Lecture one
Plastic and reconstructive surgery

General principles

The plastic surgery is correction of deformities due to congenital, post-traumatic or post-operative, to restore and optimize function and shape. The result depend on tissues loss, rapidity of wound healing and scar formation.

Anatomy of skin

Skin is the largest organ in the body ranging from 0.22 m² in newborn to more than 2 m² in the adult.

Functions of skin

1. It provides a barrier to invasion by microorganisms.
2. Regulates heat with the environment.
3. Vitamin D synthesis by sunlight.

Layers of skin

It consists of epidermis and dermis.

1. Epidermis: is the outer layer composed of keratinized stratified squamous epithelium, it divided into:
   - *Stratum germinativum*: which rests on dermis and generates the cells of the stratum corneum.
   - *Stratum corneum*: This is the desquamating dead superficial layer.

2. Dermis: which is 20 times thicker than epidermis, it consists of non-cellular connective tissues (collagen and elastic fibers) and ground substances. It divided into:
   - *Papillary dermis* (Upper & thin).
   - *Reticular dermis* (Lower & thick) which extends from papillary dermis to subcutaneous tissues.

Dermis contains skin appendages:
- sweat gland, blood vessels, lymphatics, and pilosebaceous units.

3. Subcutaneous layer

The skin is connected to the underlying bone and deep fascia by a layer of areolar tissues that varies in thickness, it is prominent in palm and sole, and absent in eyelid.
Blood supply of skin:

1-Major vessels: deep to muscle (musculocutaneous) perforators which pass perpendicular through the muscle and deep fascia dermosubdermal plexus which supply the skin.

2-Direct cutaneous artery: superficial to muscles then dermo-subdermal plexus

Priorities in plastic surgery

1. Healing
2. Function (reconstruction)
3. Cosmetic (less scar formation)

Wound

Wound is a breach in normal tissue continuum as a result of blunt or sharp trauma may be accidental injury or surgical

wound healing is classically divided into three types: primary intention, delayed primary intention, and secondary intention).

Phases of wound healing:

1-inflammatoy phases: begin at time of injury and last 2-3 days, begin with vasoconstriction to achieved hemostasis, then vasodilatation with infiltration of neutrophils, monocytes and limited number of lymphocytes

2-Proliferative phase: begin around day 3 and last through 3 weeks during which epithelization and collagen synthesis occur.

3-Remolding phase: during which increase in collagen production and breakdown, continuous for 6 month-1 year. Wound strength increase as collagen reorganized and vascularity decrease.
How the wound healing occur?

(Methods of wound healing)

1- Primary intention

By epethelization from wound edges, i.e. sharply incised wound, like surgical wound, healed by primary intention.

-- little or no tissue is lost --very small scar

2- Delayed primary intention

In crushed contaminated wound, leave wound opened after wound cleansing and debridement. This delay allows inflammatory and immune processes to control wound contamination.--- more scar tissue develops.

3- Secondary intention

Wounds heavily contaminated or with significant loss of tissue

They gradually become filled with 'granulation tissue' then closed by the processes of contraction and epithelialization,

Or the gap difficult to close so skin grafts or flaps are required to close the wound.

A graft is a piece of tissue that is moved without its blood supply and relies on its recipient bed to re-establish a blood supply.

A flap is a piece of tissue that is moved maintaining its blood supply and is not reliant on the recipient site for its vascularity

Factors affect wound healing

A) general :- Ca, DM, Malnutrition, jaundice, septicaemia, steroid, Vit. C deficiency, uremia

B) local :- poor blood supply (tension, atherosclerosis, ), infection, poor alignment, foreign body, local X ray
Principles of wound closure

1-The Closure Depend on health of wound
   → When the wound is clean → direct closure
      by approximation its edges
      -- no everted or inverted
      -- without tension.
   To be heal by primary intension
   → When the wound is lacerated → delay closure
      Preparation of wound for few days or weeks then either
      -- delay primary suturing
      -- healing by secondary intention ( graft, flap )

2- Wound preparation
   - Wound cleansing and irrigation (washing) to remove foreign bodies and decrease the numbers of bacteria.
   - Wound debridement
     is more conservative in the face than in other areas of the body because severely damaged skin often survives because of the rich facial blood supply
     Method of debridment:
     • Mechanical: sharp or blunt excision of dead tissues.
     • Gauze: repetitive application of moistened gauze.
     • Chemical: topical enzyme application

3- avoiding excessive retraction and pressure on wound
   by irrigation and moist pack should be used to prevent wound desiccation.

4- aseptic technique: such as hand scrubbing, using of sterile instrument

5- hemostasis: by electrocautery, clamping, suturing or Topical hemostatic e.g. fibrin glue.
Because the bleeding can cause ischemia and hematoma which lead to infection.

6- antibiotics coverage which indicated for the falling:
   • Acute wound with surrounding cellulitis with gross contaminated.
   • Human or animal bit.
   • Immunosuppressed or diabetic patient.
   • Valvular heart disease to prevent endocarditis

7- The need for tetanus immunization depends on the nature of the wound and the patient's previous immunization history.

