Why the Team Approach is So Critical in Limb Salvage

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Disclosures

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“I marvel that society would pay a surgeon a large sum of money to remove a patient’s leg…but nothing to save it.”

George Bernard Shaw

Coming events cast their shadows before…

Thomas Campbell
Amputation or Salvage…?

Limb Salvage Team

**Goals of Concept**

- Raise awareness of limb salvage
- Increase Options
  - Diabetes
  - ESRD
  - Venous disease
- Become a referral source for the community
- Improve financial viability
  - Streamline care
  - > 50% of patients are Medicare
  - Decrease the “steps” required for access
  - Limb salvage less expensive than amputation?

Infection Ischemia Biomechanics

- Team Approach
  - Rapid assessment
  - Simultaneous approach
  - Displace medical egos
  - Share the liability
  - Give patient and family reassurance / confidence
  - Practice EBM

“Reducing amputation rates in patients with diabetes at a military medical center: the limb preservation service model.”


**RESULTS:**

- Diabetes increased 48% from 1999 to 2003
- LEAs decreased 82% from 1999 to 2003
- Amputations of the foot, ankle, and toe comprise 71% of amputations among patients with diabetes
Change in the amputation profile in diabetic foot in a tertiary reference center: efficacy of team working.


Overall amputation rate was 39.4% before team vs. 36.7% after team established

- Data suggest that amputation is still a frequently encountered outcome
- Amputation profile changed to distal
- The implementation of a diabetic foot care team has decreased the rate of major amputations

Cost of Diabetic Foot Ulcers

- Average $27,721 US
- Average cost 4 x higher with PAD
- 9 to 20% Require Hospitalization
- Major Cost is Inpatient Care
  - 74 to 84% of total costs
- Patients hospitalized with diabetes are 28 x more likely to have an amputation than patients without diabetes
- 2/3 of all amputations are paid for by Medicare


Epidemiology of Amputation

- >60% of all amputations involve diabetes in US
- 9-20% of ulcerations end in amputation
- ~84% of lower extremity amputations are preceded by ulceration


One Amputation Does Indeed Potentiate the Next…
Following the First Lower Extremity Amputation:

- Contralateral amputation – 68% within 5 years
- Mortality Rate – 50% at 3 years
- Institutionalization – 25% remain permanently


Wound Care Market?

- $10 billion Worldwide Market for Products and Services
- 5 to 7 million Projected Annual Wounds
- Market Growth ~5% Annually

Ulcerations Are Pivotal Events In Limb Loss

- Portal for infection
- Necrosis in the presence of critical ischemia

Pathways to Ulcers and Amputations in the Diabetic Foot

- Callus/Trauma
- Neuropathy
- Vascular Disease
- Ulceration
- Failure to Heal
- Infection
- Amputation
- High Foot Pressures/LJM
Reported Risk Factors For Ulceration

…Can be Fixed with Surgery

- Peripheral neuropathy
- Vascular disease
- Limited joint mobility
- Foot deformity
- Abnormal foot pressure
- History of ulceration or amputation
- Impaired visual acuity

Peripheral Sensory Neuropathy

- Importance of neurologic evaluation
- Strong risk factor easily identified
- Offloading and Mechanical Correction

The Equation:

Neuropathy + Elevated forefoot pressure + Achilles tendon structural/functional pathology → Tissue Breakdown

Charcot Midfoot…

Subtle Foot Deformity...

Prophylactic Foot Surgery in the Patient with Diabetes?

- Patient Selection
- Pre Operative Screening
- Define Category of Procedure:
  - Elective vs. Prophylactic vs. Curative vs. Emergent
- Evidence Based?
  - Tendo Achilles Lengthening
  - 1st MTPJ Arthroplasty
- Prepared for Complications?
- Team Approach


Become More Than “A Wound Care Center”

- Limb Salvage
- Amputation Prevention
- Limb Preservation
- Comprehensive Wound Management
- Medical and Surgical Team
- Extensive OR Access

Attinger et al. How to Make a Hospital Based Wound Center Financially Viable. Gyno Onc 2008

Surgical specialty
Vascular surgeon Arterial revascularization (angiographic and bypass techniques) and venous interventions
Podiatrist Diabetic foot ulcer management and surgical correction of foot and ankle
Orthopedic surgeon Foot and ankle surgery
Plastic surgeon Wound coverage techniques
Medical specialty
Infectious disease specialist Surgical infections
Hyperbarist Treating wounds with hyperbaric oxygen
Endocrinologist Aggressive management of glucose levels
Rheumatologist Vasculitic ulcers
Hematologist Coagulopathic ulcers
Hospitalist Medical management of wound patients in house
Psychiatrist Behavior modification and dealing with grief from loss of body part; address ulcers with psychological etiology

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### Inpatient and Outpatient Service INTEGRATION

- Shared Providers
- Communication
- Prevents Delay in Care
- Physician Extenders Key
- Removes the “hand-off”

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### Principles of the Team Approach

- Can improve outcomes AND revenue
- Requires combined Inpatient and Outpatient efforts
- Hospital and Community IDENTITY
- Evidence Based Protocols
- Full Time Providers
- Hospital Administration Buy-In
- Learn to love Hospital Politics!
Comprehensive foot care programs reduce amputation rates 45-85%