

# Get a Leg Up on Preventing Lower Extremity Amputation



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11:00 AM – 12:00 PM Central

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# Patient Story

- JP is a 75 year old white female with longstanding Type 2 DM
- Oral meds + insulin
- A1C in double digits, as high as 14%
- Diabetic foot ulcer on RIGHT foot, podiatry for  $\approx$  12 months
- Stopped seeing PCP





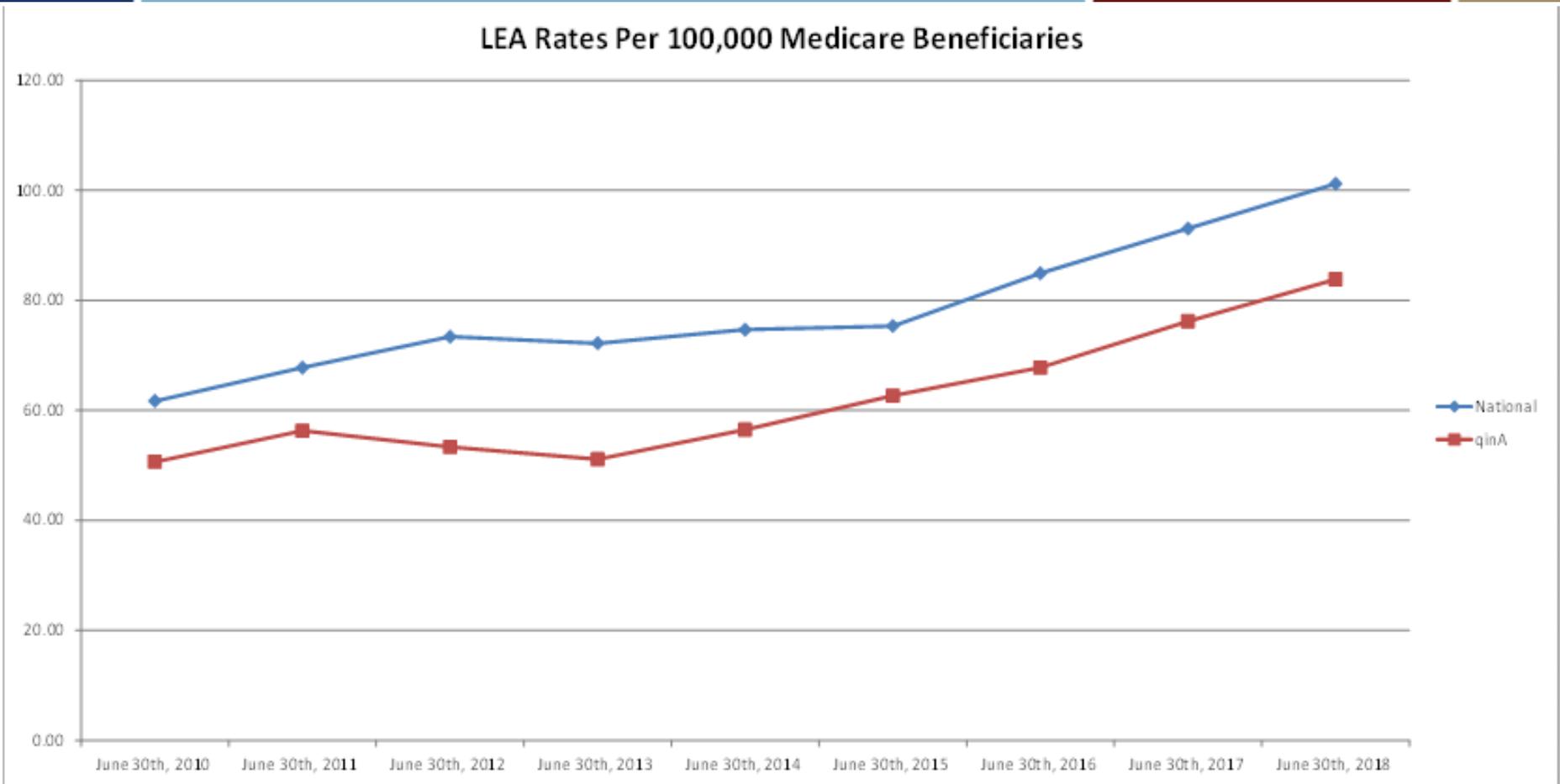
Once the sock was removed





