

Remplir™ Sales Training - USA

Module 1



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*This training includes general information on nerve repair that may not apply to Remplir.
Please refer to Remplir's IFU.*

Learning Objectives

- Understand the fundamental structure of peripheral nerves (neurons, myelin, and connective tissue layers).
- Describe how nerve anatomy relates to function (sensory and motor signals).
- Recognize the importance of healthy nerve function and the impact of nerve injury on the body.

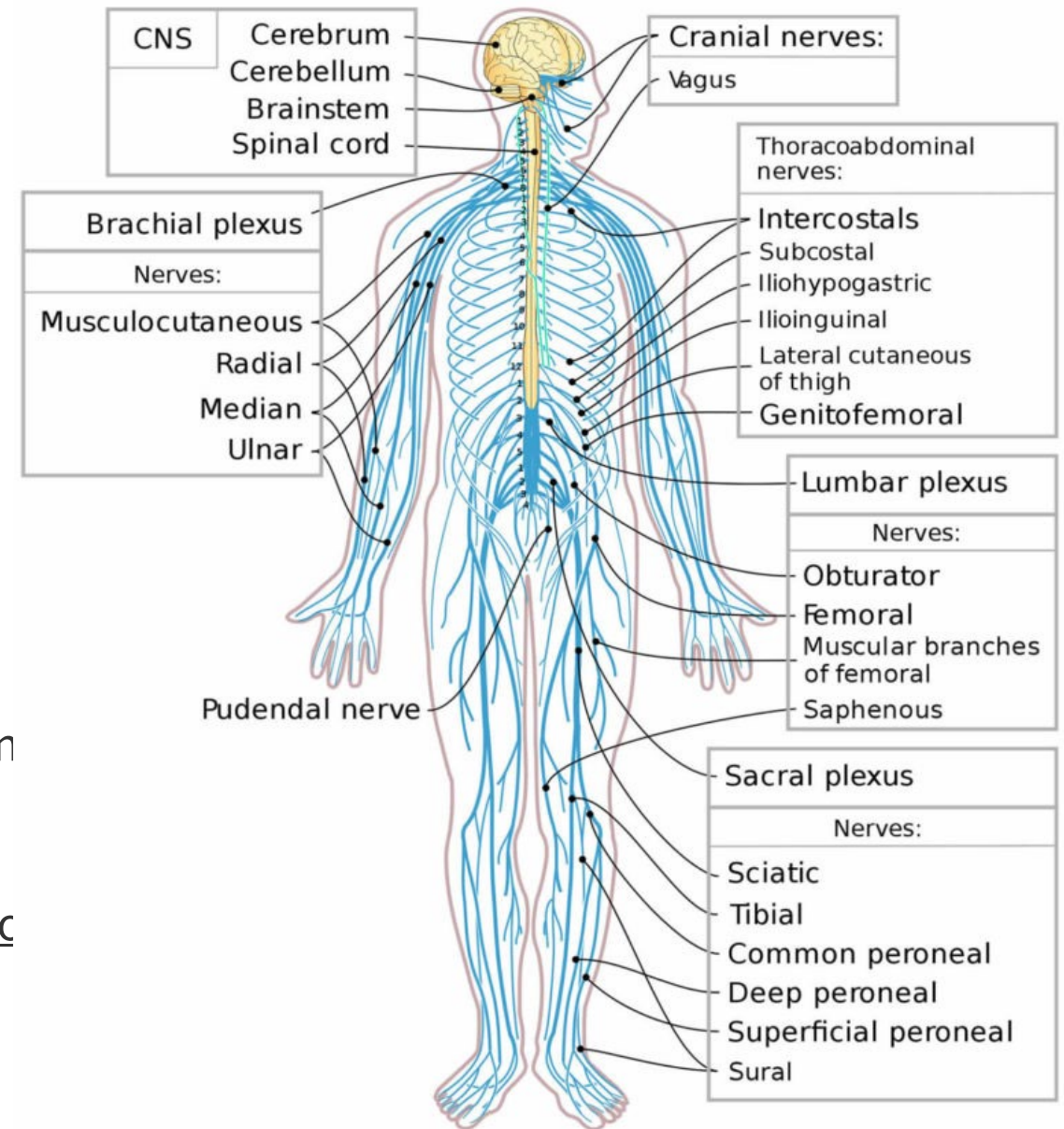
Peripheral Nerves

Central Nervous System

- Brain & spinal cord
- Protected by bone (cranium & spine)
- Does not regenerate after injury

