

# Diabetic Peripheral Neuropathy

Optimal Assessment and Management

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# Presentation Objectives

- Understand the clinical impact of DPN
- Distinguish between “symptoms” and “signs” DPN
- Describe the proposed etiology of diabetic neuropathy

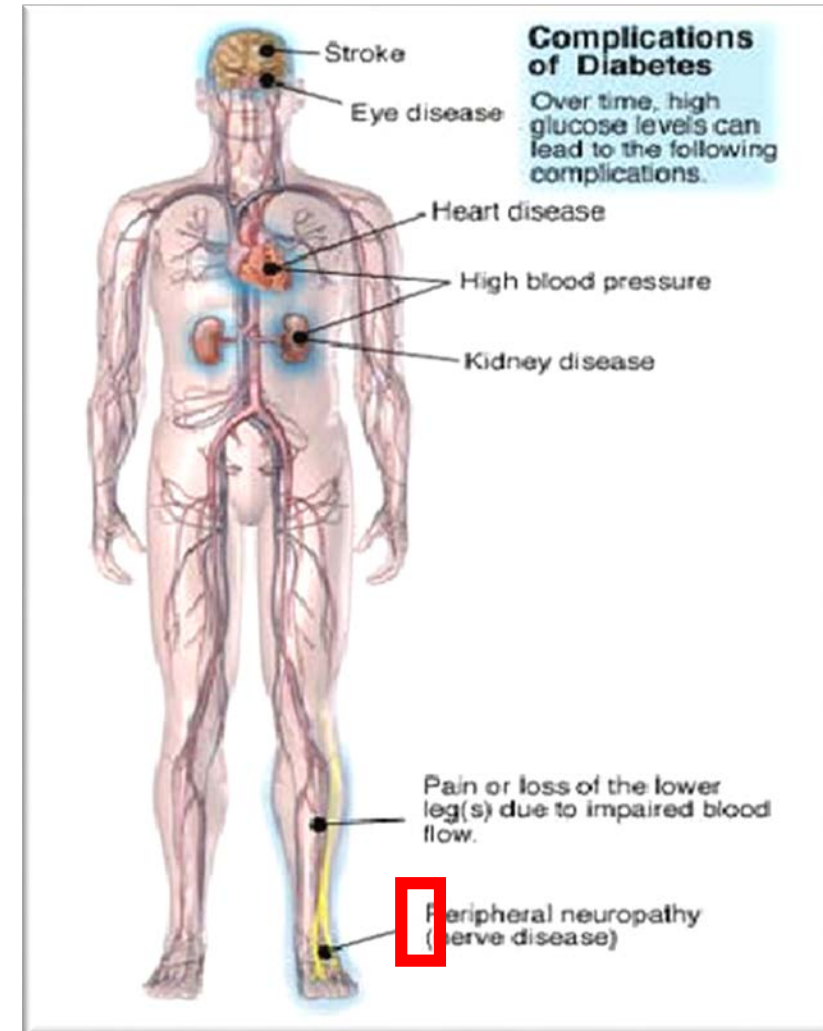
# Chronic Diabetes Complications

- Stroke
- Retinopathy
- Cardiovascular Disease (CVD)
- Hypertension
- Nephropathy
- Peripheral Vascular Disease (PVD)
- **Peripheral Neuropathy**



**most common complication**

50% to 90% of diabetes patients depending upon criteria used for diagnosis



# Diabetes Statistics...Did you know...?



Up to 70% of those with diabetes will lose sensation in their feet

*Peripheral sensory neuropathy is the leading factor to diabetic foot ulcerations*



Approximately 25% of those with diabetes will develop a foot ulcer

*More than half of all foot ulcers will become infected, requiring hospitalization and 1 in 5 will require an amputation*



After a major amputation, 30% of patients will have their other limb amputated within 3 years

*5-year mortality rate after limb amputation is reported as high as 74%, when compared to cancer- it is greater than colorectal, breast, and prostate cancer*

# Definition of Diabetic Neuropathy

- Nerve damage and dysfunction secondary to diabetes mellitus type 1 or 2
- Consensus definition: “the presence of symptoms and/or signs of peripheral nerve dysfunction in people with diabetes after exclusion of other causes”

