

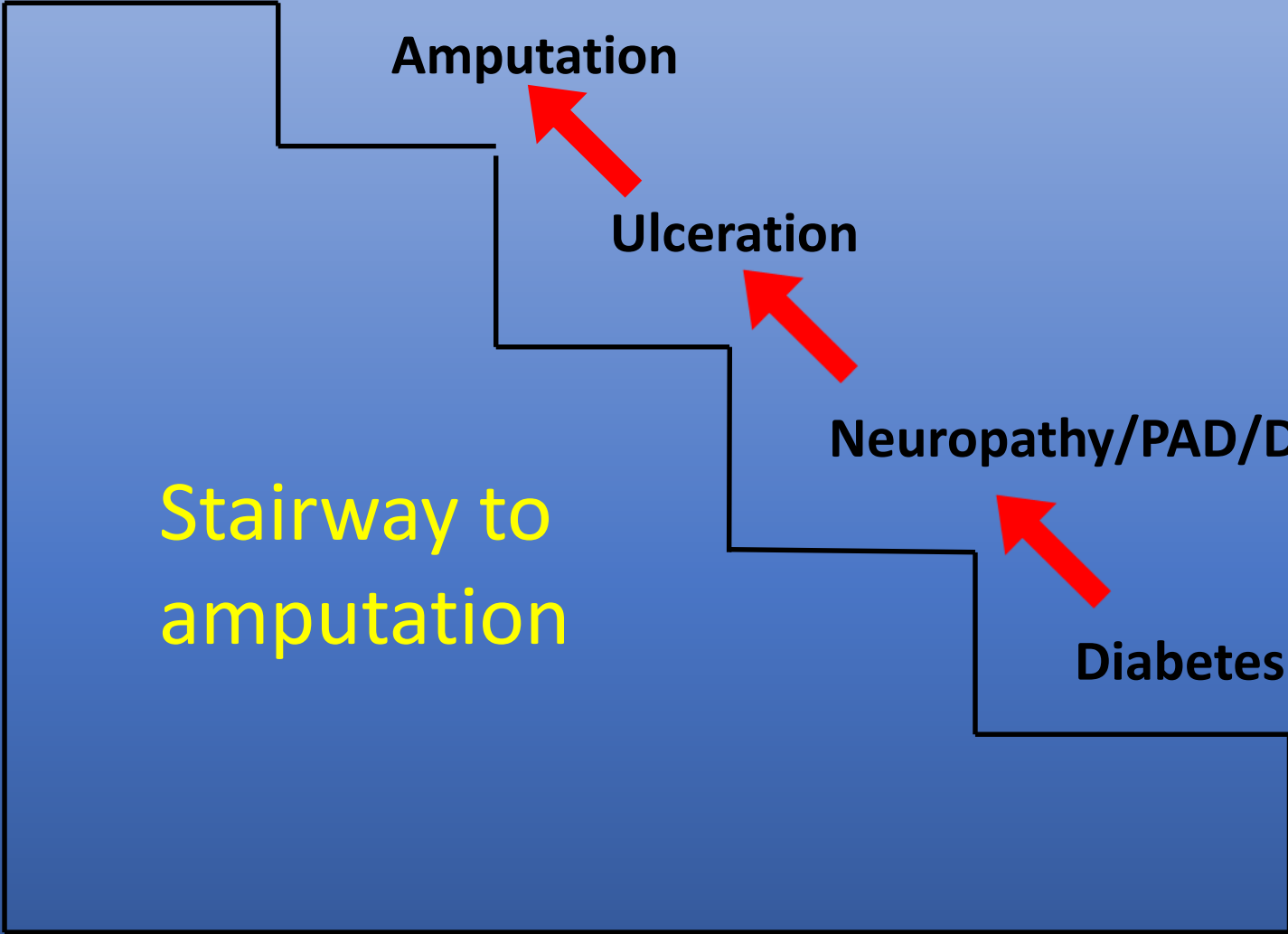
# Diabetic Foot Disease; what stops healing?