Peripheral Nervous System

- All other nerve tissue (including spinal nerves and
- No protection
- Can regenerate after injury
- Divided into somatic (motor & sensory) and autonomic (glands & organs) nervous systems



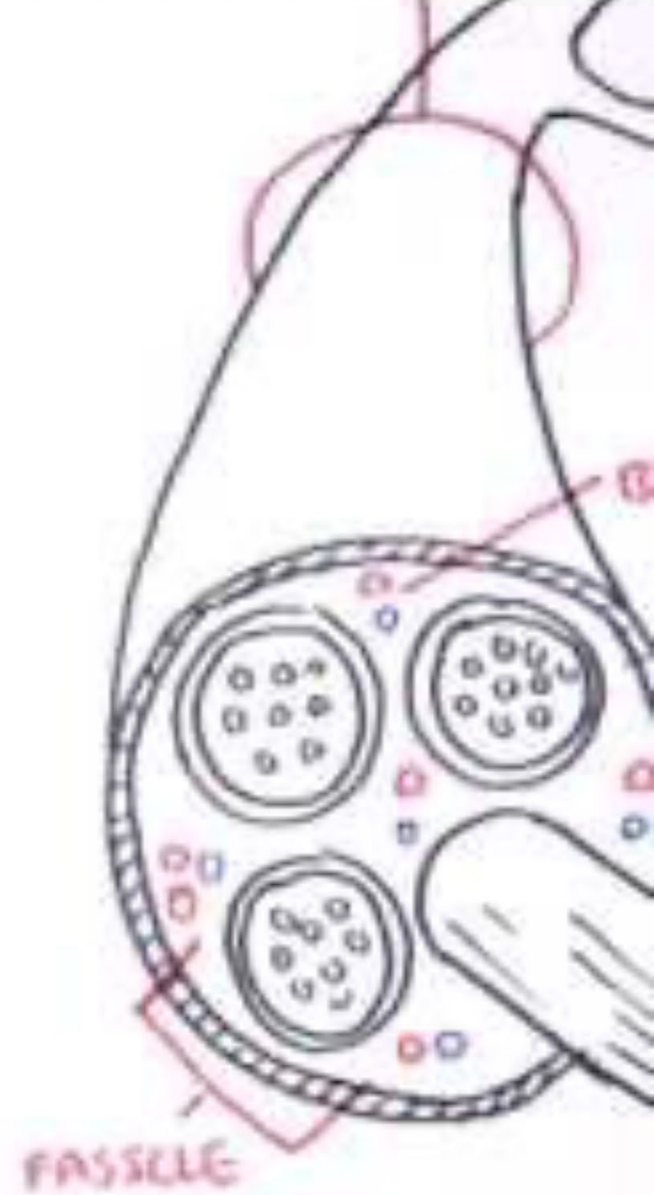
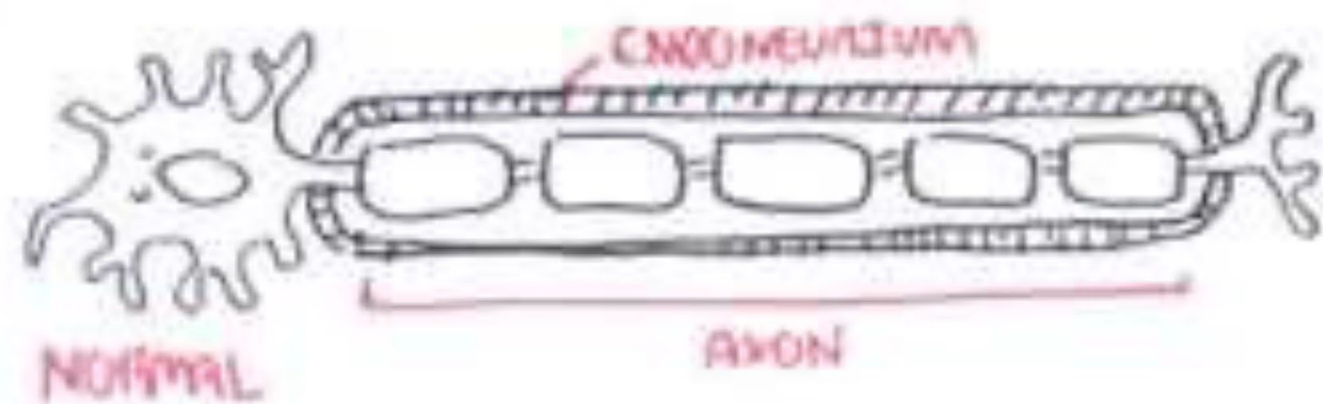
Somatic Nervous System