# Classification of Diabetic Neuropathy

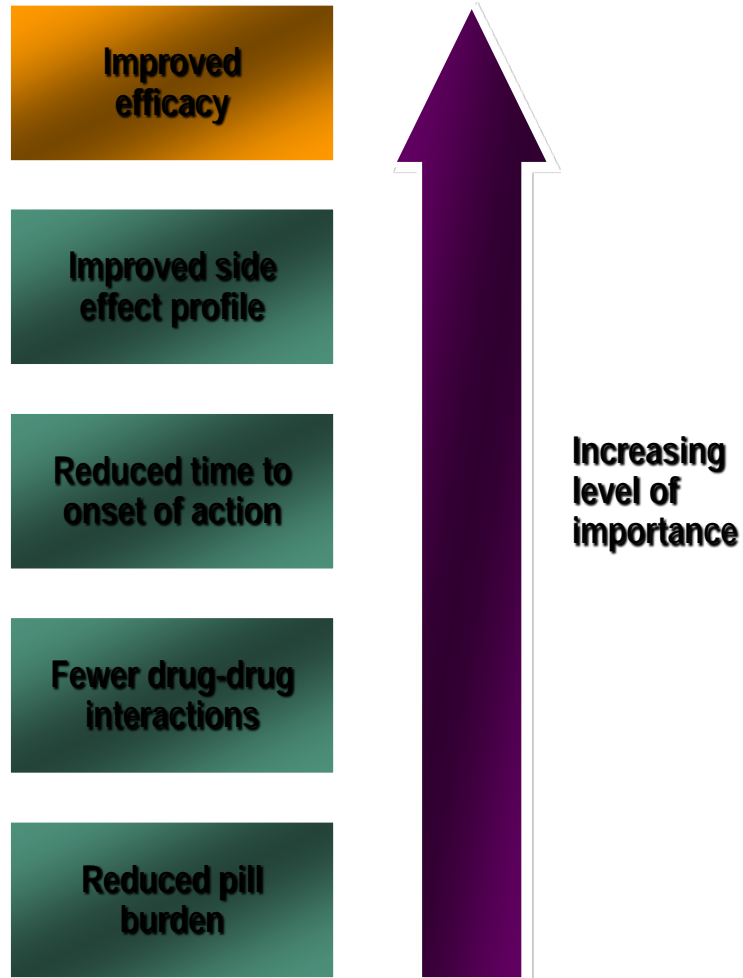
<b>Somatic</b>		<b>Autonomic</b>
<b>Poly- neuropathies</b>	<b>Mono- neuropathies</b>	
Sensorimotor	Isolated	Cardiovascular
Proximal motor	Cranial	Gastrointestinal
Truncal	Truncal	Genitourinary
	Multiple	Miscellaneous

# Impact of Diabetic Neuropathy

- 60-70% of foot ulcers are preceded by neuropathy
- 85% of diabetes related lower limb amputations are preceded by a foot ulcer
- Most Common Proximate, Nontraumatic Cause of Amputations
- Largest number of diabetes related hospital bed-days