# Medicare Claims Data

## National-Regional comparison



Analysis provided by Great Plains Quality Innovation Network | Minot, ND April 2019

# Lower Extremity Amputation Defined

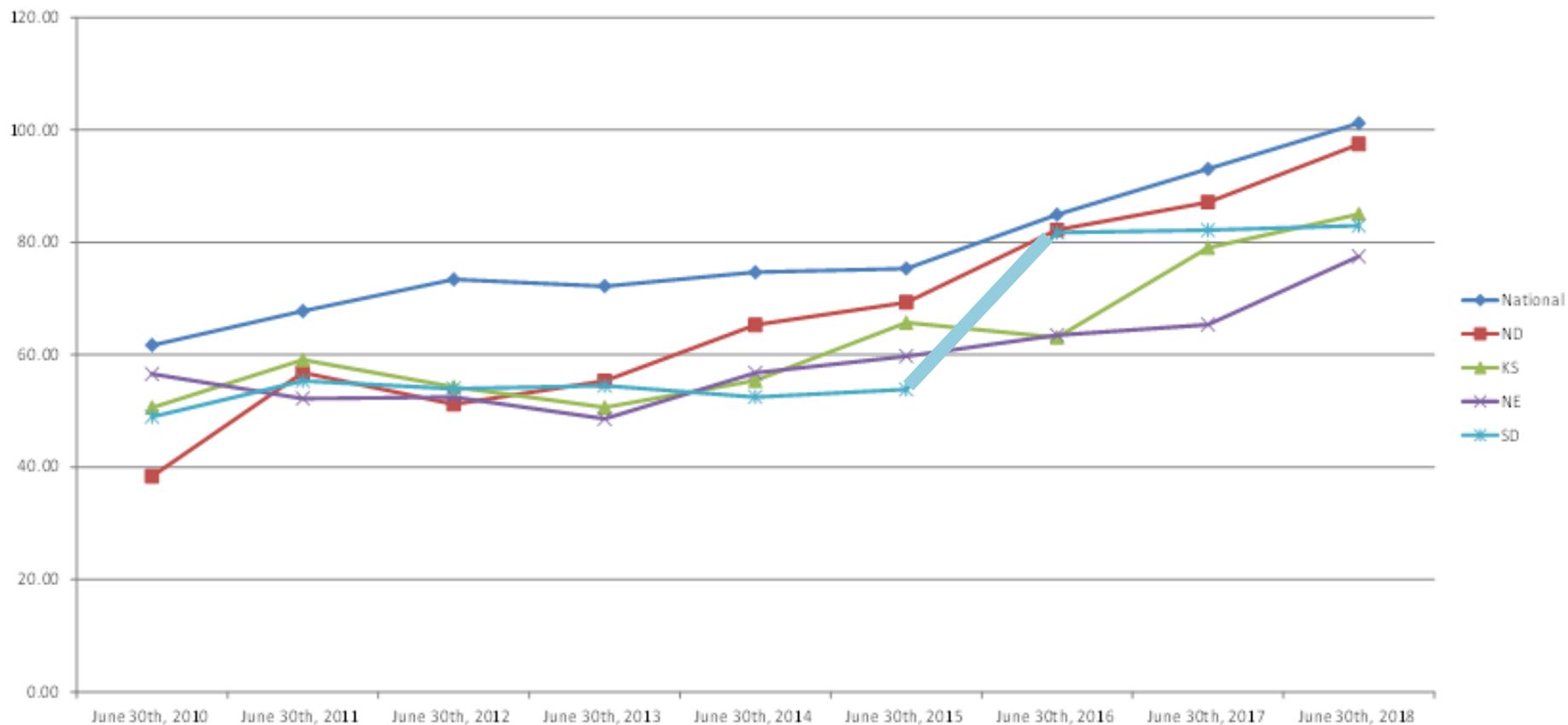
- Number of patients that had a claim with a LEA procedure code and diagnosis code identifying the patients as having diabetes.
- Claims that had a diagnosis code indicating a traumatic amputation and toe amputations were excluded.
- ICD-9 and ICD-10 codes for these inclusions and exclusions were selected to match the AHRQ Prevention Quality Indicator #16.