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Estimated annual cost	
Primary, community and outpatient care, ulceration	£629,161,354 – £786,451,692
Inpatient care, amputation	£43,797,632
Inpatient care, ulceration	£278,452,386
Post-amputation care	£20,813,777
<b>Total</b>	£972,225,149 – £1,129,515,487

**Table 1:** Total estimated expenditure on diabetic foot disease, England, 2014–2015

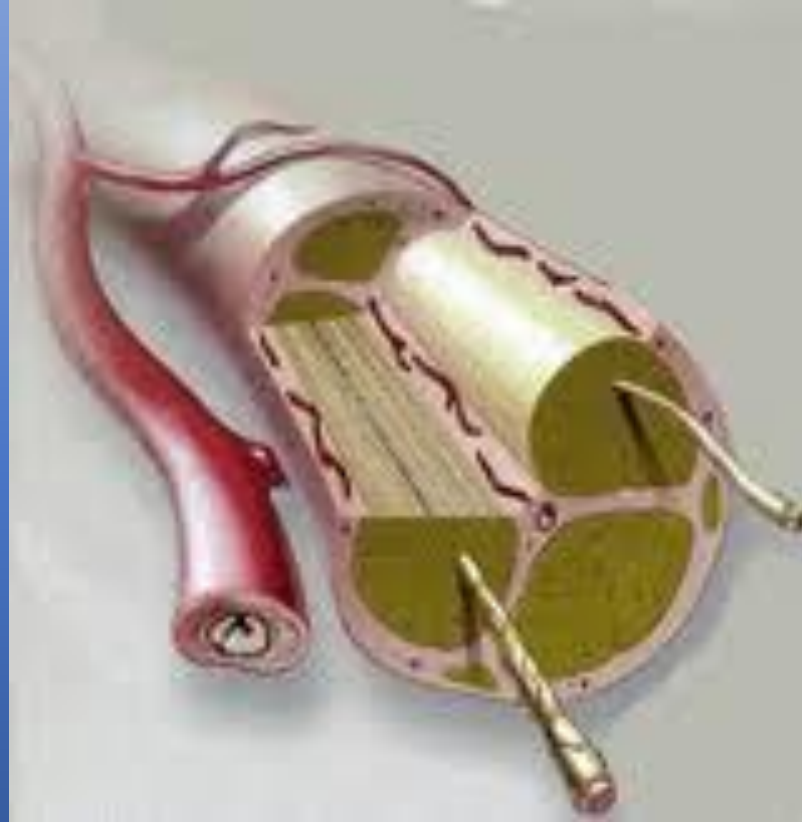
Improving footcare for people with diabetes and saving money: an economic study in England



Marion Kerr 2017

What causes ulcers in patients  
with diabetes?