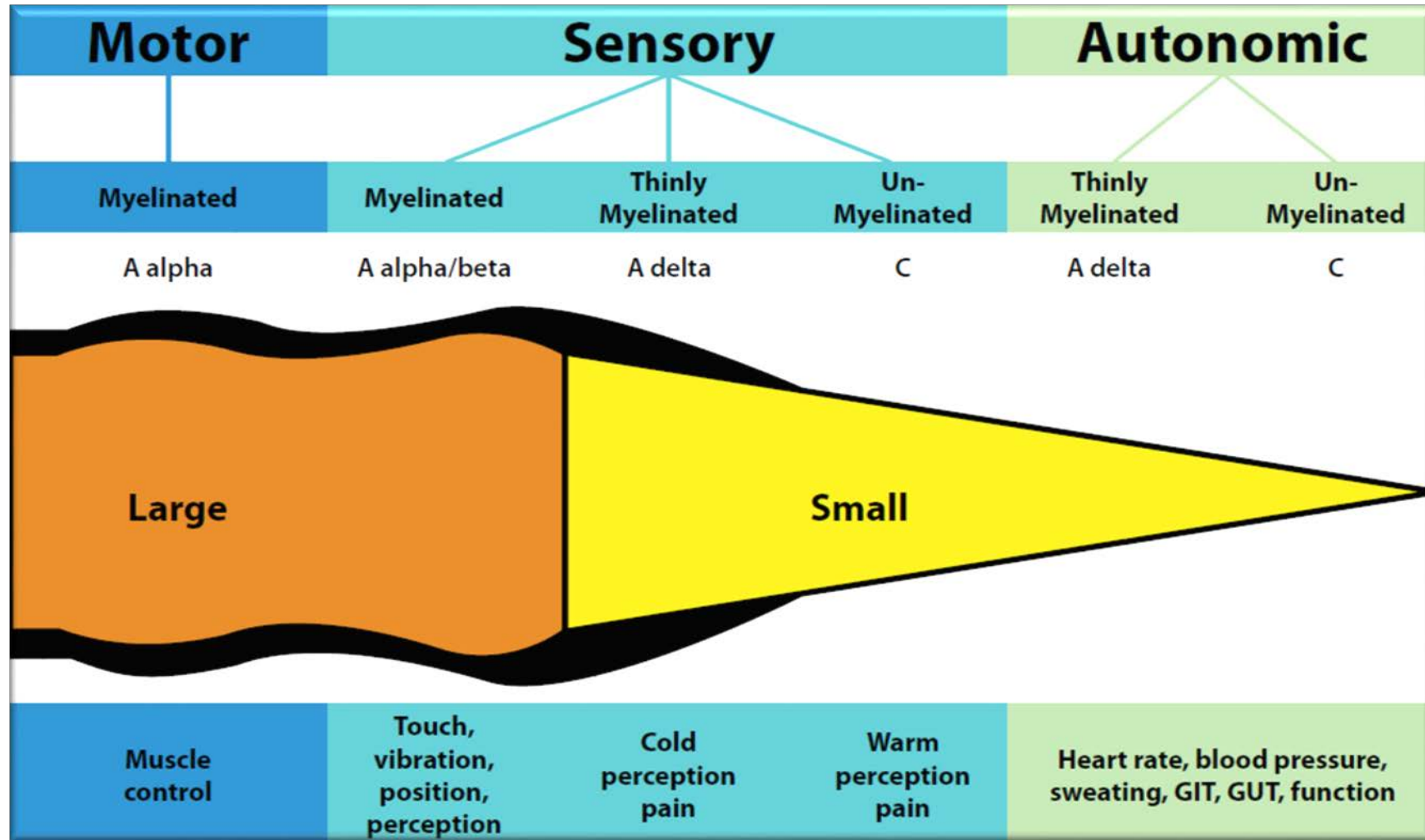
# Clinical Unmet Needs in Diabetic Peripheral Neuropathy



- There are a wide range of treatments available for neuropathic pain
- This prescribing pattern suggests that there is no one treatment that addresses all the factors
- Despite a spectrum of drugs available with different modes of action, many patients remain inadequately treated in several aspects of the disease

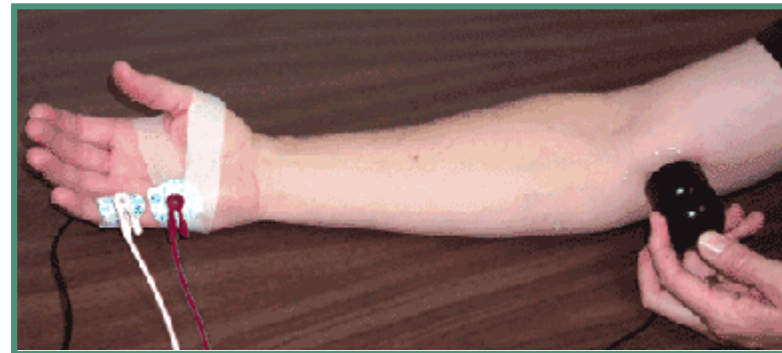
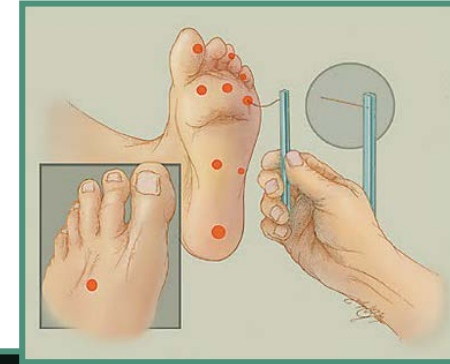


