Principles of plastic and reconstructive surgery

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Plastic surgery - in general

• Definition: Surgical correction of morphological and/or functional defects and malformations of congenital or acquired nature
  – plastic ≠ cosmetic
• Purpose: human ≠ veterinarian

Major techniques in plastic surgery

I. Plastic closure of wounds of different shape
II. Tension-relieving techniques
III. Skin reconstruction techniques

I. Plastic closure of wounds of different shape
  1. Fusiform defect
  2. Triangular defect
  3. Rectangular defect
  4. Rescent defect
  5. Circular defect
Major techniques in plastic surgery

I. Plastic closure of wounds of different shape

II. Tension-relieving techniques

III. Skin reconstruction techniques

II. Tension-relieving techniques

1. Simple tension-relieving incisions
   - unflexible skin areas
   - short incisions parallel to the wound
   - secondary intention wound healing
1. Simple tension-relieving incisions

II. Tension-relieving techniques
1. Simple tension-relieving incisions
   - unflexible skin areas
   - short incisions parallel to the wound
   - secondary intention wound healing
2. Tension sutures
   - mattress sutures

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3. V-Y plasty
II. Tension-relieving techniques

1. Simple tension-relieving incisions
   - unflexible skin areas
   - short incisions parallel to the wound
   - secondary intention wound healing

2. Tension sutures
   - mattress sutures

3. V-Y plasty
4. Z-plasty

5. W-plasty
Major techniques in plastic surgery

I. Plastic closure of wounds of different shape
II. Tension-relieving techniques
III. Skin reconstruction techniques

III. Skin reconstruction techniques

“Skin defect”: lack of skin which is not able to be attached via suturing
⇒ traumatic (injury)
⇒ surgical (operative)

Methods of skin reconstructuring

I. Pedicle grafts

I. Pedicle grafts

Definition → portion of skin (skin flap) and subcutaneous tissue with vascular attachment moved from one area of the body to another

Methods of skin reconstructuring

I. Pedicle grafts
1. Local flaps
   1. Subdermal plexus flaps
   2. Axial pattern flaps
2. Distant flaps
II. Skin (free) grafts
III. Other
Local subdermal plexus flaps

3 distinct skin plexuses:
- subdermal (deep)
- cutaneous (middle)
- subpapillary (superficial)

The flap is developed just adjacent to the skin defect:
- advancement flap: forward move
- rotation flap: curved move
- transposition flap: 90-degree lateral move
- interpolation flap: no common edge

1.b. Pedicle local flap
Advancement flap

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1.b. **Pedicle local flap**

Advancement flap

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Advancement flap (dermoid)

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Advancement flap (dermoid)
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Advancement flap (dermoid)

Bipedicle local flap
advancement flap

Pedicle local flap
Rotation (elbow fold) flap

Hemangiopericytoma

Pedicle local flap
Rotation (elbow fold) flap

Pedicle local flap
Rotation (elbow fold) flap

Pedicle local flap
Rotation (elbow fold) flap
Pedicle local flap
Rotation (elbow fold) flap

Pedicle local flap
Transposition flap

Pedicle local flap
Interpolation flap
“lip-to-lid flap”

Methods of skin reconstructuring

I. Pedicle grafts
1. Local flaps
   1. Subdermal plexus flaps
   2. Axial pattern flaps

Pedicle local flap
„Axial pattern flap”

Pedicle local flap
Axial pattern flap

Direct cutaneous artery
Lateral thoracic artery flap

Axial pattern "island" arterial flap

Axial pattern "island" arterial flap

Axial pattern "Myocutaneous" flap

Axial pattern "Myocutaneous" flap

Latissimus dorsi / thoracodorsal artery myocutaneous flap

Methods of skin reconstructuring

I. Pedicle grafts

1. Local flaps
   1. Subdermal plexus flaps
   2. Axial pattern flaps

2. Distant flaps

• Transplantation of the skin and muscle
  m. latissimus dorsi
  m. cutaneus trunci
• Enhance the survival of the graft
• For deeper, bony based defects
I.2. Distant flaps

→ pedicle grafts developed at a giving distance from the recipient bed, because the skin adjacent to the defect is not suitable for skin reconstruction (direct, indirect)

a. Pedicle / bipedicle direct flap
   - the recipient bed covered with a further single pedicle or bipedicle flap
   - the „donor” and the „recipient” surfaces are attached and fixed to each other

b. Indirect flap / Tubed flap

c. Free flap

a. Bipedicle direct flap
a. Bipedicle direct flap

b. Indirect flap / Tubed flap

- a bipedicle flap sutured into a tubed flap, and is wandered to a further area of the body ("wanderer flap")
Methods of skin reconstructuring

I. Pedicle grafts
   1. Local flaps
      1. Subdermal plexus flaps
      2. Axial pattern flaps
      2. Distant flaps

II. Skin (free) grafts

III. Other

II. Skin grafts

Definition → a segment of epidermis and dermis that is completely removed and transferred to the recipient site

Classification → (1) immunologically
   a., autograft: same organism
   b., allograft: same species
   c., xenograft: different species
   d., isograft: between identical twins or $F_1$ hybrids

Classification: - (2) surgically
   Full thickness graft
   Split thickness graft
   Mesh graft
   Seed / stamp graft
   Strip graft
Full thickness graft

- to cover large lesions on flexor surfaces or distal limb regions
- recipient bed to be prepared: scar or chr. gran. tissue is excised, scraped, or a clean wound is debrided and lavaged
- graft gained from lateral thoracic wall
- all subcutaneous tissue is removed
- nonabsorbables used for suturing

Full thickness graft

- advantages: looks like normal skin; postoperative contraction is minimal; no special equipment needed
- disadvantages: time-consuming; survival rate is the worst; worse hair growth compared with skin grafts

Split thickness graft

- composed of epidermis and a partial portion of dermis
- for extensive skin defects (mostly after burns)
- special instrumentation for gaining graft: dermatomes, razors or freehand cutting
- interrupted sutures for holding the graft
- advantage: very good survival
- disadvantage: susceptible to external effects; hair growth is absent; requires special instrument
Split thickness graft

Mesh graft

- mesh-like piece of split or full thickness graft
- indication: large skin defect; irregular wound surfaces
- special device: aluminium block of many staggered parallel rows of small cutting blades and a Teflon roller (dermotom)
- promotes epithelialisation and wound covering

Mesh graft
Mesh graft

- small pieces of full or split thickness skin
- indication: improve epithelialisation of large granulating wounds
- seeds harvested from ventral abdomen or inner surface of flank
- small pockets are created in the recipient bed
- simple to performe, resistant to infection

Punch/Seed/Stamp graft

- similar to seed/stamp grafts
- the graft is a full thickness skin strip
- a number of splits are placed in the granulation tissue bed paralel to each other

Strip graft

- similar to seed/stamp grafts
- the graft is a full thickness skin strip
- a number of splits are placed in the granulation tissue bed parallel to each other

Other methods of skin reconstructering

- Conventional acceleration of epithelisation
- Omental-grafting
- Bio-syst (swine submucosa)

⇒ accelerate secondary intention wound healing!
Thank you for your attention!