# 1. Neuropathy



95% small fibres  
5% large fibres

# 1. Neuropathy

## Sensory

dozing in front  
of the fire



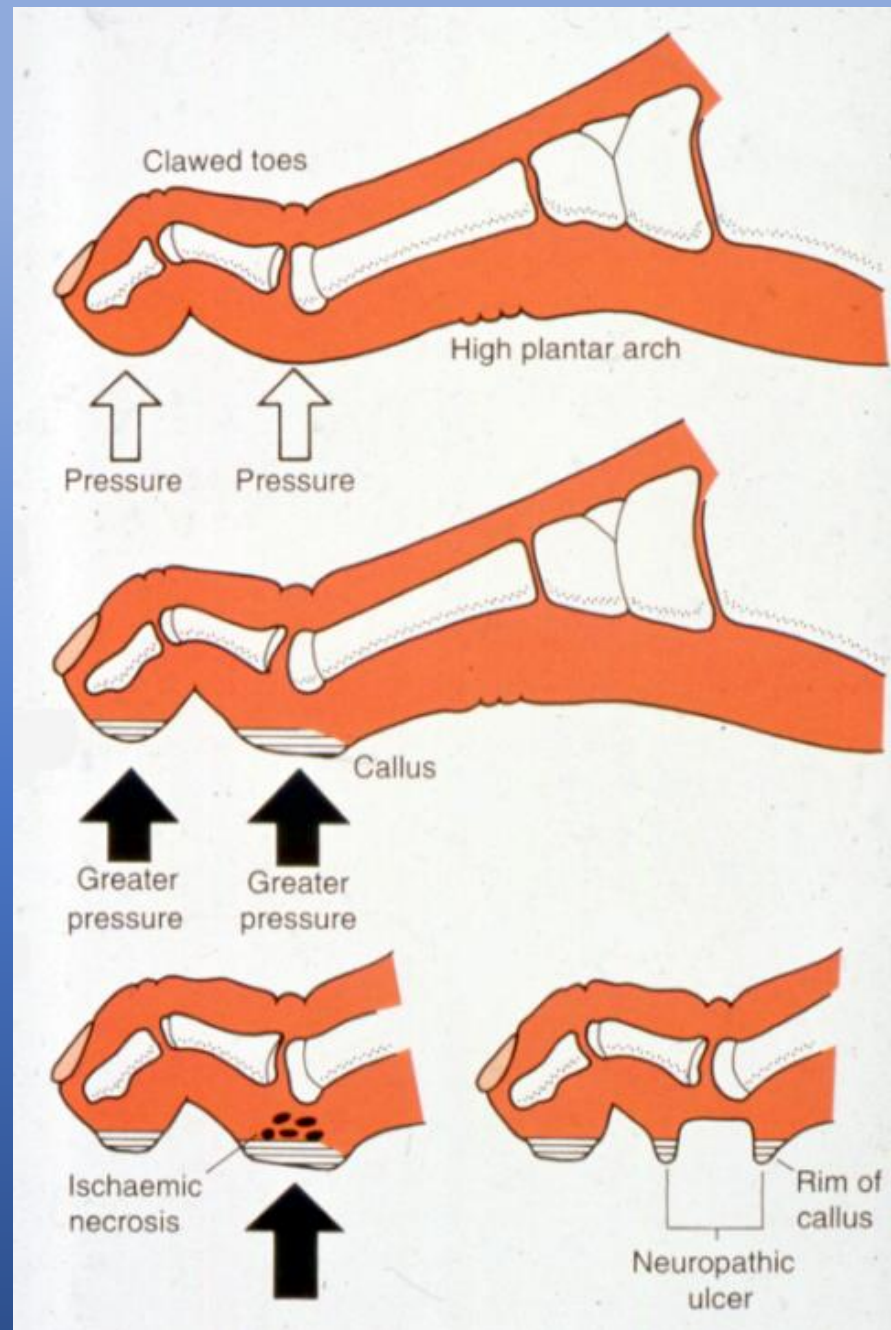
# 1. Neuropathy

Sensory

shoes rubbing