# Peripheral Nervous System

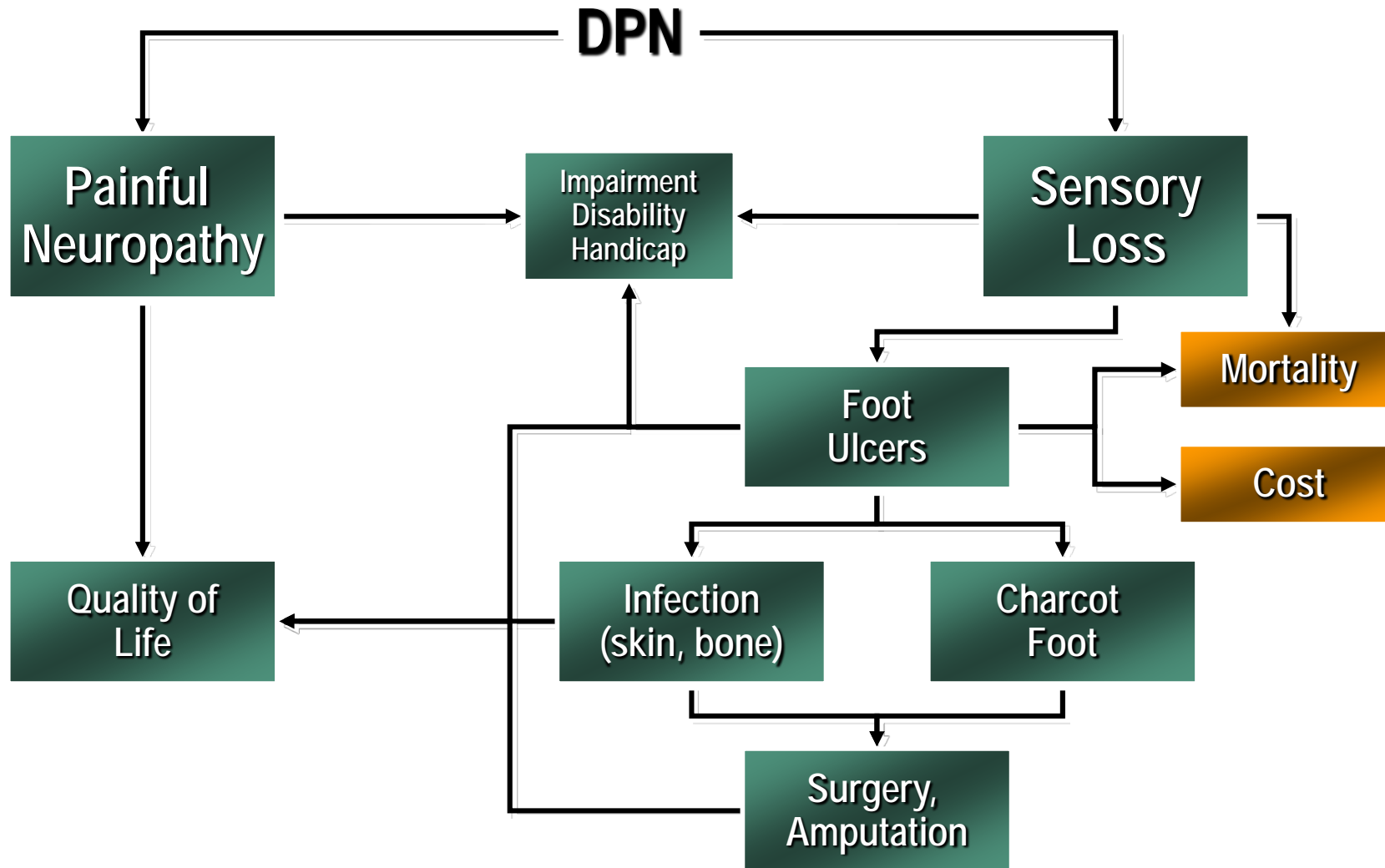


# Diagnostic Tools for DPN: Large Fiber

- 5.07 Semmes-Weinstein Monofilament
- Biosthesiometer<sup>®</sup>
- Calibrated Tuning Fork
- Nerve Conduction Velocity



