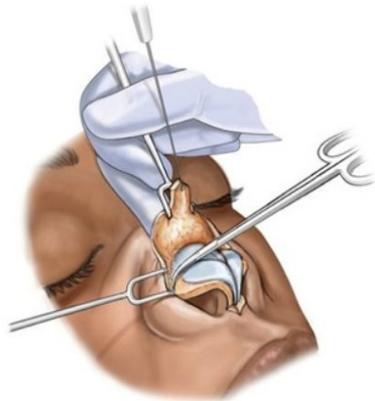
**4.** Sutures are placed around the areola and can extend downwards and horizontally under the breast crease.

# Plastic Surgery



# Plastic Surgery

- [Buttock augmentation](#) ("butt implant"): enhancement of the [buttocks](#) using silicone implants or fat grafting ("Brazilian butt lift") and transfer from other areas of the body
  - [Buttock lift](#): lifting, and tightening of the buttocks by excision of excess skin
- [Cryolipolysis](#): refers to a medical device used to destroy fat cells. Its principle relies on controlled cooling for non-invasive local reduction of fat deposits to reshape body contours.
- [Cryoneuromodulation](#): Treatment of superficial and subcutaneous tissue structures using gaseous nitrous oxide, including temporary wrinkle reduction, temporary pain reduction, treatment of dermatologic conditions, and focal cryo-treatment of tissue
- Calf Augmentation: done by silicone implants or fat transfer to add bulk to calf muscles
- [Labiaplasty](#): surgical reduction and reshaping of the [labia](#)
- [Lip enhancement](#): surgical improvement of lips' fullness through enlargement
- [Rhinoplasty](#) ("nose job"): reshaping of the [nose](#)

