Peggers’ Super Summaries: Bridging Bone Defects in Trauma

**Bone loss techniques**

- Masquelat technique
  - 2 staged approach
  - Devitalised Soft tissue and bone is removed and bone space is placed in the gap, the bone is then stabilised
    - Obliterates dead space reducing risk of infection
    - Creates surround membrane that will act as a cage for bone grafting
  - The second stage is removal of the bone space by preserving the induced membrane film and filling with bone graft at the 6-8 week stage
- Ilizarov and bone transport
- Vascularised fibula bone graft
- <4-5cm defect consider bone grafting via RIA

**Bridging bone defects in trauma:**

**CAUSES OF BONE DEFECTS**

- Trauma
- Congenital
- Infection

**OVERVIEW – DIAMOND CONCEPT**

- Structural support
- Cells
- Signals
- stability

**STRUCTURAL SUPPORT**

- from where
  - Autograft
  - allograft
  - synthetic
    - hydroxyapatite
    - collagen
    - liquid bone mineral substitutes
- type
  - cancellous
  - cortical
    - vascularised
    - non vascularised

**Definitions**

- Osteoconduction – scaffold
- Osteoinduction – stimulation with chemical markers for chemotaxis
- Osteogenesis – proliferation with pluripotent stem cells to increase bone formation
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CELLS
- Osteoblasts
- Osteocytes
- Osteoclasts

SIGNALS
- BNPs 2 & 7 in clinical use – differentiate progenitor cells
- Platelet rich plasma – unproven
- Bone tissue engineering

MECHANICAL STABILITY
- Allows biology to work
- Graft support
- Different strain cause fibrous tissue to grow instead of bone

MASQUELET TECHNIQUE
- Critical defect is 4cm possibly up to 6cm
- Fill with cement spacer
- Wait 2 months in femur
- Wait 6 weeks in tibia
- RIA for bone graft and place with BNP in defect

BONE GRAFT HARVESTING
- Anterior tibia
  - 1 by 2cm window lateral to tibial tubercle
  - Cortical window using osteotome
  - Take out cancellous bone
- Iliac crest
  - Adrenaline and anaesthetic mixture to tissue before
  - Start 1cm proximal to ASIS and make 3-4 in length
  - Expose anterior pelvic table and make osteotomy cut 1cm distal to rim and make a trap door to iliac crest hinging on inner pelvic table periosteum
  - Use osteotomes to remove cancellous graft from crest
  - Finish by replacing trap door back over ilium
  - Can use outer pelvic table for more bone graft if required
- Bone defect Mx
  - <2cm
    - bone graft
    - shorten
      - 2cm in leg
      - 5cm in arm
  - 2-4 cm
    - Monofocal ilizarov (distraction or compression)
    - Masquelet with RIA (reamer irrigator aspirator)
  - >4cm
    - Bifocal ilizarov – corticotomy at proximal tibial flare