# Motor neuropathy - deformity

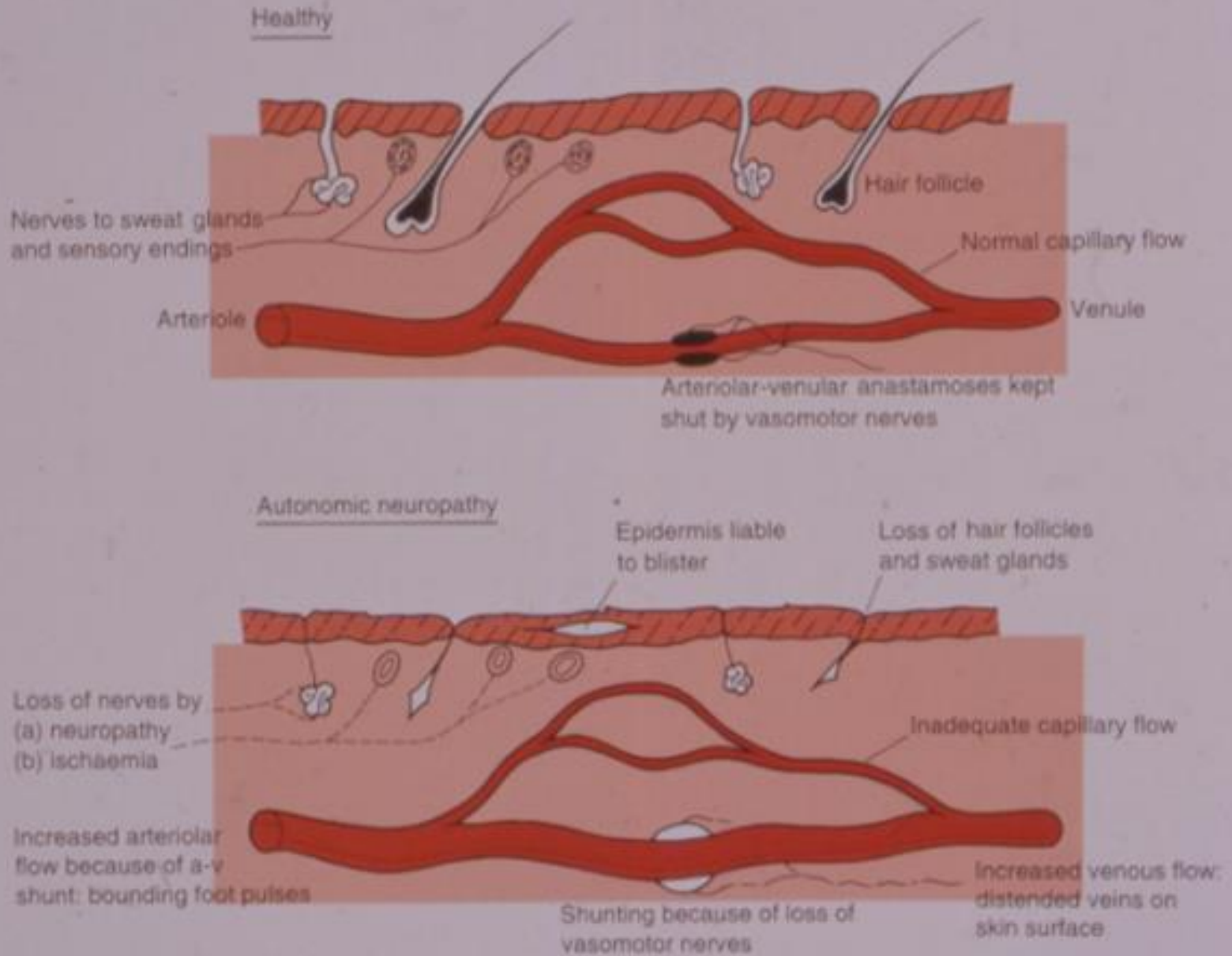




# Deformity

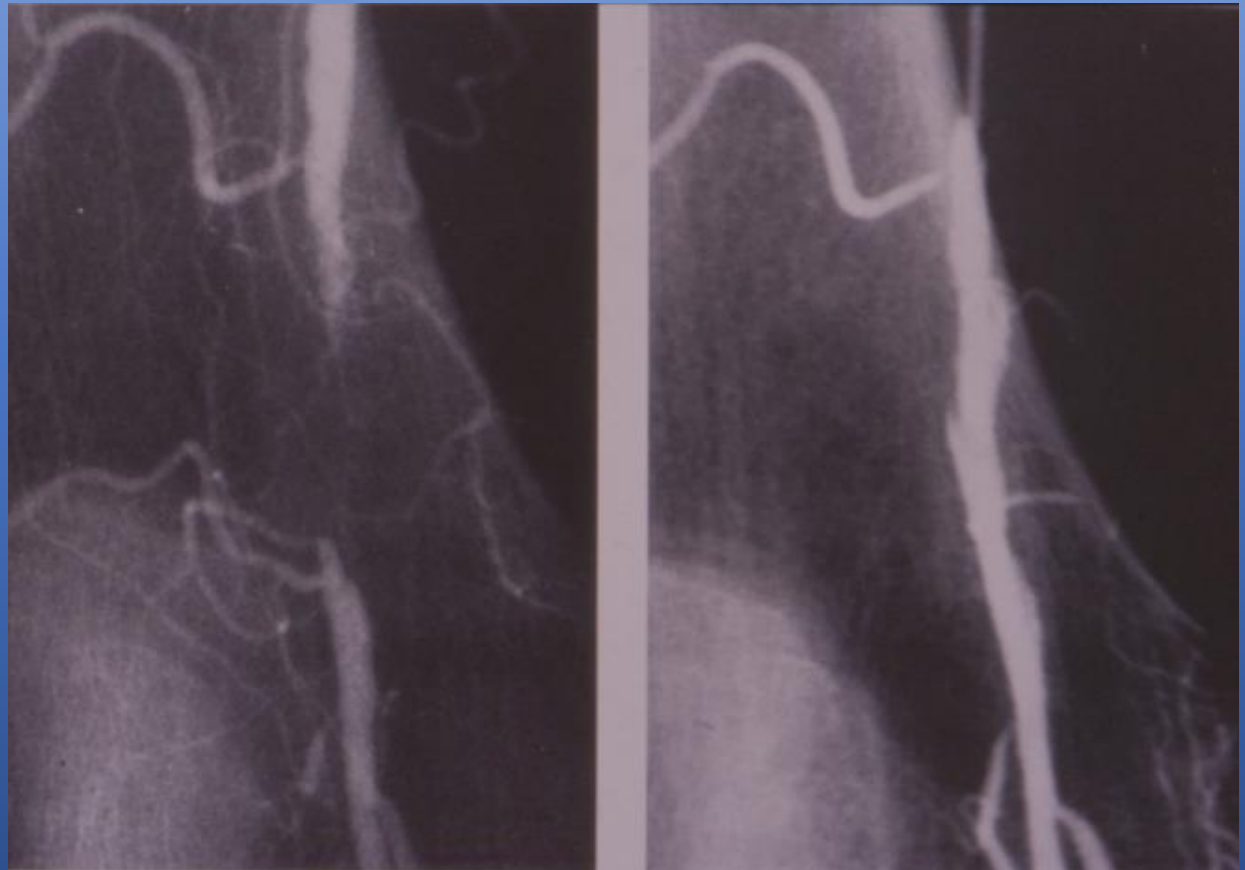


# Autonomic

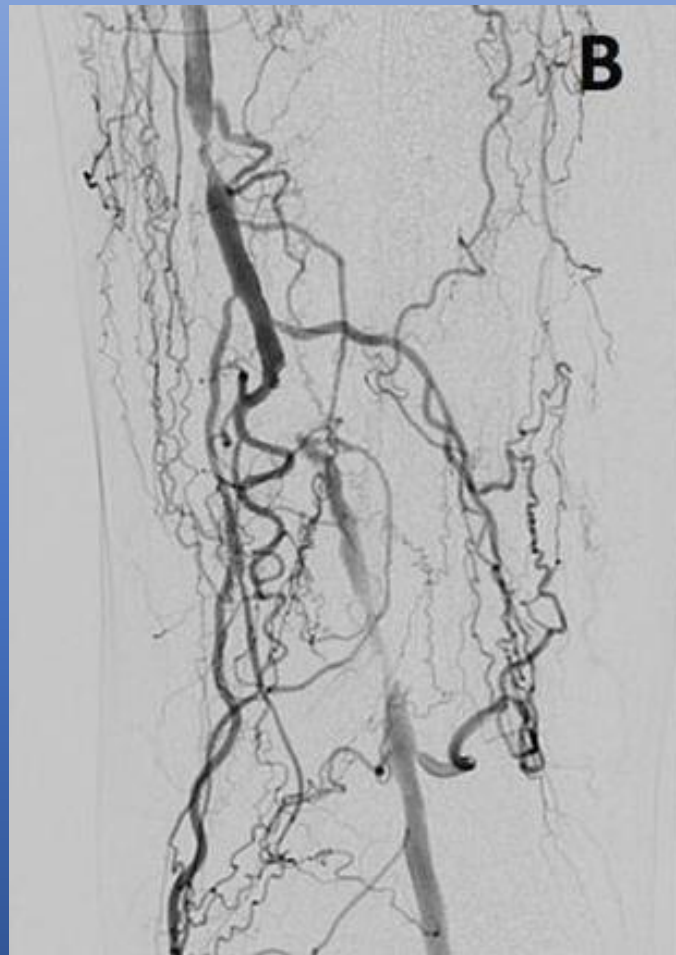


## 2. Ischaemia

Macrovascular



# Arteriography - collaterals





1. Basement membrane thickening
2. Endothelial cell damage
3. R. B. C. changes
4. Platelet stickiness increased



What stops healing?