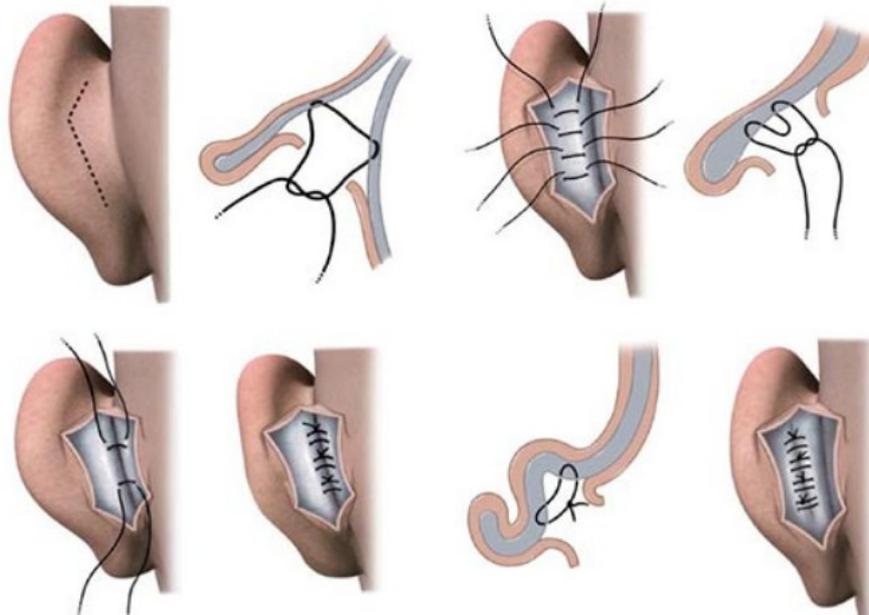


# Plastic Surgery

- [Otoplasty](#) ("ear surgery"/"ear pinning"): reshaping of the [ear](#), most often done by pinning the protruding ear closer to the head.
- [Rhytidectomy](#) ("face lift"): removal of wrinkles and signs of aging from the face
  - Neck lift: tightening of lax tissues in the neck. This procedure is often combined with a facelift for lower face rejuvenation.
  - [Browplasty](#) ("brow lift" or "forehead lift"): elevates eyebrows, smooths forehead skin
  - Midface lift ("cheek lift"): tightening of the cheeks
- [Genioplasty](#) ("chin implant"): augmentation of the [chin](#) with an implant, usually silicone, by [sliding genioplasty](#) of the jawbone or by suture of the soft tissue
- [Cheek augmentation](#) ("cheek implant"): implants to the cheek
- [Orthognathic Surgery](#): manipulation of the facial bones through controlled fracturing
- Fillers injections: [collagen](#), [fat](#), and other tissue filler injections, such as [hyaluronic acid](#)
- [Brachioplasty](#) ("Arm lift"): reducing excess skin and fat between the underarm and the elbow<sup>[26]</sup>
- [Laser Skin Rejuvenation](#) or [laser resurfacing](#): the lessening of depth in pores of the face
- [Liposuction](#) ("suction lipectomy"): removal of fat deposits by traditional suction technique or ultrasonic energy to aid fat removal
- [Zygoma reduction plasty](#): reshaping the face

# Plastic Surgery

- With one of the more common techniques, the surgeon makes a small incision in the back of the ear to expose the ear cartilage. He or she will then sculpt the cartilage and bend it back toward the head. Non-removable stitches may be used to help maintain the new shape. Occasionally, the surgeon will remove a larger piece of cartilage to provide a more natural-looking fold when the surgery is complete. Another technique involves a similar incision in the back of the ear. Skin is removed and stitches are used to fold the cartilage back on itself to reshape the ear without removing cartilage.

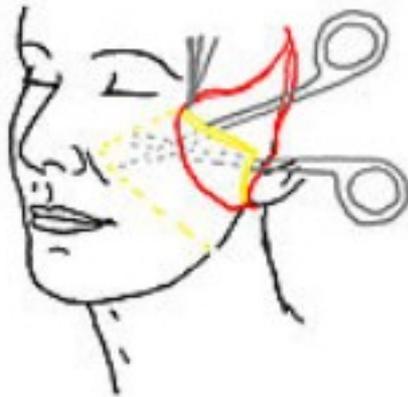


# Plastic Surgery

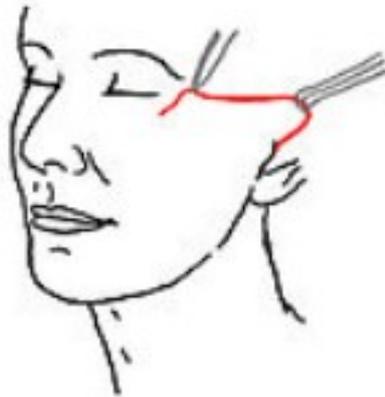
- Face lifting

## SMAS Technique

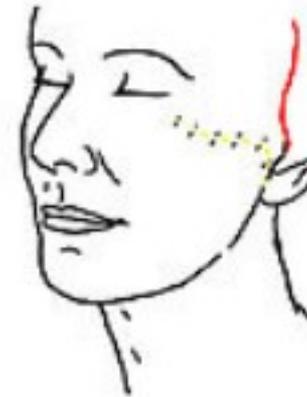
**Mobilisation**



**Reposition**



**Fixation**



# Plastic Surgery

- A flap is a unit of tissue that is transferred from one site (donor site) to another (recipient site) while maintaining its own blood supply.
- Flaps come in many different shapes and forms. They range from simple advancements of skin to composites of many different types of tissue. These composites need not consist only of soft tissue. They may include skin, muscle, bone, fat, or fascia.