Scar
Scarf is residual visible mark of wound, almost all wound result in scar
Which pass in 3 stages:
   I- 0-4 w fine noncontracted
   II- 4-12 w thick hard contracted
   III- 12w- 6 months soft white, relax
**Factors affect scar**
1- position (ie sternum)
2- age (adult > child)
3- race (nigroo> whites)
4- direction of wound (skin lines)
5- bad alignment of wound
6- Stability of wound (joint)
7- Wound infection
8- Poor blood supply (may cause necrosis and slughing)

**Types of scar**
- Leanar scar (surgical)
- Area scar (burn)

**Complication of scar**
1- Hypertrophy of scar (which not extend beyond wound)
2- kiloid (continue enlarge after 6 mouths beyond wound)
3- contrection (deformity, limitation of joint)
4- streching due to tension of stitches cause larger scar.
5- malignant changing (*Marjolin ulcer* in chronic unhealed scar of joint)
   which is premalignent, should be excised
6- hyperpigmentation or depegmentation

**Surgical incision**
To minimizes scar formation should be:--
1- the incisions should be placed within, or parallel to, skin lines (*Langer's lines*)
2- In the face these are obvious at 'wrinkle lines' of the muscles of facial expression. Placement of incisions at junctions of hairline such as the eye brow and forehead skin,
3- minimal skin tension
4- good depredment of wound and washing
5- good alignment of wound
6- use less irritant stitches (nylon, PDS, Steel wire), subcutical maneuver better than interrupted,
7- fixation of wound specially at joint (splinting)
8- to reduce stitch marking, early removal of stitches 3-5 days in face
   While in abdomen (7-8 d) can be reinforced at this time with skin tapes.
9-avoid dog ears at the angles of wound ,so use elliptical incision rather than rounded

**Traumatic tattooing**

Foreign bodies embedded in soft-tissue wounds which still permanently

**Treatment** is dermabrasion or excision.

Delayed removal of traumatic tattooing is difficult, if not impossible.

**Keloid formation**

Is an extreme overgrowth of scar tissues which continue after 6 m extend beyond site of incision , due to inhibition of maturation of fibrous tissues for unknown cause , so still continue formation and not subside , its regarded type of fibroma. Usually occur at face , sternum , shoulder ( unlike hypertrophic scar which occur at flexer surface )

**Treatment** :

1-germent ( continue pressure )

2- intradermal injection of trimeselxon

3- radiotherapy and scar revision in difficult cases

<table>
<thead>
<tr>
<th>Keloid</th>
<th>hypertrophy</th>
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<tr>
<td>more familial</td>
<td>(1) Rarely familial</td>
</tr>
<tr>
<td>up to a year later.</td>
<td>(2) develop soon after injury</td>
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<tr>
<td>rarely do</td>
<td>(3) may subside in time</td>
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<tr>
<td>rarely do</td>
<td>(4) more likely to cause contracture</td>
</tr>
<tr>
<td></td>
<td>over joint surface</td>
</tr>
<tr>
<td>i. Triamcinolone</td>
<td>(5) no treatment necessary</td>
</tr>
<tr>
<td>ii. Excision – high recurrence rate</td>
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**Soft-tissue coverage**

By 2 methods

a- Graft :- Its transplantation of tissues which blood supply depend completely on recipient area

b-Flap :- Its transplantation of tissues which blood supply depend on donor vessels
lecture tow skin substitution

A- Skin grafts

I - Partial-thickness skin grafts

*consist* of epidermis and a variable thickness of dermis. There remains some dermis on the donor site that heals by epithelialisation from the cut ends.

**donor site** The thigh, is most frequently used as a donor site, but almost anywhere else can be used. Using a skin graft knife (Hompy knife) or a power dermatome. These consist of a blade and a guard that can be adjusted to determine the thickness of the graft.

Partial-thickness grafts are used to resurface relatively large areas of skin defect and are particularly useful in burns.

II - Full-thickness grafts

*consist of* epidermis and all of the dermis; the donor site will not epithelialise and must be closed, usually directly.

Suitable **donor** sites are postauricular, supraclavicular and groin.

Full-thickness grafts are most commonly used in repairing defects on the face. Grafts taken from above the clavicles retain the ability to blush and can provide a very good color match for facial skin, whereas grafts from below the clavicles will tend to look pale.

Full-thickness grafts are harvested using a scalpel and forceps, dissecting at a level just below the dermis.

**Usual Donor site of full thickness skin graft:**
1. Postauricular skin.
2. Upper eyelid.
3. Supraclavicular skin.
4. Flexural skin: the antecubital fossa and groin.

**Usual Donor site of partial thickness of skin graft:**
Any site can be used. But most commonly donor sites are:
1. The thigh and the upper limb.
2. The flexor aspect of the forearm.
3. The whole of reasonable plane of torso.
4. Other aspect of the forearm and lower leg, these site usually used when above areas not available.

III- Composite grafts

Composite grafts consist of skin and some *underlying tissue such as fat and cartilage*. Again, donor sites must be closed directly.
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Composite grafts carry the highest risk of failure. These grafts have to be carefully designed to be as thin as possible. Their maximum thickness can only be a few millimetres.

Portions of ear, skin and cartilage can be used to reconstruct nasal defects.

**IV-Skin-graft substitutes**

Cadaver skin, Various types of collagen sponge have also been used as temporary skin substitutes.

Human epithelial cells can be grown in tissue culture to produce coherent sheets that can be transferred as a pure epithelial autograft or allograft.