# Ischaemia

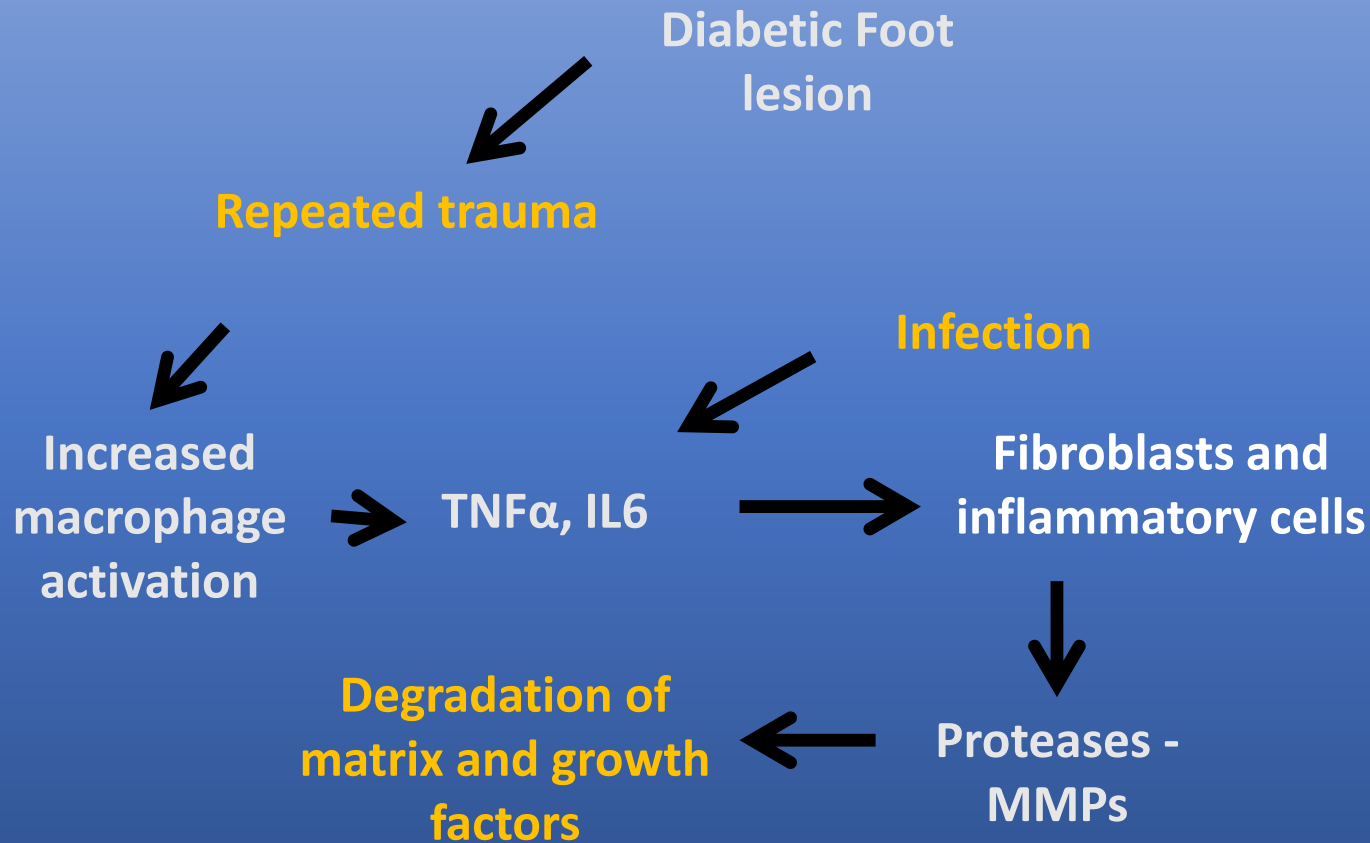
- Assessment
  - Palpation pulses
  - Doppler Ultrasound Wave forms
  - Ankle or toe systolic pressure
  - Direct/MR or CT angiography
  - TcPO<sub>2</sub> – affected by neuropathy