- **Sensory Nerves:** Afferent pathways delivering feedback *to the brain*, such as touch, pressure, temperature, proprioception, and pain to the spinal cord and brain
- **Motor Nerves:** Efferent pathways that transmit signals *from the brain* that control voluntary body movements via skeletal muscles
- **Mixed Nerves:** Nerves with both sensory and motor pathways, less likely to have good outcome after injury

Significance of nerve health

- Nerves facilitate both voluntary actions (e.g., walking, grasping objects) and involuntary reflexes (e.g., maintaining balance).
- Even a minor nerve injury can severely limit a patient's independence and quality of life — imagine losing the ability to use a fork, play a musical instrument, test the temperature of your shower, or identify that your new shoes have rubbed a blister on your toe.
- Long-term nerve dysfunction can lead to muscle atrophy, chronic pain syndromes, and mental health issues such as depression and anxiety.

CLASSIFICATION OF NERVE INJURY



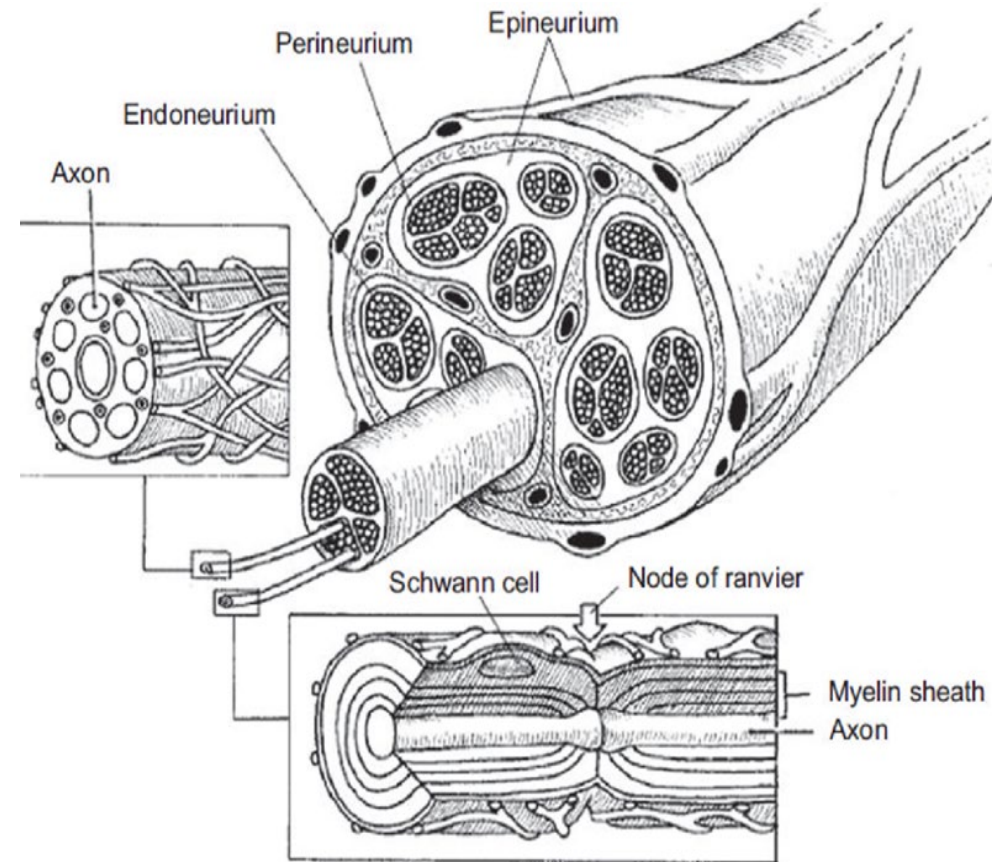
Structure and Terminology

Neurons & Axons:

- A **neuron** is the basic functional cell of the nervous system.
- The **axon** is the long, thin projection that conducts electrical impulses away from the neuron's cell body toward target cells (muscles, glands, or other neurons). Axons in peripheral nerves may be myelinated (wrapped in myelin sheaths that speed conduction) or unmyelinated.

