

# Neuroscience II

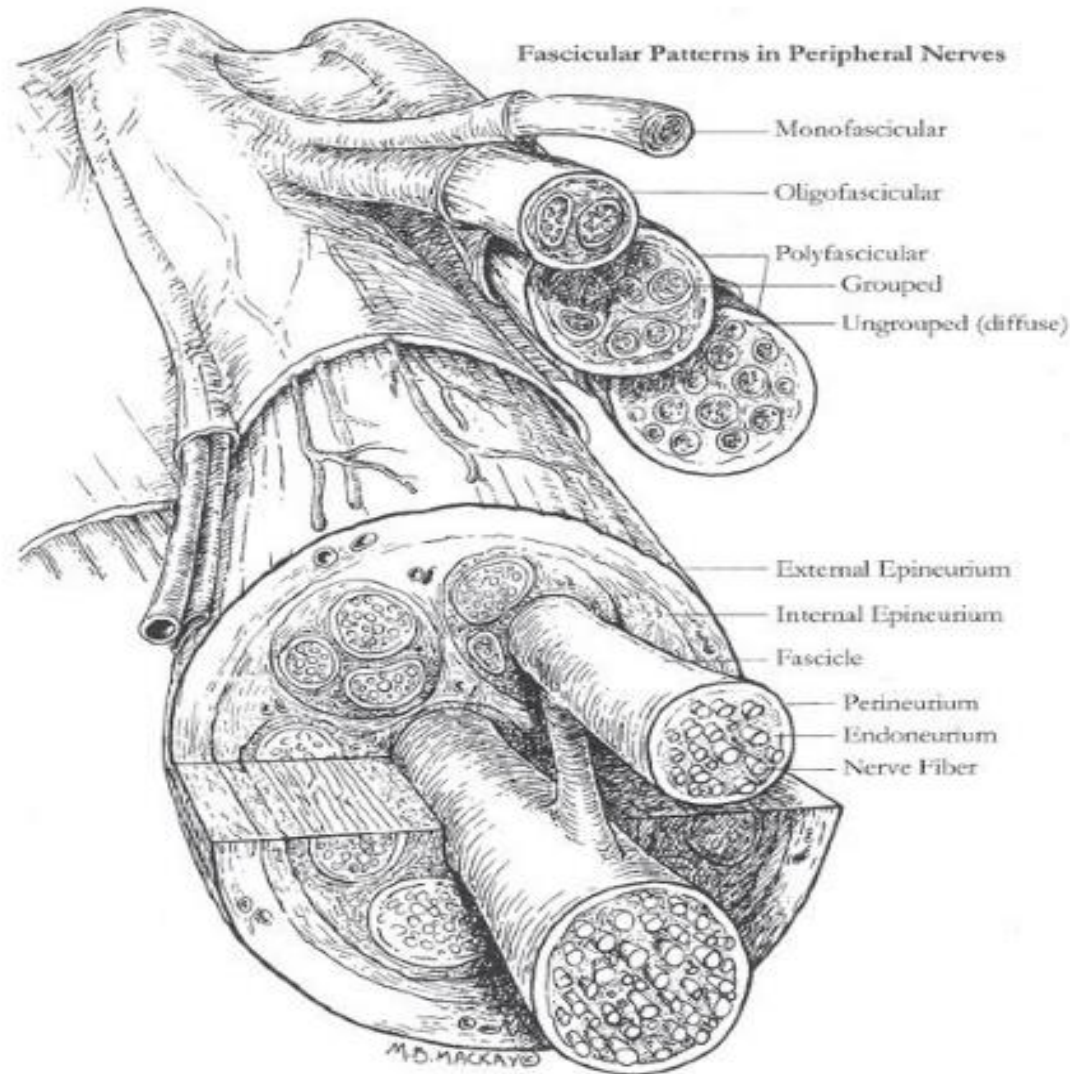
## Peripheral Neuropathy

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# Anatomy of Peripheral nerves



# Types of nerve injury

- Class I: Neuropraxia
- Class II: Axonotmesis
- Class III: Neurotmesis

# Neuropraxia

- Functional deficit in a segment of the nerve where:
  1. The continuity of the nerve is intact
  2. The perineureum, endoneureum, and epineureum are intact
  3. The distal and proximal segments are intact
  4. There is usually full recovery
  5. No degeneration of the nerve
  6. There is usually motor and sensory symptoms