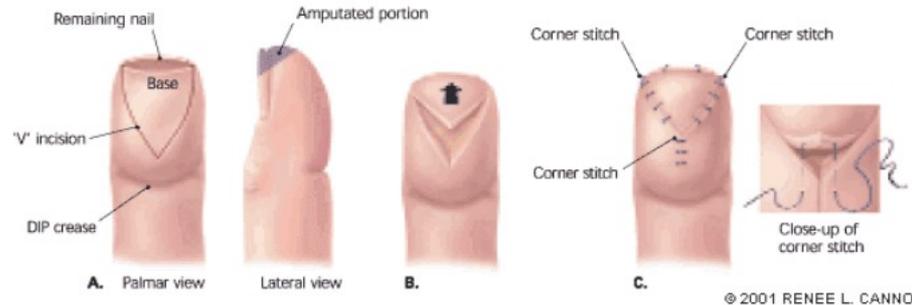
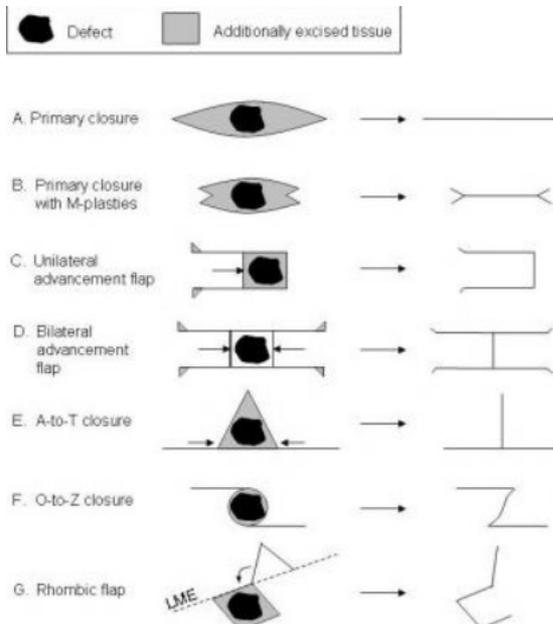
# Plastic Surgery

- **type of blood supply**
  - Random (no named blood vessel)
  - Axial (named blood vessel)
- **type of tissue to be transferred**
  - Skin, muscle, bone, fascia, visceral, composite
- **location of donor site**
  - Tissue may be transferred from an area adjacent to the defect. This is known as a *local* flap.
  - Tissue transferred from a noncontiguous anatomic site (ie, from a different part of the body) is referred to as a *distant* flap.
  - Distant flaps may be either *pedicled* (transferred while still attached to their original blood supply) or *free*.

# Plastic Surgery

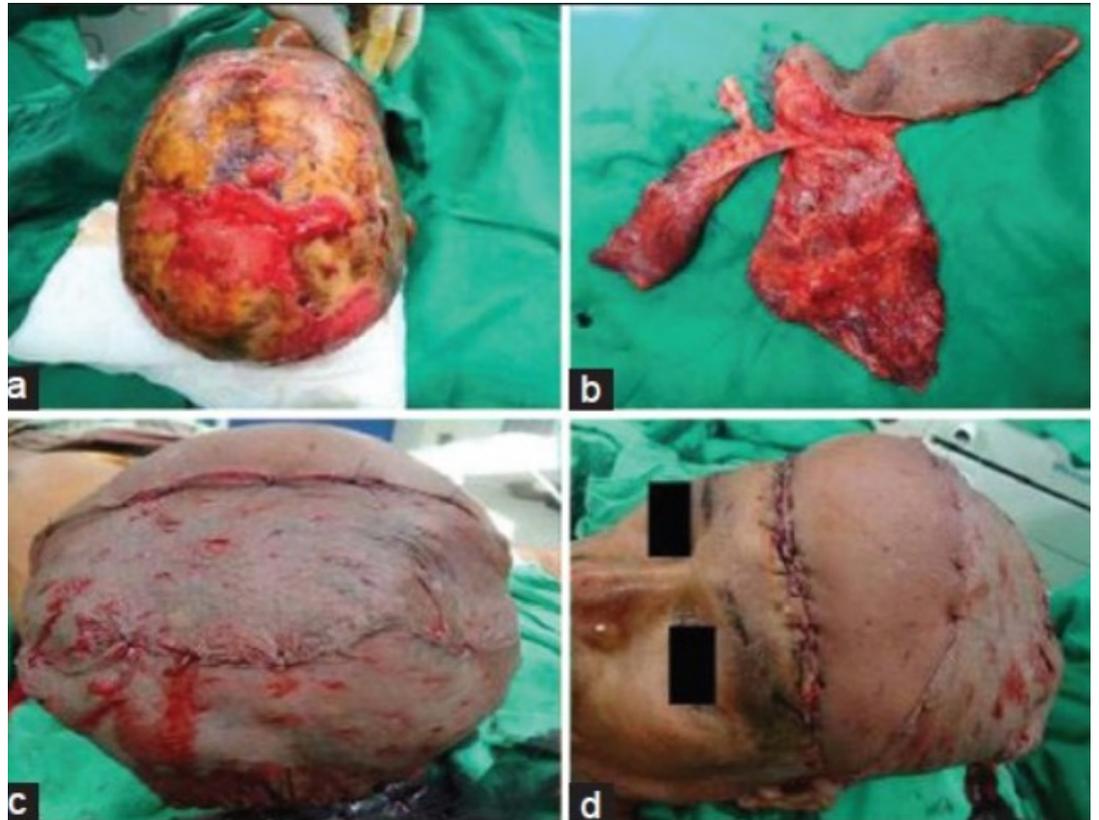
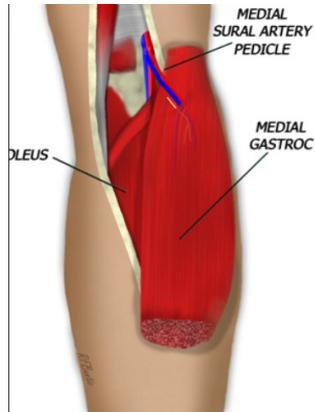
- Local flaps