**Contraindication of skin graft:**

1. Deadly, heavy contaminated wound.
2. Area of poor vascular supply.
3. Tendon denuded of paratenon.
5. Cartilage denuded of perichondrium.

<table>
<thead>
<tr>
<th><strong>Full thickness skin graft</strong></th>
<th><strong>split thickness skin graft</strong></th>
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<tbody>
<tr>
<td>1. Donor site should closed directly, Since no epithelium appendage remain for resurfacing</td>
<td>1. Donor site healed spontaneously.</td>
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<tr>
<td>2. Intake less readily.</td>
<td>2. Good intake.</td>
</tr>
<tr>
<td>3. Undergo less 2ndry contraction.</td>
<td>3. Have more 2ndry Contraction</td>
</tr>
<tr>
<td>4. Have better cosmetic result</td>
<td>4. Less cosmetic result</td>
</tr>
<tr>
<td>5. Used small area</td>
<td>5-used large area</td>
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**Cultured skin graft:**

Used for coverage of large defect when autologus skin is small to produce coherent sheets that can be transferred as a pure epithelial autograft or allograft supply for extensive third degree burn.

In vitro cultivation and serial culturing of keratinocytes make production of viable epithelium sheet possible. Cultured epithelium alone, however does not provides mechanically and aesthetically satisfactory long term coverage.
- Other tissues grafts
Other tissues can also be transferred as grafts.

--Bone grafts

The outer table of the skull, the ribs, and the iliac crest are preferred donor sites.

Acute bone grafting is never performed in the mandible, where it is accompanied by a high incidence of infection.

--Cartilage grafts are commonly used in nasal and ear reconstruction. Cartilage is an avascular tissue; survival of transplanted chondrocytes depends entirely on diffusion of nutrients.

--Vessels, Nerve, tendon, fascia and cornea are also all in common use.

To reduce failure rate of graft should be :-

1---Graft take is only possible at well-vascularised recipient sites.
   So Grafts will not take on bare bone, bare tendon or cartilage, but can survive on periosteum, and perichondrium.

2---fixation of The graft must remain adherent to the bed until it revascularises;
   Meticulous care with suturing and dressings is essential. Where grafts are applied over mobile areas appropriate splintage must be used.

3---elevation of Limbs that have been grafted to reduce venous pressure during the process of revascularisation.

4---Haemostasis at the recipient site must be good to prevent bleeding beneath the graft resulting in its elevation by clot and failure of take.

5 -- avoid infection excessive contamination with bacteria will prevent take.
   Streptococci at levels above 10^5 m.o/g of tissue will result in graft loss.

6-- do multiple small incisions at skin graft to increase area & drain any serous fluid under graft

7--dressing of both recipient & doner areas, open dressing of graft after 5 days while donar after 2 weeks

8--- Skin grafts can be stored in a refrigerator at 4 0 C for 2 weeks for delayed application.

Terminology

autograft is tissue transferred from one location to another on the same patient.
**B- Flaps**

Flaps can consist of skin only, or be complex composites of skin, muscle, bone or other tissues.

**Classification:**

1- **Random pattern flaps**

Depend on subdermal plexus of blood vessels. These flaps are widely used for local *repair of adjacent defects*, *Z-plasty* or *V-Y plasty* a combination of *Z-plasties* can lengthen a contracture.

2- **Axial pattern flaps**

Skin flaps with a known direct superficial vascular pedicle passing along their long axis are known as axial pattern flaps.

The *forehead flap*, *the deltopectoral flap* and *groin flap* all share this vascular pattern.

3- **Muscle and musculocutaneous flaps**

Many muscles also have perforating vessels passing from their substance into the overlying skin enabling musculocutaneous flaps to be designed.
Musculocutaneous flaps based on the *latissimus dorsi* and *rectus abdominis muscles* are particularly useful in breast reconstruction. *Gluteus maximus and tensor fascia lata flaps* are used for pressure-sore closure.

4- Free tissue transfer
The first successful microsurgical free tissue transfer was a *toe transfer* to reconstruct the thumb.

5- Tissue expansion
A *silicone balloon* is placed beneath the planned donor site. The balloon is then inflated by percutaneous injections of saline over several weeks in order to increase the area of the expanded flap.

**Surgical managing of burn**

**Classification of burn**
1- Partial thickness burns which involve epidermal and Superficial dermal layer of skin
2- Deep dermal burns These have lost all adenexal structures.
3- Full-thickness burns which involve all layer of skin

**Types of burn**

I - Extreme thermal burn

1- by heat

A) *Scalds* Hot water or boiling water (100 °C) or steam , the severity of burn is depend on temperature & duration of contact.

B) *Fat burns* its more damaging than boiling water because has a much higher temperature (180.0 C)

C) *Dry* (Flame or fire) burns , may be associated with inhalation injury

2- Cold injury

--*Frostbite* is due to prolonged exposure to extreme cold weather , usually associated with ischemic damage due to vasoconstriction

--*liquid nitrogen* LN2. nitrogen in a liquid state at an extremely low temperature , used in cryotherapy

II - Physical Burn

1- Electrical burns depend on – heating result & voltage:

--Low voltage (<1000 V) (240 V, 50 Hz) may induce cardiac arrest, but no deep tissue damage

--High -voltage burns (>1000 V) cause damage by two mechanisms:

  1- flash from an arc
  2- current transmission which causes deep damage

2- Friction burns induce a combination of heat and abrasion.

