

1. Decision Making For Limb Salvage Versus Amputation in the Mangled Extremity

- a. Each case is unique- understand the injury and the host
- b. What are the solutions for loss of: skin, muscle, bone, nerves, and blood vessels?
- c. Initial damage control orthopaedics- delayed/staged amputation is ok
- d. Limb scoring systems are not reliable
- e. LEAP Study data shows both amputations and limb salvage have poor long-term scores
- f. Individualize decision- have the difficult talk with the patient

2. Amputation Pearls

- a. A systematic approach is best for reproducible outcomes (in a life changing surgery)
- b. Identify-cut-bury all named nerves and ligate vessels within soft tissues above bony cut
- c. Goal is a non-painful, balanced bony cut within stable, adequate soft tissue envelope
- d. Save length and knee joint whenever possible
- e. Energy expenditure is inversely proportional to residual length (less energy with longer BKA than short BKA, but too long may limit prosthetic options)
- f. Maintain any viable atypical soft tissue flaps for closure options in traumatic injuries
- g. Secondary soft tissue flaps/grafting may be necessary to save length
- h. Do not acutely close amputations through traumatic zone of injury
- i. Proximal fractures do not predict amputation level- fix the fracture and save length

3. Predictors for Wound Healing

- a. Total lymphocyte count >1500/ul
- b. Serum albumin >3.5g/dl
- c. Total protein >6.2g/dl
- d. Hgb >11g/dl
- e. TcpO2 >30mmHg

4. Amputation Levels

a. Transmetatarsal

- i. Highly functional, plantar flap, may require toe filler and arch support (steel shank)

b. Hindfoot: Chopart, Boyd

- i. Must balance equinus and equinovarus deformities, not functional for young patient

c. Syme (Ankle Disarticulation)

- i. Functional, requires sensate heal pad, anchor heel pad to tibia w/ Achilles tenodesis
- ii. Easier suspension of socket but fewer prosthetic options than good BKA

d. Trans-tibial (BKA): 10-25% increased energy expenditure

- i. Highly functional, bone cut determined by the soft tissues
- ii. Bone cut 12-15cm from knee joint, require ~11" from heel for proper prosthetic fit
- iii. Rotational posterior flap better than fishmouth incision
- iv. Ertl (distal tib-fib synostosis) theoretically more functional but assoc'd w/ complications
- v. Numerous prosthetic options

e. Knee Disarticulation

- i. Intact adductors, good end bearing level, offset knee center alters gait and prosthetics

f. Trans-femoral (AKA): 65% increased energy expenditure

- i. Outcomes directly related to optimal adductor/hamstring muscle balancing (myodesis)
- ii. Tension myodesis with hip extended and adducted, then quad/biceps/sartorius myoplasty
- iii. Bone cut 9-14cm from MFC (12cm if no prosthetic rotator unit, 15cm if using rotator)