

Wound Management
and
Soft Tissue Reconstruction

Topics

- Evaluation
- Initial surgical management
- Dressings and wound coverings
- Definitive closure

Evaluation

| | |
|-----------------|------------------|
| • Wound: | • Extremity |
| – Size | – Pulses |
| – Shape | – Perfusion |
| – Location | – Sensation |
| – Edges | – Motor |
| – contamination | – Other injuries |

Define at risk injuries...

- High energy tibial plateau
- Pilon

- These are cases that almost always require spanning/bridging external fixation and delayed ORIF

Soft tissue issues at the time of ORIF...

- Tourniquet...?
- Full thickness flaps
- Minimize self retainers
- Soft tissue friendly closure

Open fractures/traumatic wounds

Is it Salvageable?

Indications for early amputation

- “Absolute”
 - complete disruption of the posterior tibial nerve
 - warm ischemia > 6 hours in a crush injury
- “Relative”
 - life-threatening hemorrhage in multi-trauma
 - ipsilateral complex foot trauma
 - prolonged reconstructive course beyond patient tolerance

Predicting survival

- Scoring systems
 - MESI 1985
 - PSI 1987
 - MESS 1990
 - LSI 1991
 - NISSA 1994

Dirschl and Dahners
JAAOS 4: 182-190, 1996

LEAP - predictive indices

Bosse et al. JBJS 83A(1):3-14, 2001

èMESS, PSI, LSI
èSensitivity = 46%
èSpecificity = 87% (PSI) - 97% (LSI)

Timing

- Delay increases risk of infection past a certain point....?24 hrs?
- The single most important factor is time to IV antibiotics
- Complete D+I is more important than early poorly done one.

Surgical Treatment

- Debridement
- irrigation
- stabilization
- peri-operative antibiotics

Debridement

- Initial procedure is most important
- Goals:
 - remove all foreign material
 - remove nonviable host tissue
 - decrease bacterial load
 - create clean, living wound

Debridement

- Principles
 - experienced surgeon
 - limit tourniquet
 - extend wound – longitudinal!
 - systematic, layer by layer
 - save skin in key areas
 - fat and fascia are expendable
 - dead muscle has to go

Wound Irrigation

- Volume
- Delivery Method
 - high or low pressure
 - pulsatile or continuous
- Choice of Solution
 - Antiseptics
 - Antibiotics
 - detergents

After the I&D...

- Primary closure (Temporary?)
- Immediate Flap or graft
- Open
 - Wet-to-Dry Dressings
 - Hydrocolloid Gels
 - Semipermeable membranes
 - Bead Pouch
 - VAC

Antibiotic Bead Pouch Rationale

Seligson, Henry, Osterman and others – University of Louisville

- Deliver a high local concentration of antibiotics with low systemic levels
- Reduce wound dessication
- Reduce dressing changes
 - lessen contamination
 - lessen patient discomfort

Antibiotic Bead Pouch Effectiveness

- Animal Studies
 - equally or more effective than systemic antibiotics
- Human Studies
 - mostly retrospective
 - used in conjunction with systemic antibiotics
 - see the handout for details

Technique: *Making the Beads*

- Molds vs. Handmade
- Recipe
 - What antibiotic
 - How much
- Mix the Powders
- Wire vs. Suture

Technique: *Making the Pouch*

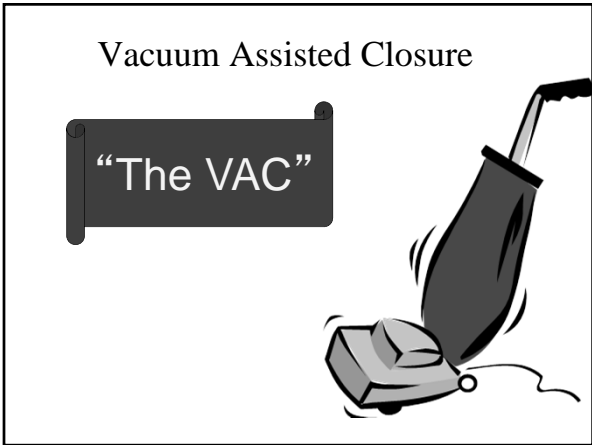
- Bead placement
- How many?
- Covering the Pouch
- To drain or not to drain?

Technique: *wound management*

- Change beads q24-72 hours - with re-debridement
- wound coverage when clean, living wound achieved
- Planned bone grafting at 6 weeks for defects or stripped bone

FDA status

[Redacted]



New Techniques in wound Management:
Vacuum-Assisted Wound closure
Lawrence X. Webb
JAAOS 10(5):303-311, 2002

- Introduced by Argenta and Morykwas, *Ann Plast Surg 1997*
- **Constant or intermittent negative pressure**
 - Removes fluid
 - Decreases edema
 - Prevents dessication and contamination
 - Improves local circulation
 - Promotes granulation
 - Traction on wound edges and surfaces

- ### Components
- Polyurethane sponge
 - Tubing
 - Adhesive plastic sheets
 - Reservoir
 - Programmable Pump

- ### Technique
- Complete debridement
 - Sponge cut to fit wound
 - Tubing placed in hole in sponge
 - Adhesive sheets applied
 - Seal tested
 - Connected to pump
 - Change under clean conditions q2-3 days

**Complications and
Contra-indications**

- Skin rash
- Skin tear or shearing
- Ingrowth of granulation into sponge
- Use with caution in:
 - Bleeding disorder
 - Large surface area (fluid loss)
 - Large exposed bone or plates
 - Exposed vessels
 - Neoplasia?

Definitive coverage

Traditional teaching for open tibias:

Proximal 1/3 → Gastrocnemius rotation

Middle 1/3 → Soleus flap

Distal 1/3 → Free Flap

Now:

Proximal, Middle, Distal → Fasciocutaneous
Rotation
Flap