There is generally a superficial open wounds that may progress to full-thickness skin loss

3- Ionising radiation

X-irradiation may lead to tissue necrosis. The tissue necrosis may not develop immediately

III - Chemical burns can causes *local effect* Tissue damage depends on:-

--the strength , the quantity of the agent & the duration of contact , and sometime also have *systemic effects* (e.g. liver and kidney damage with tannic, formic and picric acids).
Assessment of burn

a) of surface area of the burn (rule of nines) divided body into 11 areas (each one regard 9% of TBSA) Head 1, chest 1, abdomen 1, each upper limb 1, back 2, each lower limb 2 =99% +genitelia 1%

b) depth of burn

1- Superficial burns look red, painful, sometime blisters present
2- Deep burns may be blistered and have a blotchy red appearance with no capillary return on pressure and absent sensation to pinprick.
3- Full-thickness burns have a white or charred appearance; sensation is absent

surgical intervention in burn:

Early intervention

1- Non burn surgery (for associated injuries) e.g. tracheostomy, (in case dyspnea due to inhalation hot gases cause upper air way obstruction) fracture fixation. associated injury

2- Esharotomy: in circumferential burn (when cause compartment syndrom) the eshar which formed from burn my cause increase pressure by odema which affect blood supply of limb. So excised eschar (escharotomy) should done, to save limb from necrosis which can be done without anesthesia in patient room.

3- Fasciotomy: done especially in case of electrical burn., same like eshar but for deep fascia

4- Excision and wound debridement and covered by skin graft

--late intervention of burn are contracture , alopecia , after healing of burn wound with fibrosis , contraction of fibrous tissues may cause deformity and limitation of joint , Marjolin ulcer & complicated scar may occur so removal of scar and cover the defect by skin graft, flap, V-Y plasty, Z–plasty
Lecture three

Hand injuries

--blunt trauma,
--sharp trauma (penetrating)
--Other injuries include nail injuries, finger injuries, finger infection
skilled hand surgeons can sometimes reattach the finger or thumb using microsurgery.
Plastic surgeons and orthopedic surgeons receive significant training in hand surgery
care for hand injuries initially involves proper first aid techniques.

- Lacerations (cuts) ➔
  Apply pressure to the wound to stop bleeding.
  wash dirt or debris from the wound.
  daily dressing for secondary healing
- Fractures (broken bone) and dislocations ➔ Immobilize or splint the hand,
- Soft tissue injuries with tissues loss ➔ substitute the loosed tissues with graft or flap

-Treatment options of amputated part ➔
cover the amputated body part, (finger or thumb) near ice to cool. Do not place body part in
direct contact with ice in order to prevent freezing.

  3 options either -- replantation or-- amputation or -- Transimpantation
1--- replantation. The ideal reconstruction for an amputated thumb is replantation.
Amputation of many fingers at all levels except the most distal deserves an attempt at
replantation. From inspection of the parts it may be difficult to determine which will survive or
which will be the most functional.
multiple replanted fingers in the well-motivated patient usually function better than single

2--- amputation of single finger ➔ V-shape, finger incision with resection of
head of metatarsal bone, approximation of adjacent finger (which is hindered
by head of metatarsal) give better shape & function
3-- *transplantation* amputation of thumb, can use in some centers, big toe transplantaton

**Success** in revascularizing of the amputated part depends to a large degree on the mechanism of injury →

-- in Clean, guillotine amputations success excess of 90% →

--While in crushing amputations, widens the zone of injury → increasing the risk of vascular thrombosis and failure

**Functional** results are dependent on the mechanism of injury, rehabilitation, the age and motivation of the patient. Young patients will regain more motion than old patients.

**Which injuries require replantation:**

1-all thumb amputations
2-multiple amputated digits
3-all children
4-all amputations proximal to the digits
5-single digits proximal to the FDS insertion

**Strong contraindications:**

1-significant associated injuries to the torso and head.
2-extensive injury to the affected limb or to amputated part (degloving, widespread crush)
3-severe chronic illness precluding transportation or prolonged surgery

**Relative contraindications:**

--Single digit amputation, esp distal to insertion of FDP
--avulsion injuries
--severe degloving injuries
--previous injury or surgery to the part
--extreme contamination
--lengthy warm ischaemia >8hrs (at 4 degrees C >30 hrs)
--age
--poor rehabilitation potential

**Facial reconstruction**

**Eyelid**

**Lower lid** Loss of up to 25 per cent of the lid may be reconstructed by primary closure, which must be carefully maintain lid function.

For defects affecting more than 50 per cent of the lower lid, the lateral incision may be continued down to the preauricular area to rotate a large cheek flap.
Upper-lid defects of up to 25 per cent may be closed similarly to lower-lid defects. For larger defects, tissue is borrowed from the lower lid in the form of a cross-lid flap. The lacrimal punctum of the lower lid should be preserved.

Nose (reconstruction)

A) Partial reconstruction

1- skin grafts for superficial defects
2- composite graft - graft from the concha of the ear can be used to replace any missing cartilage.
3- a nasolabial flap. The flap is based on the branches of facial artery (angular br)

The flap can be used:-

superiorly to reconstruct defects on the cheek, sidewall or dorsum of the nose, alae, columella and the lower eyelid.