**Note: the October 2015 switch from ICD-9 to ICD-10 classification may affect number of LEAs identified.**

# Medicare Claims Data

## National-State comparison

LEA Rates Per 100,000 Medicare Beneficiaries



Analysis provided by Great Plains Quality Innovation Network | Minot, ND April 2019

# References

Lower-Extremity Amputations in Diabetes Are Back on the Rise, but Why? - Medscape  
- Mar 14, 2019.

[https://www.medscape.com/viewarticle/910139?nlid=128775\\_5163&src=WNL\\_mdpls\\_feat\\_190319\\_mscpedit\\_diab&uac=204651FK&spon=22&impID=1912102&faf=1](https://www.medscape.com/viewarticle/910139?nlid=128775_5163&src=WNL_mdpls_feat_190319_mscpedit_diab&uac=204651FK&spon=22&impID=1912102&faf=1)

Richlen, Bill. "Diabetic Foot Exam Made Easy." *Wound Care Education Institute*.

<https://www.wcei.net/courses/webinars> . Accessed 4 April, 2019.

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# CURRENT TRENDS IN THE DIABETIC FOOT 2019

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# DIABETIC FOOT: FACTS AND FIGURES

- Diabetes affects 26 million people in the US and more than 366 million people worldwide.

[Diabetesatlas.org/American Diabetes Association](http://Diabetesatlas.org/American%20Diabetes%20Association)

- Diabetes kills more people annually than breast cancer and AIDS combined.

[American Diabetes Association, 2009.](#)

- 80% of people with diabetes are from low and middle income nations.

[International Diabetes Federation, 2012.](#)

# DIABETIC FOOT: FACTS AND FIGURES CONTINUED...

- The number of people with diabetes is increasing in every single nation.

International Diabetes Federation/World Health Org 2012.

- Half of people with diabetes don't know they have it.

American Diabetes Association.

- Second Count: Every 7 seconds someone dies from diabetes. Every 17 seconds someone is diagnosed. Every 20 seconds someone is amputated.

International Diabetes Federation / Diabetes.org  
Armstrong, et al, Diabetes Care 2013 , In Press.

# DIABETIC FOOT: FACTS AND FIGURES CONTINUED...

- By 2030, at least 550 million people will have diabetes-approximately 10% of the world's adult population.  
International Diabetes Federation (IWGDF), 2011.
- There are now approximately 79 million people with pre-diabetes in the USA. That is equivalent to the total population of 30 states.  
American Diabetes Association, 2012. 2010 United States Census.

# DIABETIC FOOT: FACTS AND FIGURES CONTINUED...

- The population of diabetes in the USA is greater than the population of the nations 10 largest cities.  
American Diabetes Association, 2012. 2010 United States Census.
- 60-70% of those with diabetes will develop peripheral neuropathy, or lose sensation in their feet.  
Dyck et al. Diabetic Neuropathy 1999.
- Up to 25% of those with diabetes will develop a foot ulcer.  
Singh, Armstrong, lipsky. J Amer Med Associate 2005.