- It may be described based on its geometric design, be advanced, or both. Pivotal (geometric) flaps include rotation, transposition, and interpolation. Advancement flaps include single pedicle, bipedicle, and V-Y flaps.



# Plastic Surgery

- Distant flap



# Plastic Surgery

Name	Tissue Type	Complexity	Use
Abbe flap	Cutaneous	Transposition	Full-thickness lip defects
Anterolateral thigh (ALT) flap	Musculocutaneous	Free flap/Interpolation	Open tibial fractures / Esophageal reconstruction <sup>[1]</sup>
Becker flap	Fasciocutaneous	Interpolation	Hand reconstruction
Deep inferior epigastric perforator (DIEP) flap <sup>[2]</sup>	Cutaneous	Free flap	Free flap breast reconstruction
Dufourmental flap	Cutaneous	Rotation/Transposition	
Estlander flap	Cutaneous	Transposition	Labial commissure of mouth defects
Fibular flap	Osteocutaneous	Free flap	Mandible reconstruction
Gastrocnemius flap	Muscle	Interpolation	Open tibial fractures
Hatchett design flap	Cutaneous	Advancement	Forehead excisions/defects
Inferior gluteal artery perforator (IGAP) flap <sup>[3]</sup>	Cutaneous	Free flap	Free flap breast reconstruction
Karapandzic flap	Cutaneous	Rotation	Full-thickness lip defects
Latissimus flap	Musculocutaneous	Interpolation	Breast reconstruction
McGregor flap	Cutaneous	Rotation	Full-thickness lip defects

# Plastic Surgery

Posterior interosseous artery (PIA) flap	Fasciocutaneous	Interpolation	Hand reconstruction
Radial forearm/Chinese flap	Fasciocutaneous	Interpolation	Hand reconstruction
Reverse sural artery flap	Muscle	Interpolation	Calcaneal pressure sores
Rhombic/Limberg flap	Cutaneous	Rotation/Transposition	
Scapular flap	Osteocutaneous	Free flap	Mandible reconstruction
Shutter design flap	Cutaneous	Advancement	Forehead excisions
Superficial inferior epigastric artery (SIEA) flap	Cutaneous	Free flap	Free flap breast reconstruction
Superior gluteal artery perforator (SGAP) flap	Cutaneous	Free flap	Free flap breast reconstruction
Transverse rectus abdominis myocutaneous (TRAM) flap <sup>[4]</sup>	Musculocutaneous	Free flap	Free flap breast reconstruction
Transverse upper gracilis (TUG) flap	Musculocutaneous	Free flap	Free flap breast reconstruction
V-Y advancement flap	Cutaneous	Advancement	Rhinoplasty
Worthen forehead flap	Cutaneous	Rotation	Forehead excisions/defects
Z-plasty	Cutaneous	Transposition	scars

# Plastic Surgery

- **Pediatric plastic surgery**
- **Pediatric plastic surgery** is plastic surgery performed on children. Its procedures are most often conducted for reconstructive or cosmetic purposes. In children, this line is often blurred, as many congenital deformities impair physical function as well as aesthetics.
- Children make up roughly 3% of all plastic surgery procedures, and the majority of these procedures correct a congenital deformity.