Inferiorly to reconstruct defects in the upper lip, anterior floor of the mouth

B) Total or Subtotal reconstruction

forehead flap. This procedure is one of the oldest in plastic surgery. A flap based on the supratrochlear vessels may be turned 180° to cover the nasal structures

Ear reconstruction

Reconstruction of all or part of the ear for either a congenital or a post-traumatic defect requires a cartilage framework and a thin-flap skin cover. The best source of cartilage graft is the confluence of the lower costal cartilages, some cases use prostheses for cosmetic purposes
Skin lesions

Benign skin lesions

I-Non-aggressive benign tumors

Papilloma
Fibroma
Lipoma
Neuroma types:
- Ganglioneuroma
- Neuroblastoma
- Neurilemmoma (syn. Schwannoma)

Dermoid Types
-- Teratomatous -- sequestrated angular D, -- implantation D at wound, finger
-- congenital postanal

Treatment of benign tumors

All these benign lesions are usually excised as an elliptical incision, which allows a straight-line closure. The orientation of the ellipse is dictated by wrinkle lines, lines of least tension, primary closure is required to decrease scar formation before treatment of angular dermoid should take skull X ray to exclude any connection with intracranial structures

II-Treatment of Aggressive benign tumors

Desmoid's tumors or aggressive fibromatosis can arise from any fascial tissue.
* Surgical resection wide resection is the preferred treatment when it can be accomplished with minimal morbidity. Positive margins is generally followed by recurrence.
* Irradiation is effective in controlling desmoid tumors if 60 Gy can be delivered.
* The hormonal with progesterone, tamoxifen, indomethacin, and ascorbic acid have all been reported to induce remissions.

Atypical lipomas and atypical fibrous histiocytomas are generally located deep in the soft tissue or muscle; they appear atypical histologically and although they do not metastasize they tend to recur locally after resection, particularly if wide margins are not achieved.

Malignant tumours

1-Carcinomas arise from cells which are ectodermal or endodermal in origin, and they are classified squamous, basal-celled or glandular (adenocarcinomas).
2-Sarcomas occur in connective tissues with structures of mesoblastic origin, fibrosarcoma, osteosarcoma.
3-Germ cell tumours arise from germ cells (teratoma, seminoma,).

Management of malignant tumors

Basal-cell carcinoma
The lesions are best excised with intraoperative control of margins. by frozen section is advised. Should be take save margin, to be sure that removal is complete. Tumor-positive margins after excision do not invariably mean the lesion will recur, but repeat excision is usually recommended.
Squamous-cell carcinoma

because invasion into the subcutaneous tissue is possible, the resection should have a wider margin than is required for basal-cell cancers. Intraoperative examination of the resection margins by frozen section is advised.

Because of the increased risk of metastasis, the draining lymph nodes should be palpated for enlargement, in addition to the primary resection.

Melanoma

Melanoma is excised with a wider margin than squamous-cell carcinoma. A margin of 1.5 cm is recommended on the face near vital features; a margin of 3 cm is recommended elsewhere.

-- adjunctive treatments irradiation, chemotherapy, and immunotherapy, none has been successful. Early detection and complete initial surgical resection are the keys to caring for patients with melanoma.

Breast surgery

1- Augmentation

increase the size, change the shape, and alter the texture of the breasts of a woman, by placement of an implant behind the mammary tissue or behind the subjacent pectoral muscle.

The indications for the procedure are the cosmetic interests of the patient or marked asymmetry due to dystrophy of one breast.

The operation. The route of access is through an incision either in the areola, or just above the inframammary crease, or within the axilla.

The a pocket carried down to a plane (for implant) either under the pectoralis major and above the pectoralis minor muscles (submuscular) over pectoralis major under breast glands (subglandular).

Implants used usually Silastic outer envelopes filled with either a gel of the same material or with saline.
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Complications

1- the breast become rounder and firmer than desired because capsule contraction around the implant,
2- decreased nipple sensation
3- hematoma formation within the pocket,
4- a hypertrophied scar at the incision,

2- Reduction (mastopexy)

Reduction mammoplasty is a procedure for reducing the size of large breasts either to alleviate these symptoms and or to improve the appearance.

Mastopexy is a procedure to correct breast ptosis not indicated by medical cause or physical reason, but by the self-image of the woman.

Large breasts may cause:
1--neck and back pain,
2--grooving of the shoulders from the brassiere straps,
3-- intertrigo.

Operation is to remove excess of 300 g per breast. The pattern for breast reduction is best in a standing position before surgery. The nipple, with a reduced diameter, is left as an island on the pedicle. Medial and lateral segments of breast tissue and fat are removed.

A suction lipectomy may be performed to reduce axillary fat. The flaps of breast so created are tailored to leave symmetric amounts of tissue on both sides. The incisions are closed in several layers over suction drains.

Complications include hematoma, decreased nipple sensation, hypertrophied scars, asymmetry, and nipple loss due to ischemia. Patient satisfaction with the change in breast shape and weight is usually high.

3- Reconstruction

A breast reconstruction after mastectomy is not a necessity since adequate external prostheses are available. However, the convenience and appearance of the reconstructed breast are superior.

The operation may be performed immediately after the mastectomy under the same anesthetic, or at any time in the future.

