Foot & Ankle Soft Tissue Reconstruction

- Challenging problem for the F&A Surgeon
- Local tissues are NOT usually available
- Numerous reconstructive methods are available
  - Allow the soft tissue defect to heal by secondary intention
  - Primary Closure
  - Skin grafting (Split vs Full Thickness)
  - Local fascial, fasciocutaneous, muscle, musculocutaneous & pedicle flaps
  - Microvascular free flap

Soft Tissue Reconstruction of the Diabetic Foot
Split Thickness Skin Graft (STSG)
ADVANTAGES

- “Easy take” in the foot & lower extremity
- Better Chance of Survival
- Simple to Perform and Easily Available
- Reliable & Minimally Invasive
- Can Cover Large Open Wounds & Amputations
- Cost Effective if needed to be repeated
- Dorsal aspect and NWB areas
- Closing donor sites in the arch or NWB areas
- Contains epidermis & part of dermis
- Donor sites: thigh/buttock/calf/foot

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Soft Tissue Reconstruction of the Diabetic Foot
Split Thickness Skin Graft (STSG)

- **Thin (0.008-0.012 inches)**
  - Heals readily
  - Wound contracts a lot

- **Intermediate (0.012-0.018 inches)**
  - More durable / best choice!

- **Thick (0.018-0.030 inches)**
  - Greater chance of failure
  - All of epidermis & dermis
  - Wound contracts very little
Soft Tissue Reconstruction of the Diabetic Foot
Split Thickness Skin Graft (STSG)

4 WEEKS POST-OP & STENT REMOVAL
Local Random Skin Flaps

- Categorized by their type of movement.
  - Advancement, rotation, transposition.
- Allow transfer of similar tissue for adjacent coverage.
- Especially useful in diabetic patients.
- Advantage of providing durability.
- Usually based on geometric designs.
- Include epidermis, dermis, and subcutaneous tissues.

LOCAL RANDOM SKIN FLAPS


- Advancement
- Rotational
- Transposition
- Bilobed
- Rhomboid
- Double Z rhomboid
Angiosomes

Taylor and Palmer defined an angiosome as a “block of tissue (skin, subcutaneous tissue, fascia, muscle and bone) fed by a source artery.”

Knowing vascular anatomy allows:
- Surgeon to plan safe incisions
- Provide sufficient blood flow on either side of the incision for the surgical wound to heal
- Assess which pedicle flaps can be harvested successfully

There are 3 major angiosomes of the foot:
- Posterior Tibial Artery:
  - Medial and medial-posterior ankle
  - Sole of the foot
- Anterior Tibial Artery:
  - Dorsum of the foot
  - Anterior ankle
- Peroneal Artery:
  - Lateral Supramalleolar area
  - Lateral and plantar heel
Local Rotational Flaps

- Excise the defect as a triangle – most of times
- Rotate a semicircular flap about the pivot point to close the circular or triangular defect.
- The secondary defect may then be closed primarily or skin grafted.

LOCAL RANDOM FLAPS

CASE # 1

Zgonis T et al. Surgical management of the unstable diabetic Charcot deformity using the Taylor Spatial frame. Oper Tech Orthop 2006; 16:10-17
LOCAL RANDOM FLAPS
CASE # 1

LOCAL RANDOM FLAPS
CASE # 1
**Rhomboid Flap**

- Used to close a rhomboid shaped defect with internal angles of 60 and 120 degrees.

- A flap with identical dimensions is designed on the side of the defect judged to have the most available tissue.

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**LOCAL RANDOM FLAPS**

Zgonis T et al. Plastic surgery reconstruction of the diabetic foot. AORN 2008
LOCAL RANDOM FLAPS
CASE # 2

MUSCLE FLAPS

- TYPE 2 MUSCLE FLAPS PROVIDE A WELL VASCULARIZED TISSUE ISLAND
- USEFUL FOR:
  - FILLING BONE DEFECTS
  - NERVE WRAPS
- EXAMPLES: ABDUCTOR HALLUCIS, FDB & ABDUCTOR DIG MIN
- EASILY COVERED WITH SKIN GRAFT

ABDUCTOR DIGITI MINIMI MUSCLE FLAP

Zgonis T et al. Use of a muscle flap and a split-thickness skin graft for a calcaneal osteomyelitis after an open reduction and internal fixation. JAPMA 2008

4th Annual International External Fixation Symposium
December 11-14, 2008
ABDUCTOR DIGITI MINIMI
MUSCLE FLAP

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MUSCLE FLAP
ABDUCTOR DIGITI MINIMI MUSCLE FLAP

ABDUCTOR DIGITI MINIMI MUSCLE FLAP
CONCLUSIONS

- “Out of the box” thinking…
- Team Approach
- Careful Patient Selection!!!
- Reconstructive F&A Surgeon

THANK YOU!

zgonis@uthscsa.edu