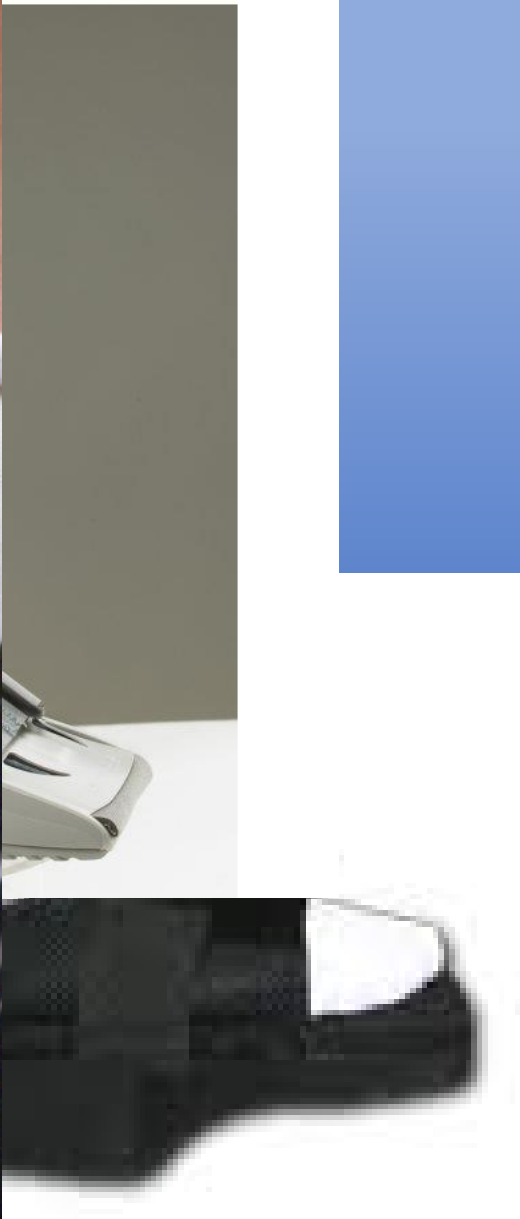
# Neuropathy

- Pressure relief



# Chronic inflammation and wound healing





# Infection

- Diagnosis?

# IDSA 2012 infection grading

**Infection present** -at least 2 of the following items:

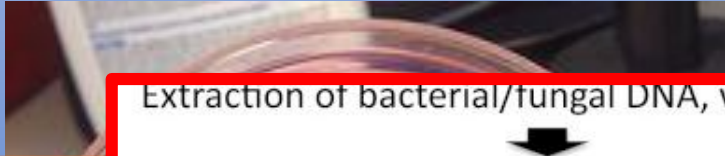
- Local swelling or induration
- Erythema
- Local tenderness or pain
- Local warmth
- Purulent discharge

**Mild** : >0.5 cm to  $\leq$ 2 cm around the ulcer

**Moderate** : erythema > 2 cm, or involving structures deeper than skin and subcutaneous tissues

**Severe** : systemic symptoms

# Microbiology?

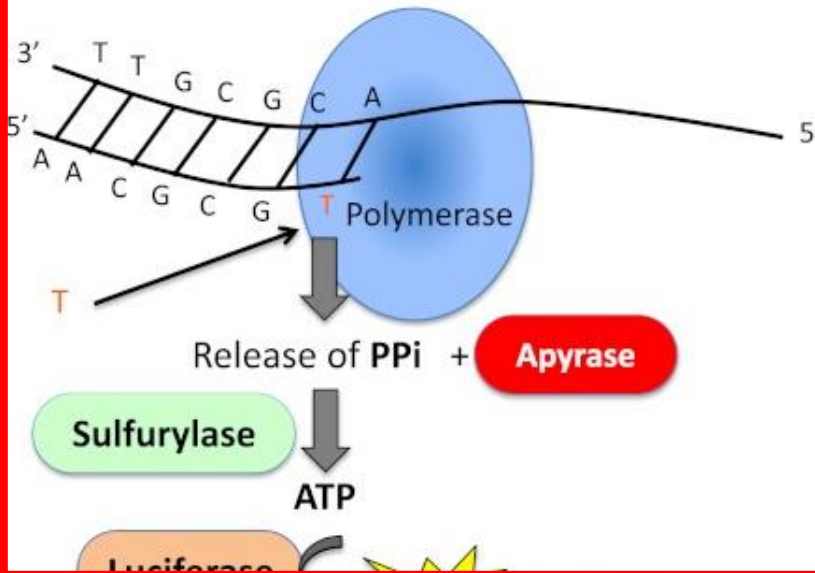


- Specimen
- Microscopy
- Gram stain
- Leucocyte
- Epithelial
- No organi
- Aspirate/T
- 1 Moderat
- 2 Moderat
- Candida s
- Ampicillin
- G
- Trin
- Extended A
- Anaerobe
- Enrichmen
- No furthe