The early immediate procedure has the advantage of saving a later operation and perhaps in shoring up the patient's psyche. It should preserves more of the native breast skin,

The delayed operation may give more time to decide which type of reconstruction, prevention of complications, may required postoperative radiation or chemotherapy.

---The early procedure is simplest breast reconstruction, either use implant of transposed myocutaneous flap

the implant placed in a submuscular pocket, similar to augmentation. But in contrast to augmentation, the pocket is created completely beneath muscle (pectoralis major, serratus anterior, and rectus abdominis) to protect the implant from overlying flap necrosis and to minimize scar capsule contraction. to early recognize any recurrence of tumor, also done in 2 steps
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1- use implant expander (which is inject fluid gradually to produce appropriate pocket for implant)

2- removal of expander and insert the implant

The ellipse of skin resected in the mastectomy may be replaced by a transposed island myocutaneous flap from latissimus dorsi with an implant placed under the pectoralis major.

Complications

1- A larger and more ptotic breast when compared with opposite breast
2- There is little functional deficit from the transposition of the muscle. The anterior fascia of the rectus abdominis superior to the arcuate line is partially or completely resected, which results in some laxity of the abdominal wall; this defect can be supported with a patch of synthetic mesh.
3- The blood loss from the rectus abdominis is an extensive

---The delayed procedure resected skin can also be 'replaced' by skin expansion before implant placement. This procedure has the advantage of providing additional skin without requiring a new donor site. At the initial operation a Silastic envelope with a subcutaneous filling portal is inserted. After surgery, saline is injected through this portal at weekly or biweekly intervals.

1 to 3 months after the placing of the expander, a permanent implant is sited in the expanded pocket, with some attempt to create an inframammary crease. If the opposite breast is large or ptotic, final symmetry is enhanced by performing a mastopexy or breast reduction on that side. This operation is done at the time of breast reconstruction, or at a later date to maximize symmetry.

4- Subcutaneous mastectomy

The breast tissue may be removed with preservation of the entire breast skin and nipple in. The indications is removal of the breasts with premalignant disease. Also the treatment of benign breast disease and gynecomastia

The operation is performed in a similar manner to breast reduction. The nipple is maintained primarily by a superior pedicle and the breast is degloved through an incision in the inframammary crease.

Gynecomastia

Hypertrophy of the male breast

Causes :-

1- Idiopathic In adolescence usually resolves spontaneously in several years.
2- hormonal :- either increase of esterogen due to gonadal problems or tumours or non gonadal diseases (liver, lung, adrenal)
3- drug :- hormonal, cimitidin, digitalis
4- Klinfelter syndrome
5- breast tumour :- Unilateral breast enlargement in older men should be biopsied because of the rare occurrence of male breast cancer.
Lecture four

Cleft lip and palate

Anatomy & embryology of hard and soft palate

The roof of mouth cavity formed from Hard & soft palates

**Hard Palate** formed 2 Bones (Horizontal Bones):
1. Maxilla (Palatine Processes)
2. Palatine Bones

**Soft Palate**
Fibromuscular shelf attached like a shelf to posterior portion of hard palate
Normally, Five primitive tissue lobes grow in the 2nd and 3rd months of pregnancy
- One Frontonasal Prominence grow downward
- two Maxillar Prominence meet first lobe to form upper lip
- two Mandibular Prominence fuse to form lower lip
But in babies with cleft lip and cleft palate, the fusion never takes place or occurs only part way, leaving an opening (cleft).

**Risk factors:**
No one knows exactly what causes clefts. Its believe due to factors from genetics or the environment
The incidence of cleft lip and palate is one in 600 (1:600) live births,
1. familial, family history of cleft lip and palate in which the first-degree relative
2. racial: caucasian and Iceland have high incidence than nigros
3. Environmental factors during pregnancy include:
   - mother not getting enough nutrients, such as folic acid
   - Having DM before pregnancy.
   - Taking certain medicines, such as some for epilepsy.
   - obesity during pregnancy.
   - Having certain infections during pregnancy, such as rubella (German measles).

<table>
<thead>
<tr>
<th>The typical distribution of cleft types is:</th>
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</thead>
<tbody>
<tr>
<td>• cleft lip alone — 15 %</td>
</tr>
<tr>
<td>• cleft lip and palate —— —— 45 %</td>
</tr>
<tr>
<td>• isolated cleft palate — 40 %</td>
</tr>
</tbody>
</table>

Cleft lip/palate predominates in males whereas cleft palate alone appears more common in females. In unilateral cleft lip, the deformity affects the left side in 60 % of cases.

**Effect upon function**
1. sucking and eating more in cleft palate
2. speech unable tomake conistant sound (k,g, p,b, ,d,t)
3. teeth
4. nose due to contamination with oral organisim
5. hearing problem due to repeated inf acut or chronic Otitis Media
6. Airway Problems airway distress from tongue becoming lodged in palatal defect

**Antenatal diagnosis**
An antenatal diagnosis of cleft lip, whether unilateral or bilateral, is possible by ultrasound scan after 18 weeks of gestation.

**management**
A craniofacial team is routinely used to treat this condition to provide patients with comprehensive multi-disciplinary care from birth through adolescence.
1. **Primary management (pre-surgical advice)**

#### Feeding

They cannot create adequate negative intra-oral pr to be able to express the milk from the breast or bottle. Simple measures, such as: *enlarging the hole* in the teat, and position of feeding. *Nursing the baby* change positions of feeding until you find one which works, nipple needs to stay on the back of the tongue.