# Clinical Impact of DPN TOTAL Symptoms



# Large Fiber Neuropathies

- Clinical presentation
  - Impaired vibration perception
  - Pain is deep-seated gnawing
  - Numbness, Ataxia
  - Wasting of small muscles of hands and feet
  - Weakness
  - Increased Blood flow, the hot foot
- Risk Charcot Neuropathy

# Clinical Presentation of Small Fiber Neuropathies

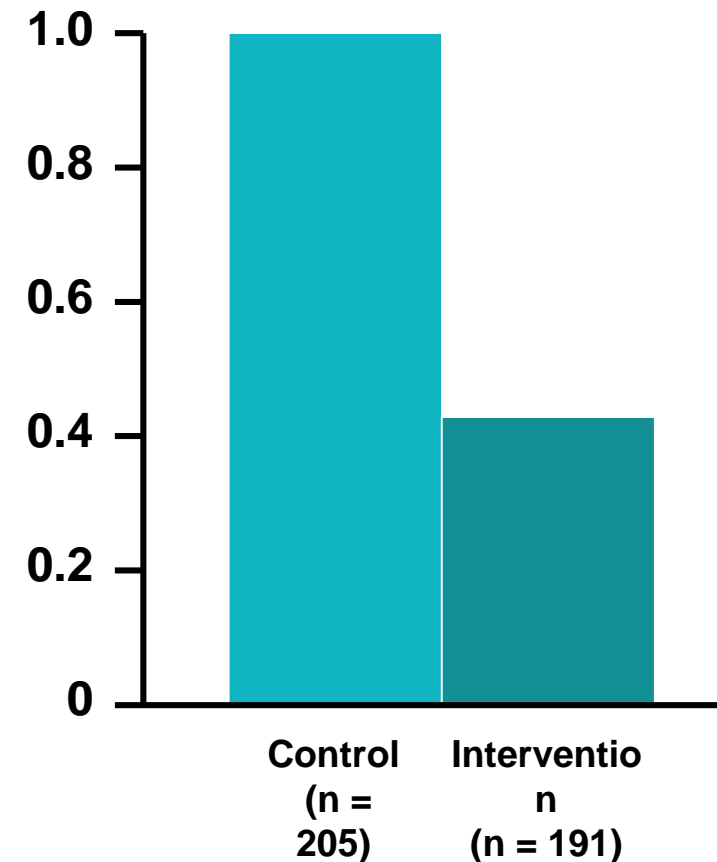
- Pain is burning, superficial, allodynia
- Early hyperesthesia and hyperalgesia, late hypo-
- Impaired warm thermal and pain thresholds
- Decreased sweating
- Normal strength, reflexes and EMG!!!
- Abnormal QST and skin biopsy
- The cold foot
- Risk foot ulceration, gangrene and amputation
  - 85,000 amputations in the US each year, 1 every 10 minutes, 87% contribution is small fiber neuropathy

# Small Fiber Neuropathies

- Management
  - Education
  - Padded socks
  - Appropriate shoes with adequate support
  - Regular shoe and foot inspection-give the patient a monofilament and a mirror on the floor of the bathroom
  - Care with exposure to heat injury
  - Emollients to avoid dryness of sympathetic dysfunction

# Simple Intervention Reduces Serious Foot Lesions in Type 2 Patients

- Educate patient on foot care
- No patient enters a clinic with shoes on
- Examine patient's feet and their shoes
- Provide written information about foot care, a mirror on the bathroom floor and a monofilament to take home