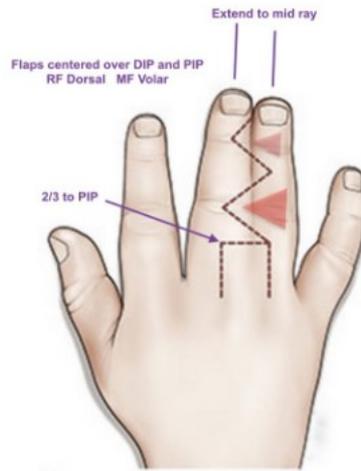
# Plastic Surgery

- [Cleft lip](#) and/or palate - Babies born with the defect will have opening in the vicinity of the upper lip. The size of the opening reaches anywhere from a small notch to near towards the base of the nostril, in which it would either involve one or both sides of the lip.



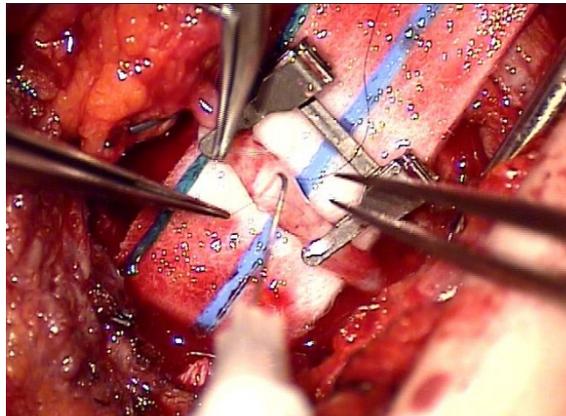
# Plastic Surgery

- [Syndactyly](#) / [Polydactyly](#) – The most common of congenital malformations affecting limbs. It is believed that Syndactyly, exhibits in variation, in which digits can be fused either partially or across its entire length, or as simple as only being connected superficially by skin. It affects 1 in every 2,000 – 3,000 live births. Polydactyly is the presence of extra fingers or toes at birth, and is believed to affect somewhere around 2 out of every 1,000 live births.



# Plastic Surgery

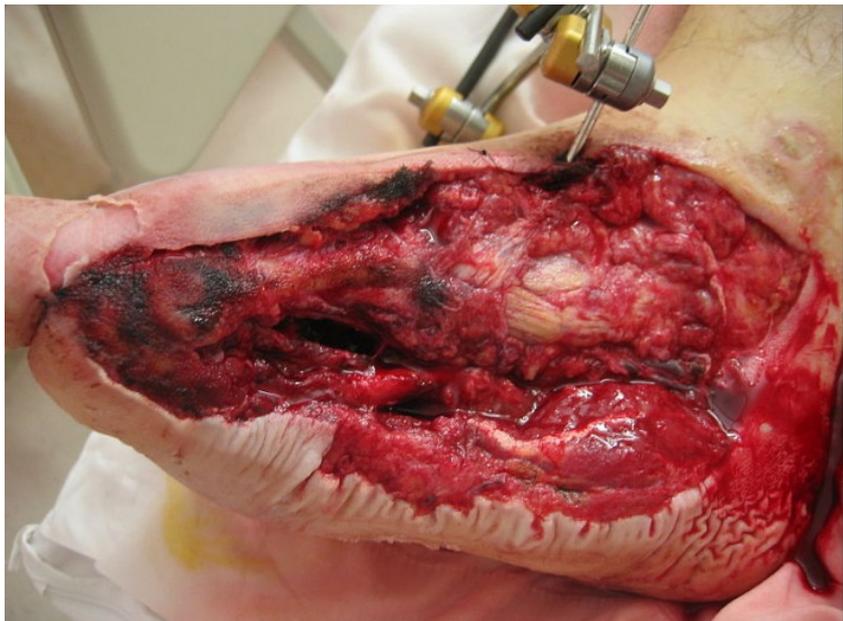
- **Microsurgery** is a general term for surgery requiring an operating microscope. The most obvious developments have been procedures developed to allow anastomosis of successively smaller blood vessels and nerves (typically 1 mm in diameter) which have allowed transfer of tissue from one part of the body to another and re-attachment of severed parts. Microsurgical techniques are utilized by many specialties today
- Microsurgery is generally concerned with the reconstruction of missing tissues by transferring a piece of tissue to the reconstruction site and reconnecting blood vessels.