Fascicles:

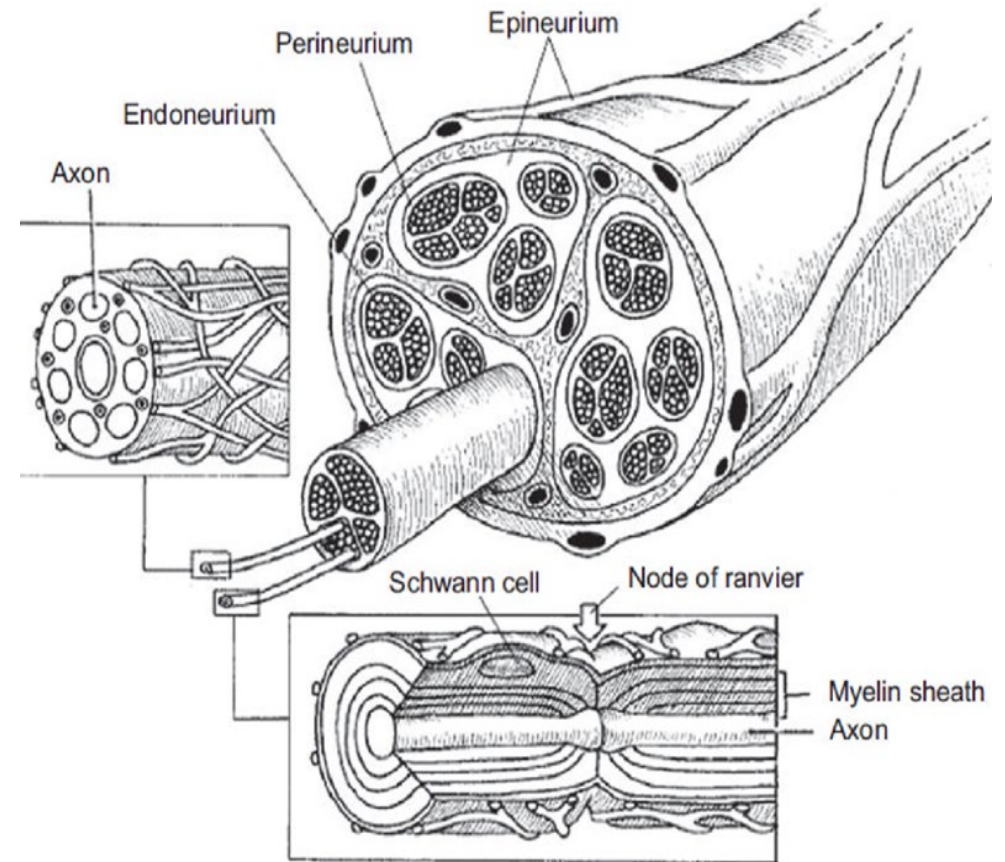
- Peripheral nerves are composed of bundles called **fascicles**, each containing numerous axons.



Structure and Terminology

Connective Tissue Layers:

- **Endoneurium:** A delicate layer that surrounds individual axons and Schwann cells. It provides the microenvironment for axonal function.
- **Perineurium:** A protective sheath encircling each fascicle. It maintains the **blood-nerve barrier**, preventing toxins or pathogens in the bloodstream from freely entering nerve tissue.
- **Epineurium:** The outermost collagenous layer that encloses the entire nerve trunk. It provides the nerve with tensile strength and some protection against external mechanical stress.



Module 1: Classification of Nerve Injury

Seddon	Sunderland	Description of Injury	Prognosis
Neurapraxia Temporary interruption of conduction, no loss of axon continuity	Grade I	- Temporary demyelination caused by minor compression or stretch injury - Conduction block without Wallerian degradation	Excellent No treatment required
Axonotmesis Loss of axon continuity & myelin sheath but preservation of connective tissue framework	Grade II	- Myelin sheath & axons damaged - Endoneurium, perineurium & epineurium intact	Excellent No treatment required
	Grade III	- Myelin sheath, axons & endoneurium damaged with endoneurial scarring - Perineurium & epineurium intact	Variable. Surgery may be indicated due to scar tissue
	Grade IV	- Damage to all structures <u>except epineurium</u> - Nerve remains in continuity but there is extensive scarring at the injury site - Risk of neuroma-in-continuity	Poor. No recovery without surgical treatment
Neurotmesis Complete discontinuity	Grade V	- Complete nerve transection or disruption due to severe injury (e.g., laceration, avulsion) - Risk of terminal neuroma formation at proximal nerve stump	Poor. No recovery without surgical treatment



MK--0002025 v1.0

