Cranioplasty; Indications and technique

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We need cranioplasty

• After compound fracture of the skull

• After decompressive craniotomy/ craniectomy
  • For hemorrhages
  • For stroke
  • For severe brain edema
Compound fracture
Decompressive craniotomy

Hemorrhage/ severe edema
Decompressive craniotomy

Stroke
Timing for cranioplasty

- 3 or 6 months after primer surgery
- 1 year after primer surgery
What is ideal cranioplasty material?

• Must fit the cranial defect and achieve complete closure
• Radiolucency
• Resistance to infection
• Not dilated with heat
• Strong to biomechanical processes
• Easy to shape
• Not expensive
• Ready to use
Types of materials

- Autografts
  - Cranium (sliding flaps technique of the external tabula),
  - Saved craniotomy flap
  - Tibia, rib, scapula, sternum, ilium
- Non-metal allografts
  - Methyl-metacrylate
  - Hydroxyapatite
  - Polyethylene, silicon, ceramic, cortoss
- Metal allografts
  - Titanium
Methyl-methacrylate (PMMA)

- After word war II
- Easy to shape
- Leighter in weight
- Radiolucent
- Need wash with saline to prevent heat damage
- Fix to the bone either suture or miniplate
Methyl-methacrylate (PMMA)

Custom made cranioplasty
Hydroxyapatite

• Calcium phosphate

• Minimal tissue reaction

• Increases bone repair

• Good osteointegration

• Not very resistant to mechanical stress (easy break)
Non-metal allografts

Silicon

Cortoss

Porous polyethylene
Titanium

- Plate or mesh
- Flexible structure
- Bioacceptable
- Relatively cheaper
- Radiolucent
- Good resistance to infection
- Strong resistance to mechanical stress
Titanium mesh
Saving craniotomy flap

- Dry freeze -70 degrees

- Abdominal fatty tissue (Kreider 1920)

- Autoclaved prior to replacement

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Contraindications

- Infection
- Hydrocephalus
- Brain swelling
Complications

- Allergy (reaction against material)
- Subgaleal fluid collection
- CSF leak
- Infection (osteomyelitis)
- Seizure
- Transient neurological deficit
- Epidural or subdural hematoma
- Hydrocephalus
Thank you