# Plastic Surgery

- Free tissue transfer
- Free tissue transfer is a surgical reconstructive procedure using microsurgery. A region of "donor" tissue is selected that can be isolated on a feeding artery and vein; this tissue is usually a composite of several tissue types (e.g., skin, muscle, fat, bone). Common donor regions include the rectus abdominis muscle, latissimus dorsi muscle, fibula, radial forearm bone and skin, and lateral arm skin. The composite tissue is transferred (moved as a [free flap](#) of tissue) to the region on the patient requiring reconstruction (e.g., mandible after oral cancer resection, breast after cancer resection, traumatic tissue loss, congenital tissue absence). The vessels that supply the free flap are anastomosed with microsurgery to matching vessels (artery and vein) in the reconstructive site.

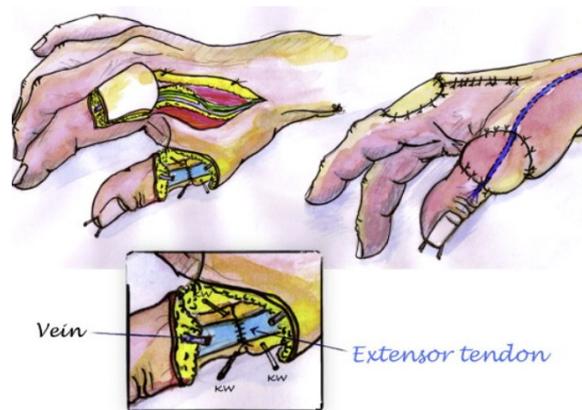
# Plastic Surgery



# Plastic Surgery

- **Replantation**

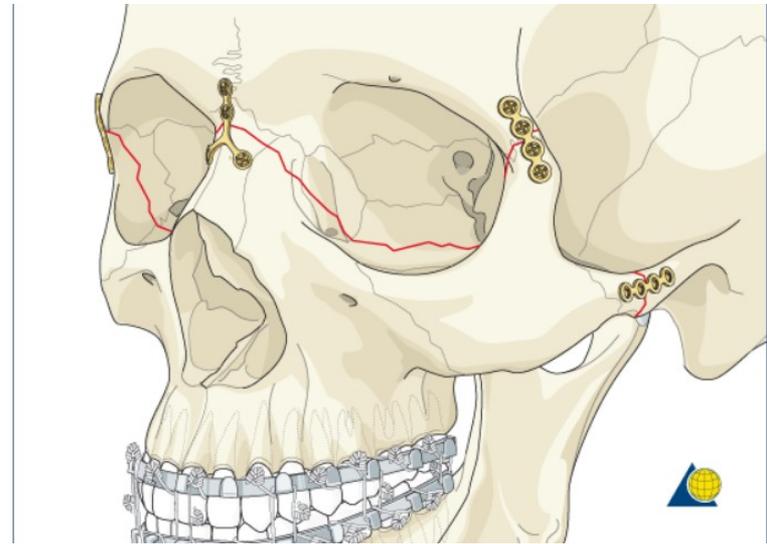
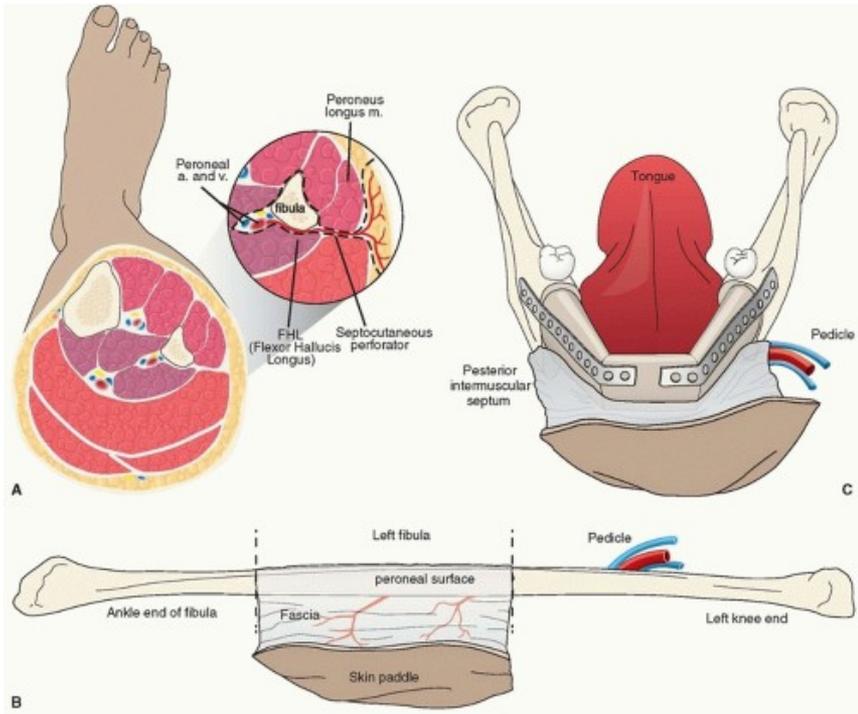
- Replantation is the reattachment of a completely detached body part. Fingers and thumbs are the most common but the ear, scalp, nose, face, arm and penis have all been replanted. Generally replantation involves restoring blood flow through arteries and veins, restoring the bony skeleton and connecting tendons and nerves as required.