# Axonotmesis

- Injury to the axon and endoneurium
- Degeneration of the segment distal to the injury (Wallerian degeneration several days after the injury)
- No conduction distal to the segment
- Recovery can occur by axonal regeneration but it takes longer duration
- Functional deficit occurs as a result but recovery is possible

# Neurotmesis

- There is lesion of the axons, endoneurium, perineurium, and epineurium
- Wallerian degeneration within several days
- No spontaneous recovery is possible without surgical repair
- Functional motor and sensory deficits result from this type of injury

# Classification of neuropathy

- Plexopathy: such as brachial plexus lesion
- Mononeuropathy: such as median neuropathy, anterior interosseus syndrome, Ulnar nerve compression, Radial nerve compression, Posterior interosseus syndrome, Femoral nerve syndrome, Lateral cutaneous nerve syndrom (meralgia parasthetica), Common peroneal nerve syndrome.
- Polyneuropathies: it is a systemic neuropathy that affects almost all nerves in a variable degree. It is usually length dependent where the longest axons are affected earlier. It can be classified into hereditary or acquired polyneuropathy

# Hereditary Polyneuropathies

- CMT: Charcot-Marie-tooth syndrome
- Friedreich ataxia
- Giant axonal neuropathy

# Acquired polyneuropathies

- Neuropathies associated with endocrine disorders: diabetes and thyroid diseases
- Neuropathies associated with systemic disease  
Connective tissue disease (rheumatoid arthritis, lupus, Sjögren syndrome) (see pg. 315)  
Inflammatory bowel disease (ulcerative colitis, Crohn disease) Liver disease Renal failure (uremic neuropathy)
- Neuropathy related to nutritional deficiency  
Vitamin deficiency (B12, B6, E), Copper

# Acquired polyneuropathies

- Toxic neuropathies: Medications (metronidazole, colchicine, disulfiram, cisplatin, vinca alkaloids, many others) Heavy metals (lead, mercury, arsenic)
- Neuropathy associated with infections Viral (HIV, HTLV-1, VZV, hepatitis B and C), Bacterial (Lyme, leprosy)
- Acute inflammatory: Guillain-Barré Syndrome (GBS)
- Chronic Acquired Immune-Mediated Demyelinating Polyneuropathies

# GBS Variants

- Acute inflammatory demyelinating polyneuropathy (AIDP): 90% of cases
- Acute motor axonal neuropathy
- Acute motor-sensory axonal neuropathy (AMSAN)
- Miller-Fisher syndrome:
- Acute panautonomic neuropathy

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# Chronic Acquired Immune-Mediated Demyelinating Polyneuropathies

- Chronic inflammatory demyelinating polyneuropathy (CIDP)
- Multifocal acquired demyelinating sensory and motor neuropathy (MADSAM)/ Lewis-Sumner syndrome
- Distal acquired demyelinating sensory neuropathy.
- Multifocal motor neuropathy

# Symptoms of polyneuropathy

- Motor symptoms (somatic or autonomic)
- Sensory neuropathy (somatic or special senses)

# Motor somatic Symptoms

- Weakness
- flaccidity
- Atrophy of muscles
- Hyporeflexia or areflexia
- Fasciculations

# Motor autonomic symptoms

- Orthostatic hypotension in the form of dizziness
- Tachycardia or bradycardia
- Gastroparesis (feeling of fullness)
- Urine incontinence
- Fecal incontinence
- Impotence
- Blurred vision
- Dryness of skin (anhidrosis with reduced sympathetic flow)
- Excessive sweating (with increased sympathetic flow)

# Somatic sensory symptoms

- Focal sensory loss (mononeuropathies) and gloves and stocking distribution of sensory loss in case of polyneuropathy)
- Parasthesia, dysesthesia, allodynia, hypersthesia, burning sensations, electric shooting pain
- Ataxia due to decreased position sense

# Special sense neuropathy

- Loss of smell due to involvement of the olfactory nerve: anosmia
- Blurring of vision (optic neuritis). This is central nervous system nerve
- Loss of taste that is usually seen with facial nerve palsy
- Vertigo with vestibular neuritis

# Neuralgias

- Irritation of the nerve results in ephaptic transmission and spontaneous firing
- Usually idiopathic but can result from irritation of the nerve or toxic, metabolic causes.
- Examples:
  1. Trigeminal neuralgia
  2. Occipital neuralgia
  3. Glossopharyngeal neuralgia