For cleft plates of difficult feeding so use cup and spoon feeding, and palatal obturator (a prosthetic device made to fit the roof of the mouth covering the gap).

**Airway**

Intermittent airway obstruction is more frequent during sleep and feeding can be life threatening and managed by:

--- Nursing the *baby prone.*

--- Nasopharyngeal *intubation* to maintain the airway in more severe cases.

#### Strapping

To reduce the distance of defect with growing

**Latham appliance** One of the new innovations of cleft lip and cleft palate repair is surgically inserted by use of pins during the child's 4th or 5th month. After it is in place, the doctor, or parents, turn a screw daily to bring the cleft together to assist with future lip and/or palate repair.

2. **The Surgical management**

There have been many different surgical techniques and sequences advocated in cleft lip and palate management.

--- Cleft lip repair (*Millard operation*) is commonly performed between 3 and 6 months of age, (skin flaps done then reconstruction of orbicularis oris)

--- Cleft palate repair is frequently performed between 6 and 18 months, Cleft palate closure can be achieved by one- or two-stage *palatoplasty*. V-Y plasty and 4 flaps.

3. **Secondary management**

Following primary surgery, regular review by a multi-disciplinary team is essential. Many aspects of cleft care require long-term review.

**Hearing**

Should undergo regular audiological assessment before 12 months of age, if sensorineural hearing loss is managed with a *hearing aid*.

**Speech**

Initial speech assessment should be performed early (18 months) and repeated regularly to ensure that problems are identified early and managed appropriately.

*Secondary palatal surgery:

  — intravelar veloplasty (muscular reconstruction of soft palate);
  — pharyngoplasty;

*Speech-training devices.

**Dental**

Delayed tooth development and delayed eruption of teeth; morphological abnormalities.
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All children with cleft lip and palate should undergo regular dental examination.

1- Large defect of abdominal wall reconstruction after:
   - Trauma
   - Infection (progressive bacterial synergistic gangrene
   - After surgery for cancer, resection of fistulas,

2- Abdomenoplasty for pendulous abdomen Usually after multipregnancy, severe loss of Wt
   (mini tummy tucks vs. full tummy tucks)

# Abdominal wall reconstruction (abdomenoplasty)

There are 2 types of abdomenoplasty

1. Large defect of abdominal wall reconstruction after:
   - Trauma
   - Infection (progressive bacterial synergistic gangrene
   - After surgery for cancer, resection of fistulas,

2. Abdomenoplasty for pendulous abdomen Usually after multipregnancy, severe loss of Wt
   (mini tummy tucks vs. full tummy tucks)

## 1. Large defect of abdominal wall

Knowledge of the vascular anatomy of the abdominal wall allows the design of safe elective incisions and appropriate flaps.

Should be assessed the defect result from trauma or tumor removal, evaluate size of missing tissues and donor vessels as well as planning for flap transfer depend on the zone defected methods of reconstruction. Depend on the zone defected:-

<table>
<thead>
<tr>
<th>Zone</th>
<th>Territory</th>
<th>Blood supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Midcentral abdominal wall above the umbilicus.</td>
<td>Deep epigastric arcade</td>
</tr>
<tr>
<td>II</td>
<td>Lower abdominal wall below umbilicus.</td>
<td>Epigastric arcade, superficial inferior epigastric, superficial external pudendal and superficial circumflex</td>
</tr>
<tr>
<td>III</td>
<td>Lateral abdominal wall..</td>
<td>Intercostal, subcostal, and lumbar arteries</td>
</tr>
</tbody>
</table>

2- Abdomenoplasty for pendulous abdomen

Pendulous abdomen usually result after pregnancy, obesity.
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the transverse incision should be low down, can change position of umbilicus by do island flap, excise the excess of skin and fat

A good candidate for Abdominoplasty Surgery (Tummy Tucks):
1- Is close to their ideal body weight (within 30%)
2- Wants to remove specific areas of loose skin or fat that is diet- and exercise-resistant
3- Weight has been stable for 6 months or more
4- Has good skin tone and elasticity
5- Has realistic expectations, emotionally stable Understands the risks of surgery

Procedure:
- Full tummy tuck involves an incision around the umbilicus and across the lower abdomen, a mini tummy tuck leaves the umbilicus intact and requires a smaller incision.
- Liposuction is sometimes employed and the fat is removed from below the umbilicus tightening muscles from the umbilicus to the pubis.

Complications:
1- Bleeding, Hematoma
2- Infection
3- Keloid
4- Puckered, skin
5- Seroma
6- Skin irregularities
7- Skin necrosis or skin death (more likely with smokers)
8- Slow healing
9- Wound dehiscence

Cosmetic surgery
Cosmetic surgery is surgical procedures, that are performed only for the improvement in appearance from an acceptable ‘normal’ to a more ‘coveted normal’.

Who is a Good Candidate?
People who have health conditions such as diabetes, hypertension, lung disease, heart disease, high cholesterol, arthritis, emphysema, are malnourished, severely depressed, obese and/or smokers are not generally good candidates for cosmetic surgery.