# Plastic Surgery

- **Craniofacial surgery**
- Craniofacial surgery is divided into pediatric and adult craniofacial surgery. Pediatric craniofacial surgery mostly revolves around the treatment of congenital anomalies of the craniofacial skeleton and soft tissues, such as cleft lip and palate, craniosynostosis, and pediatric fractures. Adult craniofacial surgery deals mostly with fractures and secondary surgeries (such as orbital reconstruction) along with orthognathic surgery. Craniofacial surgery is an important part of all plastic surgery training programs, further training and subspecialisation is obtained via a craniofacial fellowship. Craniofacial surgery is also practiced by Maxillo-Facial surgeons.

# Plastic Surgery



# Plastic Surgery

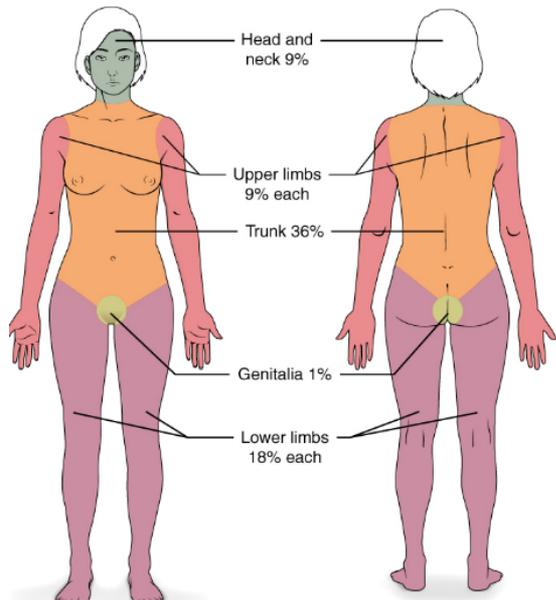
- Burn surgery
- A **burn** is a type of injury to skin, or other tissues, caused by heat, cold, electricity, chemicals, friction, or radiation. Most burns are due to heat from hot liquids, solids, or fire