# DIABETIC FOOT: FACTS AND FIGURES CONTINUED...

- More than half of all foot ulcers (wounds) will become infected, requiring hospitalization and 20% of infections result in amputation.

Lavery, Armstrong, et al. Diabetes Care 2006

- Diabetes contributes to approximately 80% of the 120,000 non-traumatic amputations performed yearly in the United States.

Armstrong et al. Amer Fam Phys 1998.

# DIABETIC FOOT: FACTS AND FIGURES CONTINUED...

- Every 20 seconds, somewhere in the world, a limb is lost as a consequence of diabetes.

DFCon11, Bakker (after Boulton), DFCon.com  
Boulton. The Lancet (cover) Nov. 2005.

- After a major amputation, 50% of people will have their other limb amputated within 2 years.

Goldner. Diabetes 1960.      Armstrong, et al, J  
Amer Pod Med Assn, 1997.

# DIABETIC FOOT: FACTS AND FIGURES CONTINUED...

- More than half of the people with osteomyelitis of the heel will undergo high level amputation.  
Faglia, et al, Foot Ankle Int, 2013.
- The relative 5 year mortality rate after limb amputation is 68%. When compared with cancer-it is second only to lung cancer (86%). (Colorectal cancer 39%, Breast cancer 23%, Hodgkin's disease 18%, prostate cancer 8%).

Armstrong, et al, International Wound Journal, 2007.

Armer Cancer Society; Fats & Figures 2000.

Singh, Armstrong, lipsky et al. J Amer Med Assoc 2005.

Icks, et al, Diabetes Care, 2011.

# DIABETIC FOOT: FACTS AND FIGURES CONTINUED...

- Median time to healing for diabetic foot wounds: 147, 188, and 237 days for toe, midfoot and heel ulcers.  
Pickwell, et al, Diabetes Metab Res Rev, 2013.
- People with a history of a diabetic foot ulcer have a 40% greater 10 year mortality than people with diabetes alone.  
Iversen, et al, Diabetes Care, 2009.
- Every 30 minutes a limb is lost due to a landmine. Every 30 seconds, a limb is lost due to diabetes.  
Bharara, Mills, Suresh, Armstrong, Int Wound J, 2009.

# DIABETIC FOOT: FACTS AND FIGURES CONTINUED...

- Having a wound immediately doubles ones chances of dying at 10 years compared with someone without diabetes.  
Iversen, et al, Diabetes Care 2009.
- For people on dialysis receiving an amputation, 2 year mortality is 74%.  
Ndip, et al, 2012, Diabetes.
- Diabetic foot ulcers double mortality and heart attack risk while increasing risk for stroke by 40%.  
Brownrig, et al, Diabetologia, 2012.

# DIABETIC FOOT: FACTS AND FIGURES CONTINUED...

- Chronic wounds affect some 8 million Americans each year. That's one wound every 3.8 seconds in the USA, alone.  
Harsha, 2008 and Tomic-Canic 2010.
- Each \$1 invested in care by a podiatrist for people with diabetes results in \$27 to \$51 of healthcare savings.  
JAPMA, 101(2), 2011.
- Podiatry care not only reduces amputation risk, but also dramatically impacts rate of hospitalization and re-ulceration.  
Gibson, et al, Int Wound Journal, 2013.

# DIABETIC FOOT: FACTS AND FIGURES CONTINUED...

- Podiatric medical care in people with a history of diabetic foot ulcer can reduce high level amputation from between 65% and 80%.

Gibson, et al, Int Wound Journal, 2013.

- Instituting a structured diabetic foot program can yield a 75% reduction in amputation rates and a near four-fold reduction in inpatient mortality.

Weck, et al,  
Cardiovascular Diabetology, 2013.