# Symptoms Suggestive of Polyneuropathy

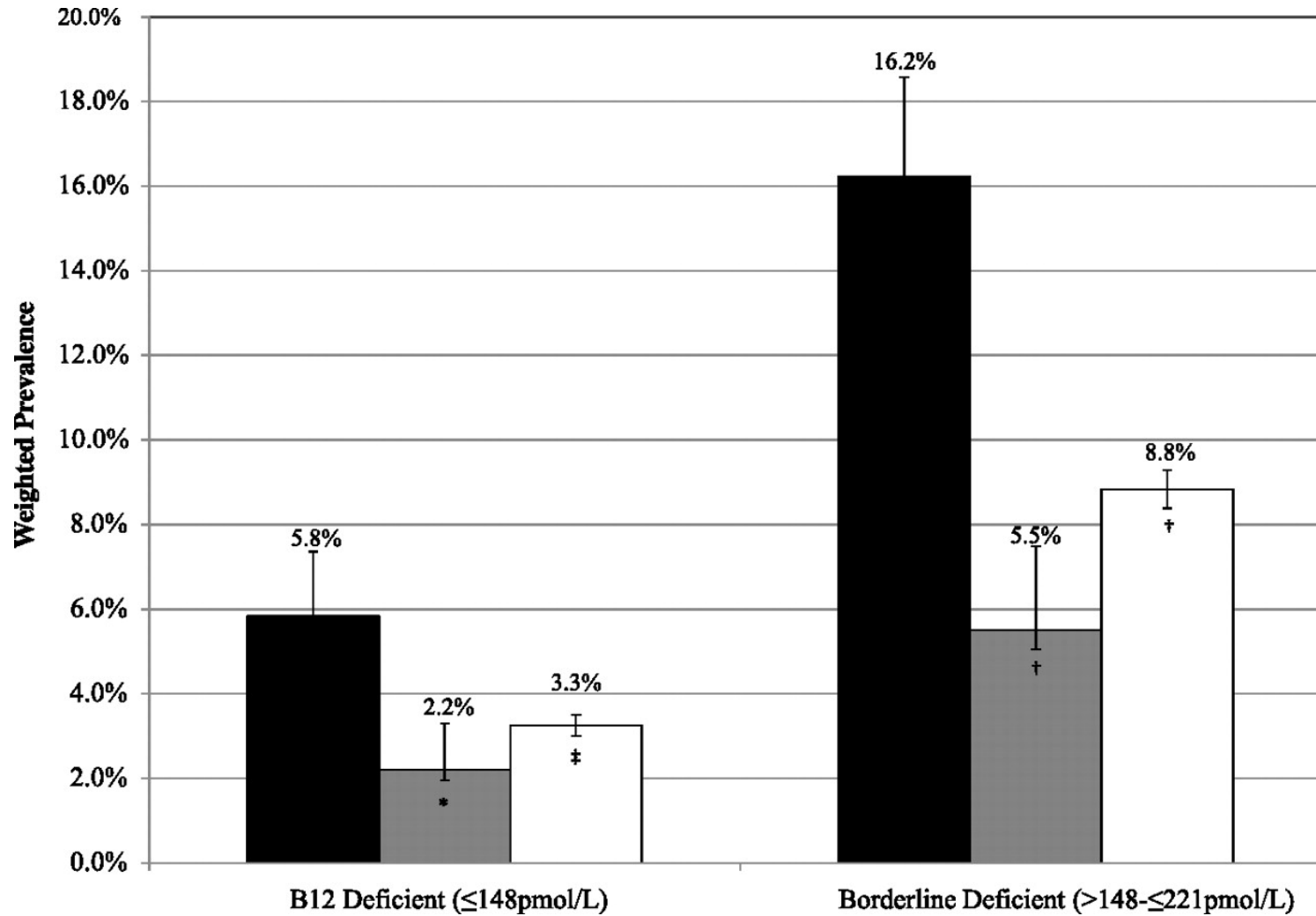
- Distal and symmetric
- Involve lower more than upper limbs
- Include:
  - Numbness (diminished or loss of sensation)
  - Paresthesias (tingling, prickling)
  - Dysesthesias (pain, burning, aching, tenderness)
  - Weakness (possibly present)