# Plastic Surgery

Type <sup>[1]</sup>	Layers involved	Appearance	Texture	Sensation	Healing Time	Prognosis	Example
Superficial (1st-degree)	Epidermis <sup>[7]</sup>	Red without blisters <sup>[1]</sup>	Dry	Painful <sup>[1]</sup>	5–10 days <sup>[1][18]</sup>	Heals well; <sup>[1]</sup> Repeated sunburns increase the risk of skin cancer later in life <sup>[19]</sup>	
Superficial partial thickness (2nd-degree)	Extends into superficial (papillary) dermis <sup>[1]</sup>	Redness with clear blister. <sup>[1]</sup> Blanches with pressure. <sup>[1]</sup>	Moist <sup>[1]</sup>	Very painful <sup>[1]</sup>	less than 2–3 weeks <sup>[1][13]</sup>	Local infection/cellulitis but no scarring typically <sup>[13]</sup>	
Deep partial thickness (2nd-degree)	Extends into deep (reticular) dermis <sup>[1]</sup>	Yellow or white. Less blanching. May be blistering. <sup>[1]</sup>	Fairly dry <sup>[13]</sup>	Pressure and discomfort <sup>[13]</sup>	3–8 weeks <sup>[1]</sup>	Scarring, contractures (may require excision and skin grafting) <sup>[13]</sup>	

# Plastic Surgery

Full thickness (3rd-degree)	Extends through entire dermis <sup>[1]</sup>	Stiff and white/brown <sup>[1]</sup> No blanching <sup>[13]</sup>	Leathery <sup>[1]</sup>	Painless <sup>[1]</sup>	Prolonged (months) and incomplete <sup>[1]</sup>	Scarring, contractures, amputation (early excision recommended) <sup>[13]</sup>	
4th-degree	Extends through entire skin, and into underlying fat, muscle and bone <sup>[1]</sup>	Black; charred with eschar	Dry	Painless	Requires excision <sup>[1]</sup>	Amputation, significant functional impairment, and, in some cases, death. <sup>[1]</sup>	



American Burn Association severity classification<sup>[42]</sup>

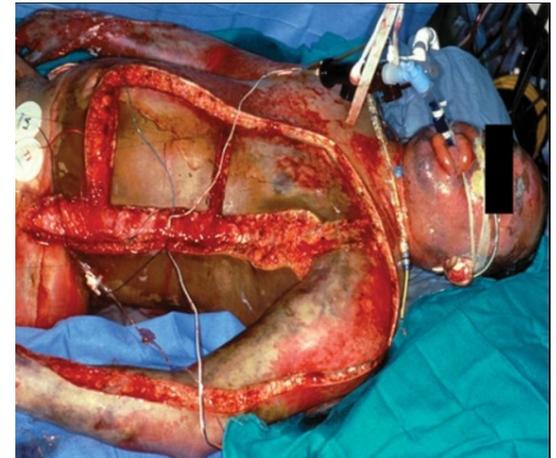
Minor	Moderate	Major
Adult <10% TBSA	Adult 10–20% TBSA	Adult >20% TBSA
Young or old < 5% TBSA	Young or old 5–10% TBSA	Young or old >10% TBSA
<2% full thickness burn	2–5% full thickness burn	>5% full thickness burn
	High voltage injury	High voltage burn
	Possible inhalation injury	Known inhalation injury
	Circumferential burn	Significant burn to face, joints, hands or feet
	Other health problems	Associated injuries

# Plastic Surgery

- Treatment
- Resuscitation begins with the assessment and stabilization of the person's airway, breathing and circulation.
- If inhalation injury is suspected, early intubation may be required.<sup>1</sup>
- This is followed by care of the burn wound itself.
- People with extensive burns may be wrapped in clean sheets until they arrive at a hospital.<sup>1</sup>
- As burn wounds are prone to infection, a tetanus booster shot should be given
- Intravenous fluid
- Wound care (cooling, cleaning, removal of dead tissues, dressing, NPWT)
- Medications (pain management, benzodiazepins, antibiotics)
- Surgery

# Plastic surgery

- Surgery
- Escharotomy, fasciotomy, skin grafting



# Plastic Surgery

- Hand surgery is concerned with acute injuries and chronic diseases of the hand and wrist, correction of congenital malformations of the upper extremities, and peripheral nerve problems (such as brachial plexus injuries or carpal tunnel syndrome). Hand surgery is an important part of training in plastic surgery, as well as microsurgery, which is necessary to replant an amputated extremity. The hand surgery field is also practiced by [orthopedic surgeons](#) and [general surgeons](#).