# THE “UNHOLY TRIAD”

- Peripheral Vascular Disease
- Neuropathy
- Immunopathy



# PERIPHERAL VASCULAR DISEASE

- PAD carries a potential for death that is greater than both prostate and breast cancer combined.
- The American Heart Association/American College of Cardiology recommends PAD screening for anyone over the age of 50 who has diabetes and/or smokes and those over 70 years of age.

# VASCULAR EXAM

- Dorsalis Pedis Pulse
- Posterior Tibial Pulse
- Skin Texture and Temperature
- Capillary Refill
- Hair Growth
- Rubor and Palor



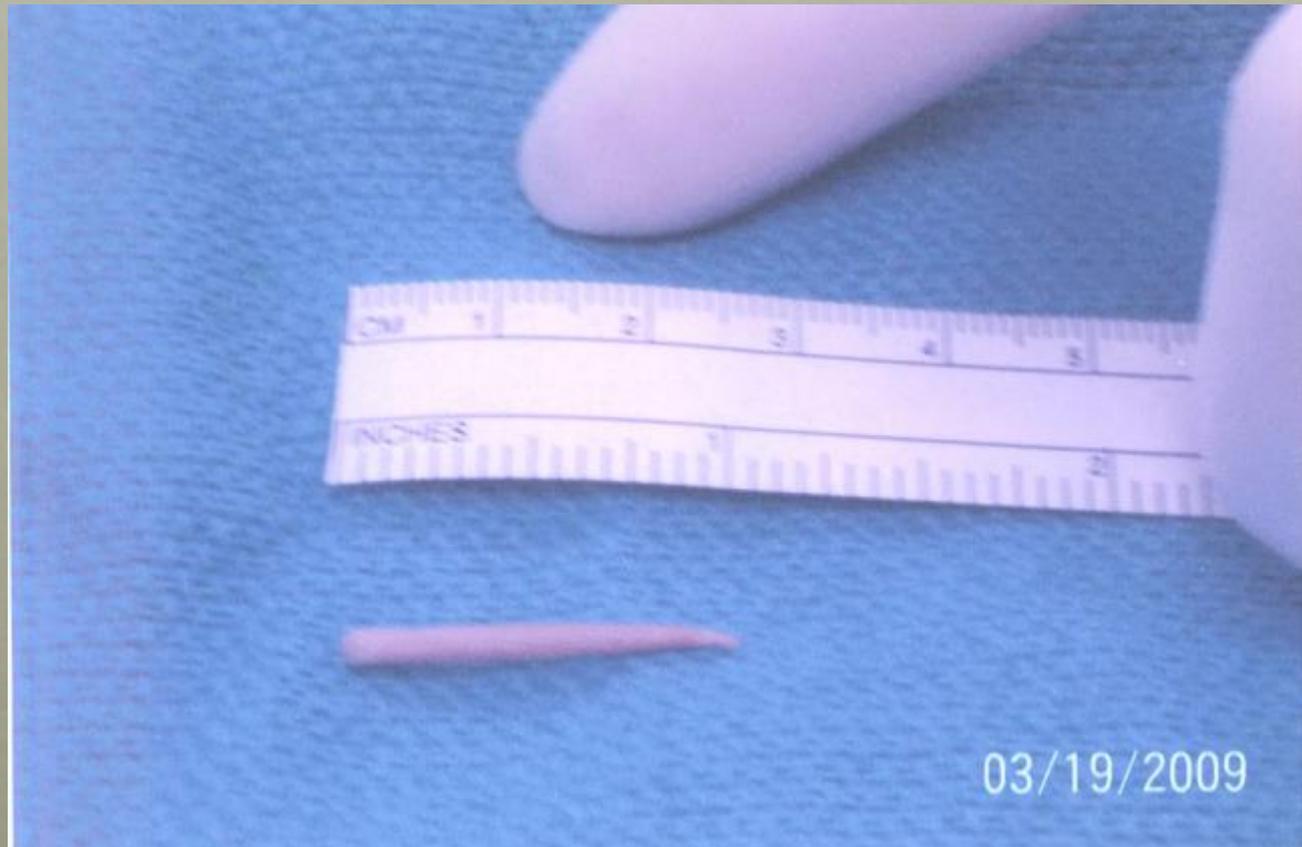
# VASCULAR EXAM

- Handheld Doppler
- Segmental Arterial Dopplers/ABI
- Angiogram
- Referral To Vascular Specialist For Stenting or Arterial Bypass.