Extraction of bacterial/fungal DNA, viral RNA

16S rRNA PCR

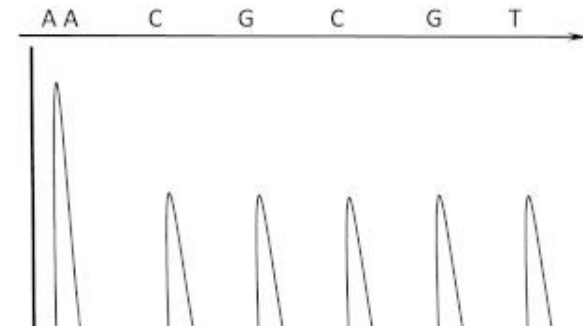
Pyrosequencing



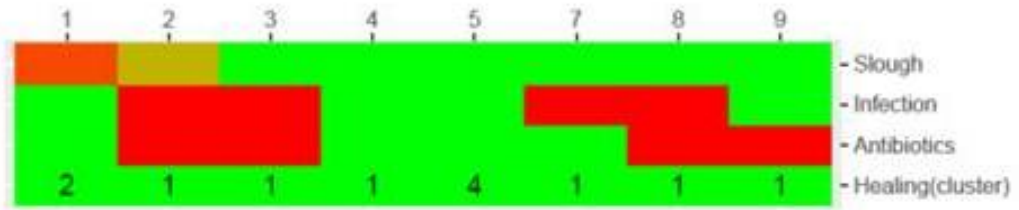
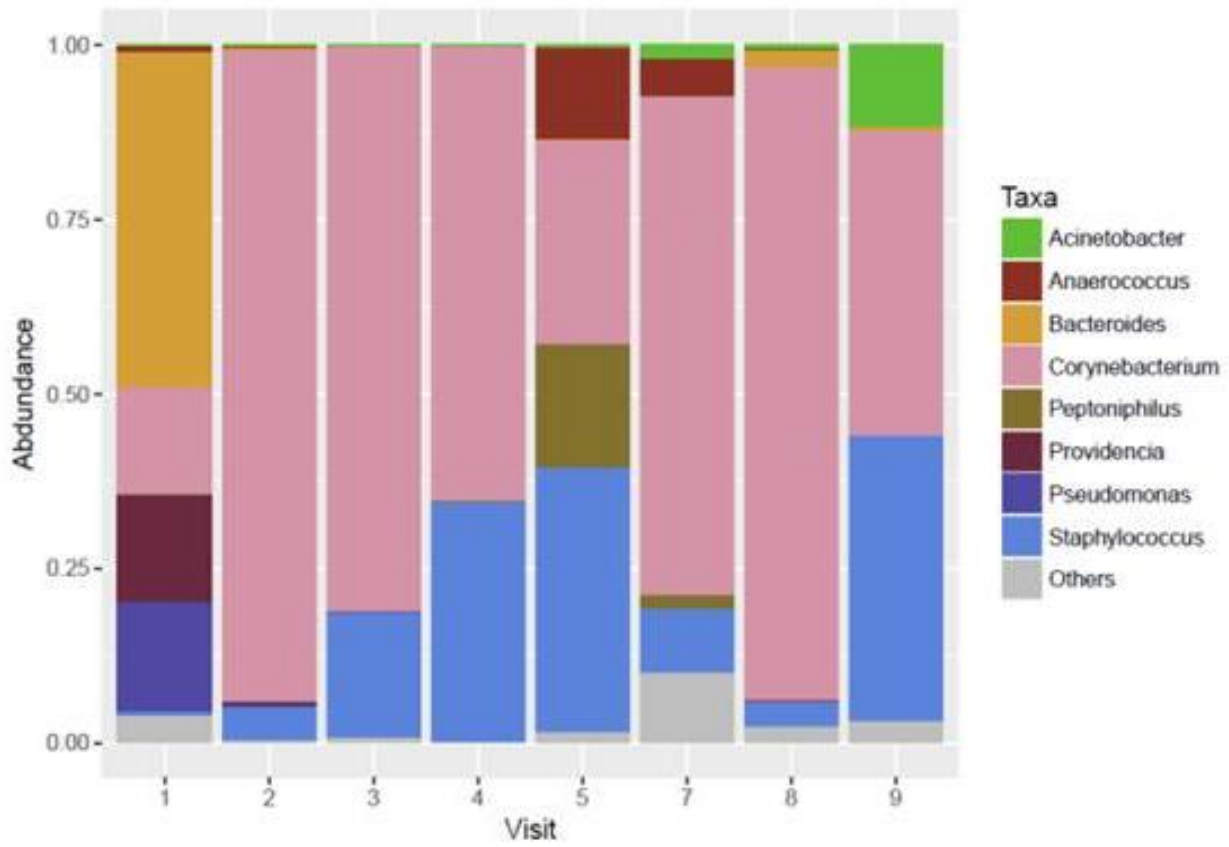
Diabetic foot ulcer microbiome:  
Species identification/  
phylogenetic analyses

Blastn/tBlastn  
Sequence & pathway databases

Nucleotide sequence



A



# Other markers?

- Lactate?
- pH?
- Temperature?
- NO

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