So the good candidates
1- Ideal weight (within 30%),
2- Non-smokers, if smoker should stop for at least 2 weeks prior to surgery and remain smoke-free until at least 2 weeks after surgery,
3- Emotionally stable, with low stress, exercise and maintain a healthy lifestyle.
4- Is important to have realistic expectations and not expect plastic surgery to change your life.
A good candidate also accepts the disadvantages of plastic surgery (cost, inconvenience, discomfort, and medical risk).

Rhinoplasty
Rhinoplasty is change irregularity of nasal contour, or after nasal trauma (blunt, penetrating, blast)
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-- performed after the nasal skeleton has matured in adolescence.

<table>
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<tr>
<th>Types of rhinoplasty</th>
<th>open rhinoplasty or closed rhinoplasty</th>
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**In open rhinoplasty,**
the surgeon makes a small, irregular incision to the columella (fleshy external end of the nasal septum).

**In closed rhinoplasty,** surgeon performs incision endonasally (exclusively within the nose), and does not cut the columella

**Types of rhinoplasty – primary and secondary**

**primary rhinoplasty** reconstructive, functional, or aesthetic corrective procedure.

The midline dorsal prominence → osteotome for the bone and a scalpel for the cartilage. The medial borders of the upper lateral cartilages may require resection as they also produce some dorsal prominence.

**septal deviation,** which may interfere with nasal breathing and alter the timbre of the voice. → the mucoperichondrium is elevated from both sides of the septum through an incision in the membranous septum

**secondary rhinoplasty** revision of a failed rhinoplasty, 5–20% of rhinoplasty operations

The corrections usually "open approach", is more technically complicated, usually because the nasal support structures either were deformed or destroyed in the primary rhinoplasty

**Reconstruction rhinoplasty**
Reconstruction rhinoplasty is indicated for the correction of defects and deformities caused by

**Skin cancer.** The most common cause for a nasal reconstruction → melanoma and BCC

**Traumatic nasal defect.** Less common blunt (impact), penetrating and blast trauma.

**Congenital deformities.** Cleft lip and palate.

**Liposuction (lipoplasty)**
is the surgical process by which a plastic surgeon removes very stubborn fat from a person's body, and sometime reinjected to another areas of body

Liposuction can be performed on many parts of the body including the stomach, hips, waist, thighs, arms and also used frequently in conjunction with other operations such as a tummy tuck, a face lift and breast reduction procedures

**benefits of liposuction**

1--plastic surgeon can removing fat from specific areas of your body.

2- With liposuction, the normal result is immediate weight loss, and a slimmer, more contoured shape are the changes

**procedures and techniques used in liposuction**

makes a very small incision in the skin, and inserts a tiny tube (cannula) through the skin into the fat layer. The tube is attached to a vacuum that sucks out the fat.

It may be using general anesthesia or local anesthesia,

Liquification methods
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- water assisted liposuction (WAL)
- ultrasound assisted liposuction (UAL)
- Laser-assisted liposuction (LAL)
→ loosening or partially liquefying the fat to make it easier to extract, through a small cannula.

If reinjected fat, so inserted in many test tubes, transfuge then injected in other areas

Side effects of liposuction
1- Temporary swelling, bruising, soreness, and numbness.
2- Irritation and minor scarring around the incision sites.
3- Baggy or rippling skin. The skin will usually tighten and retract after a few months. But in some people the skin may remain somewhat loose.
4- Permanent color changes in the skin.
5- Damage to the nerves and skin.

Serous complications
1- Excessive blood and fluid loss, leading to shock. (rare)
2- Fat clots or blood clots, → (pulmonary embolism).
3- (pulmonary edema). This is most likely to occur when a large volume of fluid is injected into the body.
4- Infection. In some cases, antibiotics may be given before or after liposuction

Blepharoplasty and brow lift
Excess skin in the upper and lower eyelids and periorbital fat can be corrected by a blepharoplasty or a blepharoplasty combined with a brow lift. The lower lid may have excess or herniated periorbital fat, even in a young person; this can be a familial characteristic that worsens with age. Young people will occasionally have a lower-lid blepharoplasty to remove this excess tissue, which will not reaccumulate until quite late in life. It is performed through a subciliary incision carried out laterally into one of the laterally radiating wrinkles.

The incision can also be created through the conjunctival fornix. Through the subciliary incision the skin and orbicularis oculi muscle are elevated as a single flap.

Botox
Botox injections are a diluted form of botulism which paralyzes or weakens the muscles that form wrinkles. Botox is the most popular non-surgical cosmetic procedure performed

What kind of wrinkles do Botox injections treat?
Botox can safely and successfully treat wrinkles that are caused by muscle contraction. These include frown lines, forehead creases, crow's feet, and neck bands.

Results are normally seen within a few days. The results should last 3-4 months.

Face lift
Excess facial skin and fat, particularly in the lower face, can be removed or reduced by a face-lift procedure. Two symmetric incisions are made from the scalp to the preauricular skin to the postauricular sulcus and into the posterior scalp to allow the elevation of bilateral cheek flaps, which
are then advanced posteriorly to resect an ellipse of facial and scalp skin and tighten the facial tissues along a vector parallel to the jawline.

A submental incision may be made specifically to excise submental fat and to excise or suture the medial borders of the platysma muscle. The supraplatysmal fat within the neck may be removed by direct excision or by suction lipectomy.