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Bone Defects w/ Dr. Frumberg



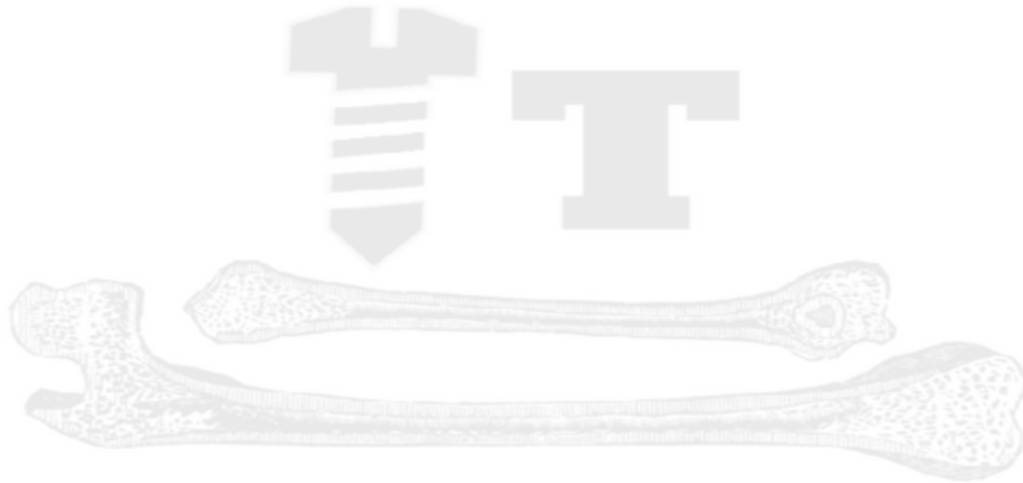
Bone defects- why they occur?

- Bone defect- one that wont heal if left untreated (>50% cortical diameter + >1cm in length)
- Causes: Infection, trauma, tumor, nonunion



Classification- bone defect size

- Type I- <20mm
- Type IV>120mm



Classification- Soft tissue defect

- No soft tissue defect > soft tissue defect requiring reconstruction > unreconstructable
- NPWT benefits: increase granulation tissue, decreased periwound edema, decreased time to wound closure, control bacterial proliferation, less frequent dressing changes
 - Does Not alter need for definitive soft tissue reconstruction though

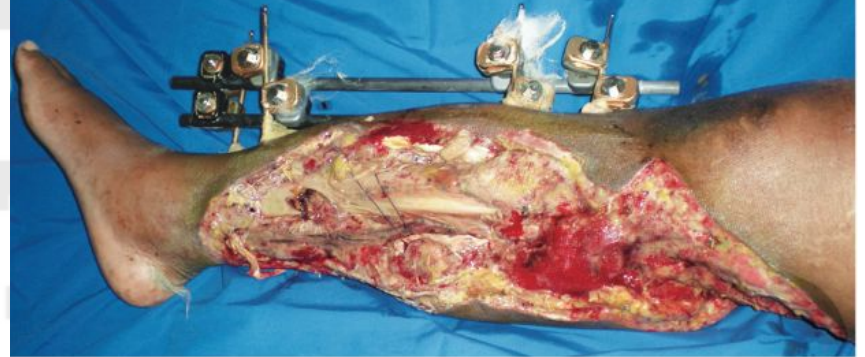


Fig. 3: Gamma soft tissue defect

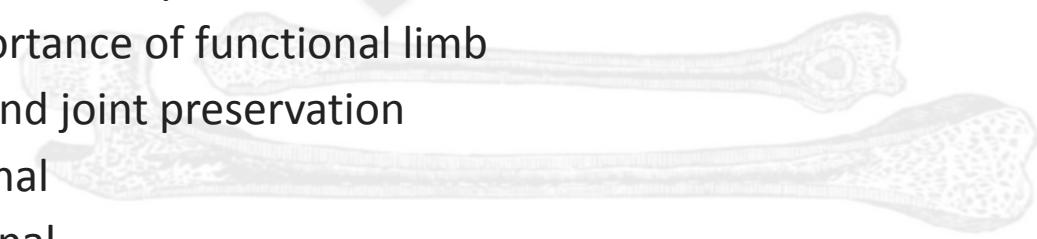
Classification- Host type

- Good immune system > local/systemic compromised > not a surgical candidate (i.e.- neutrophils <1000, CD4 <100, IVDU, etc) -6x more likely to develop infection



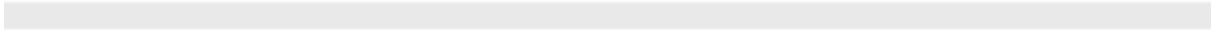
Treatment

- Acute bone shortening, synthetic autogenous bone graft, masquelet induced membrane technique, gradual shortening, bone transport, fibula bypass grafting
- Devices for stability
 - importance of functional limb use and joint preservation
 - Internal
 - external



Type I defects <20mm

- Shortening: lower limb can be shortened up to 20mm w/o functional defects, same in UE
 - Easiest way to deal with bone defect, may downgrade soft tissue category
- Masquelet



Type II defects- 20-60mm

- Masquelet 2 stage technique (induced membrane)
 - Cement spacer paced (beyond bone edges), stage 2 at 4-8 weeks after
 - Bone grafting: iliac crest bone graft best, reamer irrigator aspirator (RIA) - assoc w/ blood loss, synthetic



Fig. 6: Cement spacer extending over bone ends

Type II defects 20-60mm

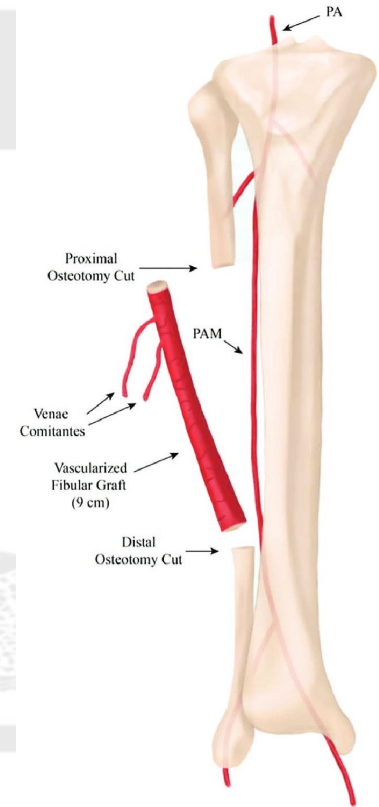
- Distraction-based treatment
 - Lizarov
 - Shortening and then lengthening
 - Bone segment transport
 - Useful in type B hosts



Fig. 4: Gradual shortening with circular external fixator

Type III defects 60-120mm

- Vascularized fibula grafts
- Masquelet
 - Complications: failure 29%, infection, refracture
- Bone transport



Type IV defects

- Allograft
 - Maybe assoc w/ ankle valgus, muscle weakness
- Amputation
 - May lead to a better outcome than a poorly salvaged limb
- Free tissue transfer



Resources, thank you Dr. Frumberg

- Ferreira, N., & Tanwar, Y. S. (2020). Systematic approach to the management of post-traumatic segmental diaphyseal long bone defects: Treatment algorithm and comprehensive classification system. *Strategies in Trauma and Limb Reconstruction*, 15(2), 106.