# PERIPHERAL NEUROPATHY

- Sensory
- Autonomic
- Motor



# PERIPHERAL NEUROPATHY

- Essentially the result of altered glucose metabolism as a consequence of hyperglycemia. This leads to inhibition of nitric oxide production, accelerated Wallerian degeneration of the nerves and deterioration of the nerve sheath.
- Presents initially with hyperesthesia and hypersensitivity to temperature or pain and is followed by painful feelings or burning. Later defined by anesthesia.

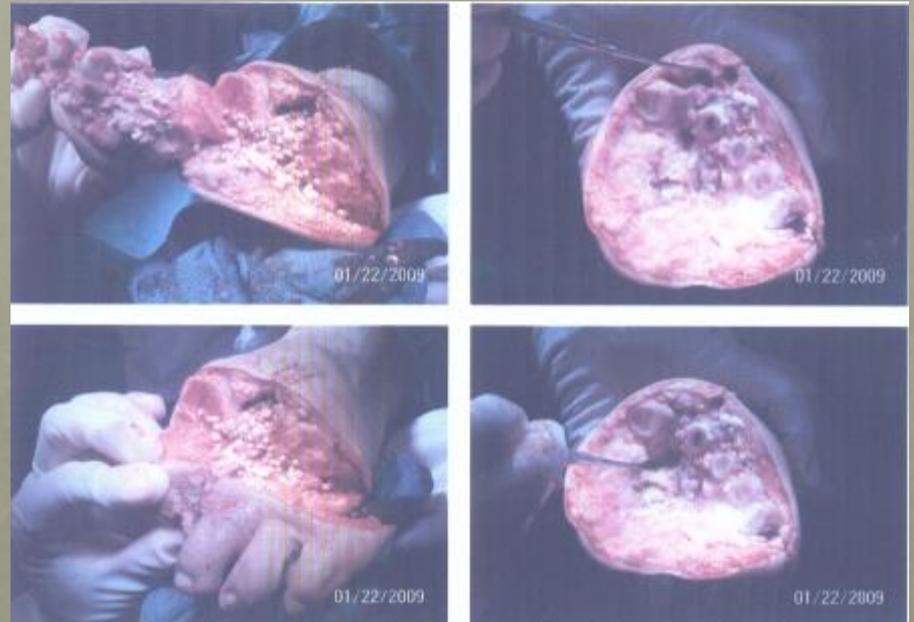
# NEUROPATHY EVALUATION

- 5.07 Semmes Wire
- Tuning Fork/Vibration
- Sharp/Dull Discrimination
- Deep Tendon Reflexes
- Nerve Conduction Studies
- Nerve Biopsy



# IMMUNOPATHY

- Bodies decreased ability to fight off infection
- WBC chemotaxis affected by hyperglycemic state
- Decreased circulation may not allow antibiotics to saturate infected areas



# PERIOPERATIVE MANAGEMENT

- Evaluate Circulation: Use Segmental Doppler/Doppler Studies
- Serum Albumen: Less than 2.5 will have difficulty healing
- Necrotic Tissue: Needs debridement down to healthy, bleeding tissue
- Infection: Appropriate antibiotics
- Glycemic Control: Try to optimize

# ANTIBIOTIC THERAPY

- Try to obtain accurate (deep) cultures before administering antibiotic therapy
- Diabetic infections almost always polymicrobial
- Blood cultures if warranted (fever?)
- Begin patient on broad spectrum antibiotics until culture and sensitivity returns (Zosyn/Vancomycin)
- Don't forget MRSA, VRE and anaerobes!