# Treatment Goals in Neuropathy

- Halt progressive nerve fiber loss
- Early intervention
- Good glycemic control

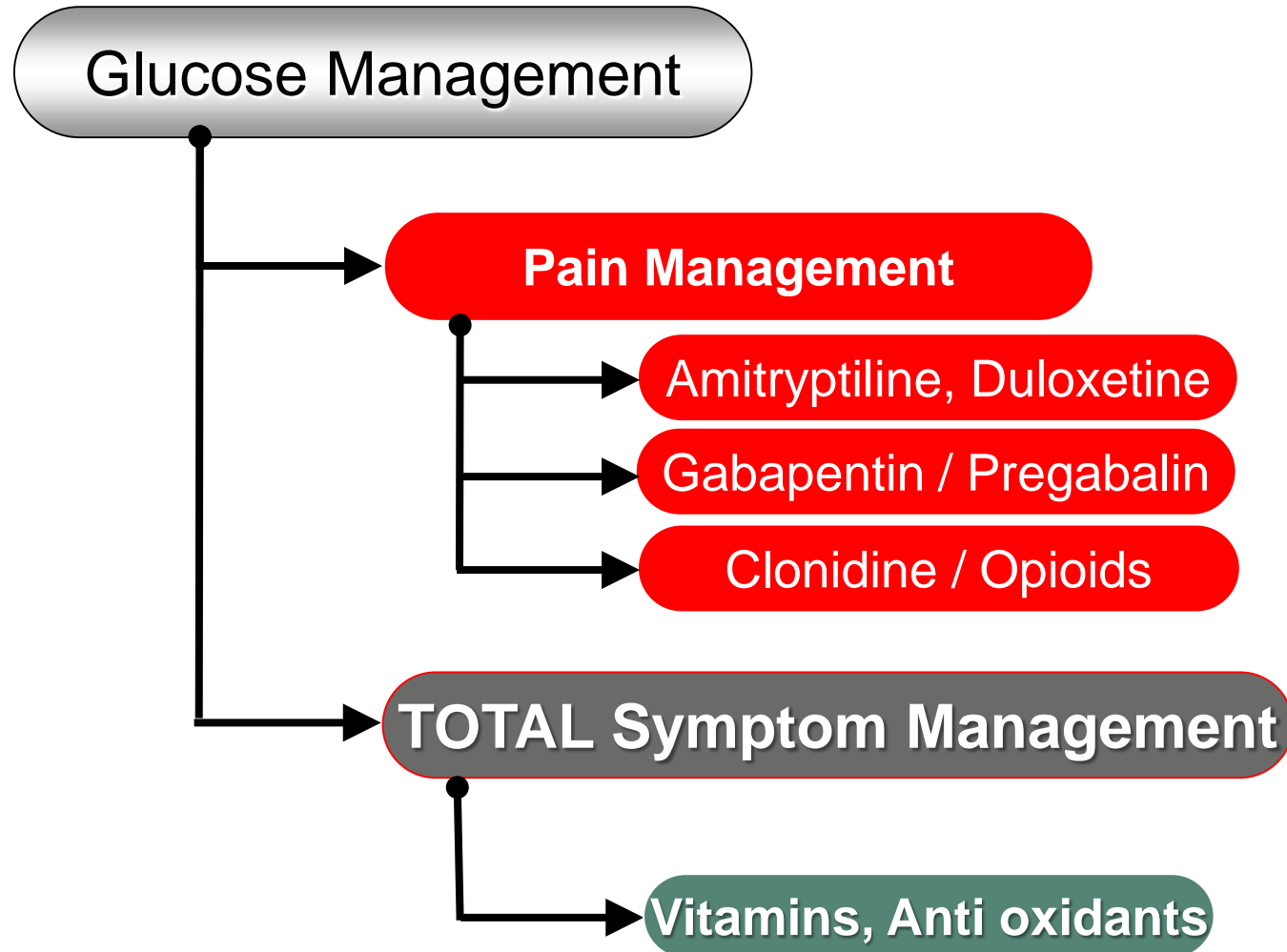
# Weighted prevalence of biochemical B12 deficiency and borderline deficiency adjusted for age, race, and sex in U.S. adults ≥50 years of age: NHANES 1999–2006.



Reinstatler L et al. Dia Care 2012;35:327-333



# DPN Treatment Options



Adapted from Tavakoli M and Malik R. *Expert Opin Pharmacother.* 2008.

Fonseca V. et al. Poster presented at the 20<sup>th</sup> Anniversary 2011 American Academy of Clinical Endocrinology Annual Meeting and Clinical Congress

\*These data and conclusions should be considered preliminary until published in a peer-reviewed journal.