# WHAT'S NEW AND EXCITING?

- Platelet Rich Plasma
- Amniotic stem cells
- Tissue Expanders
- Antibiotic Beads
- Wound Vacuums
- Ultrasonic debrider
- Skin substitute grafts



# OSTEOMYELITIS

- If you can touch the bone through an opening in the skin then the bone is probably infected
- Bone infection **MUST** be surgically debrided
- Antibiotic therapy for six weeks (IV, oral or combination-opinions differ)
- PICC lines, Port-a-cath, PO
- MRIs can be deceiving
- Combination of x-rays, clinical judgment best option



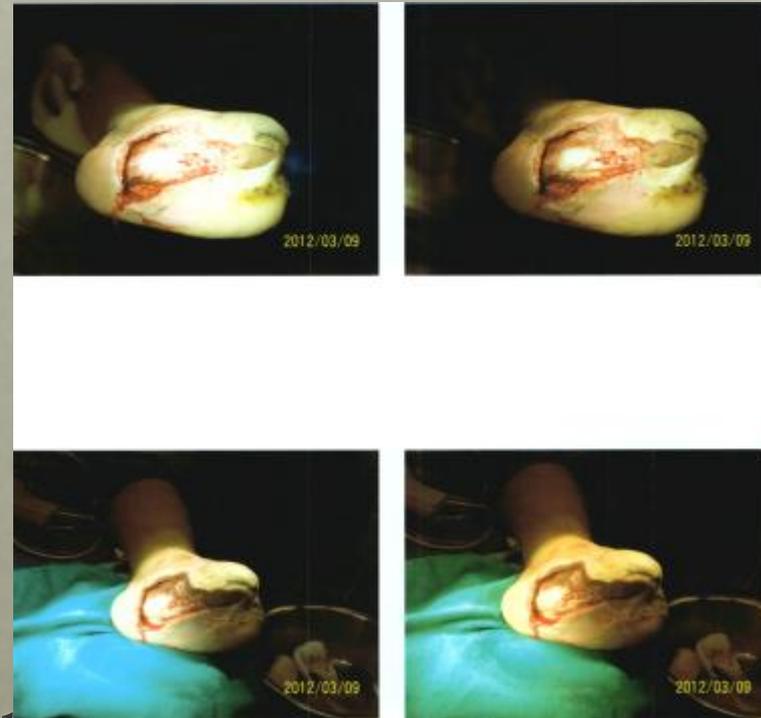
# WHEN TO AMPUTATE?

- Life threatening infection/sepsis
- Uncontrollable pain
- Patient wants to move on



# PLEASE MAKE IT STOP!

- Diabetes out of control: Carbohydrate Society
- Quit smoking!
- Blood sugar control (HgA1C)
- Exercise
- Proper footwear and foot exams
- EDUCATION
- Regular medical checkups every three months



# DIABETIC ULCERS

Neurotrophic ulcers are caused by increased pressure on bones. Callused rims are present with a “meaty” base. These ulcers do not hurt. Must offload pressure to cure these wounds. Most of these wounds are on the bottom of the foot.

Ischemic ulcers are also known as pressure ulcers. It can take as little as four hours for one to develop. They are usually painful and have a necrotic center. Vascular compromise plays a significant role in these ulcers.

# DIABETIC ULCERS



# WOUND CARE

- Eradicate infection
  - Debridement
  - Ph neutral environment
  - Moist wound environment
  - Nutrition
- Many wound care protocols, products on the market. Most of them work. Please keep your patients checkbook in mind. It doesn't always take a cannon to kill a mosquito!



# PREVENTION

- Diabetic shoes/socks
- Offload bracing
- Prophylactic surgery
- Regular foot exams
- Routine foot care (corns and calluses/toenails)



ARE YOU DONE YET?

