

Classification of nerves

Dr Jayanti Pant

Properties of Nerve Fibers

- Excitability
- Conductivity
- Unfatigability
- Refractory period
- All or none law
- Accomodation



Joseph Erlanger



Herbert Spencer Gasser

Erlanger and Gasser Classification

Fiber Type	Functions	Fiber Diameter (μm)	Conduction Velocity (m/sec)
A α	Proprioception, Somatic motor	12 -20	70 -120
A β	Touch, pressure	5-12	30-70
A γ	Motor to muscle spindles	3-6	15-30
A δ	Pain, temperature	2-5	12-30
B	Preganglionic autonomic	<3	3-15
C (Dorsal root)	Pain, temperature	0.4-1.2	0.5-2
C (Sympathetic)	Postganglionic sympathetic	0.3-1.3	0.7-2.3

Numerical Classification

Number	Origin	Fiber Type
Ia	Muscle Spindle, annulo- spiral ending	A α
Ib	Golgi tendon organs	A α
II	Muscle spindle, flower spray ending; touch , pressure	A β
III	Pain and cold receptors, some touch receptors	A δ
IV	Pain, temperature, and other receptors	C

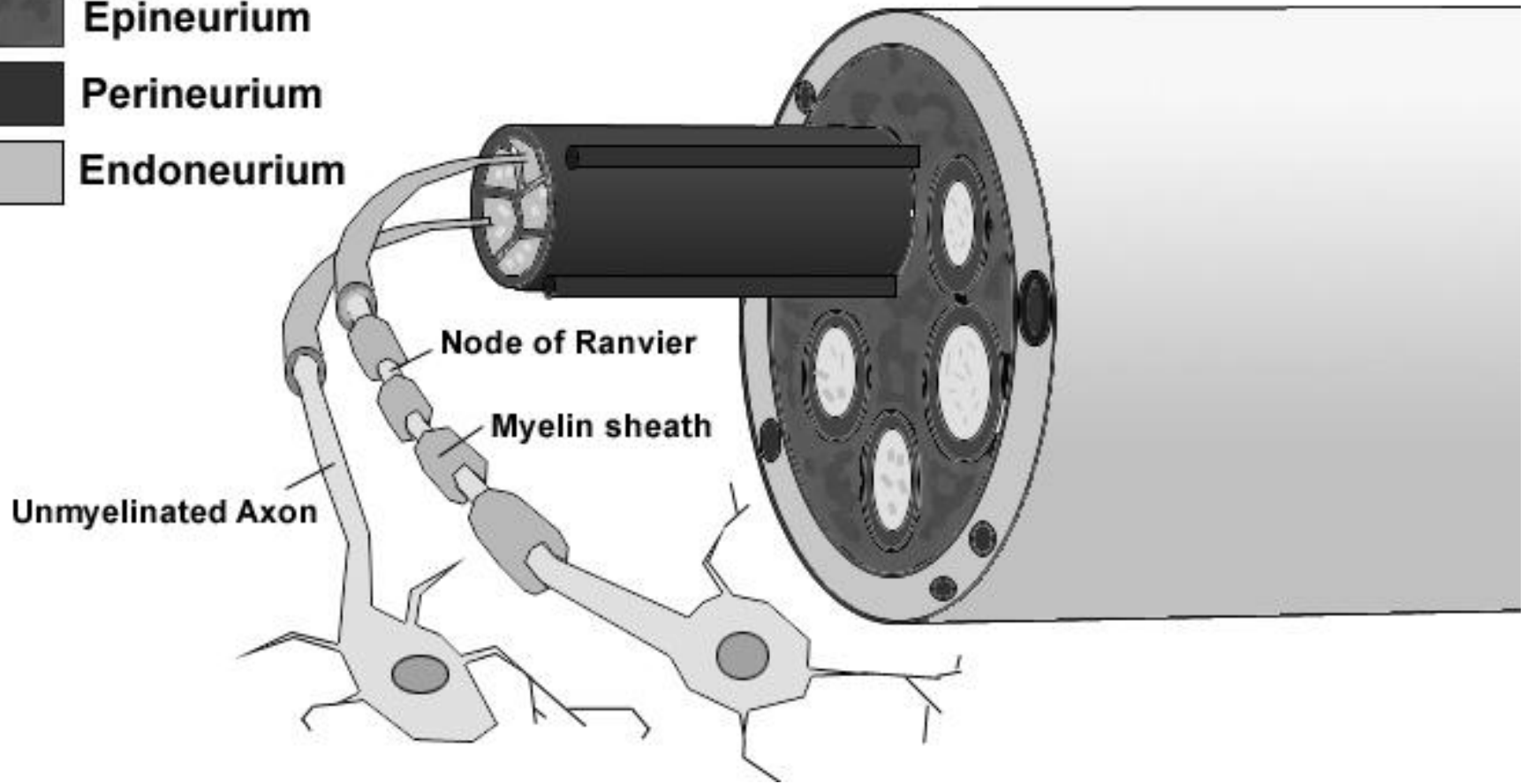
Susceptibility to conduction blocks

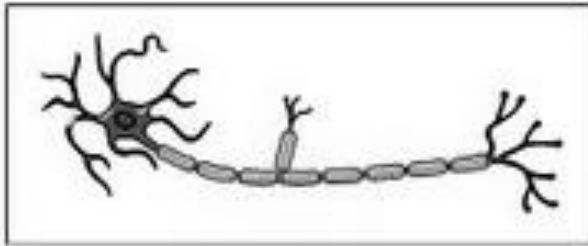
Susceptibility to:	Most Susceptible	Intermediate	Least susceptible
Hypoxia	B	A	C
Pressure	A	B	C
Local Anaesthetics	C	B	A



Augustus Volney Waller

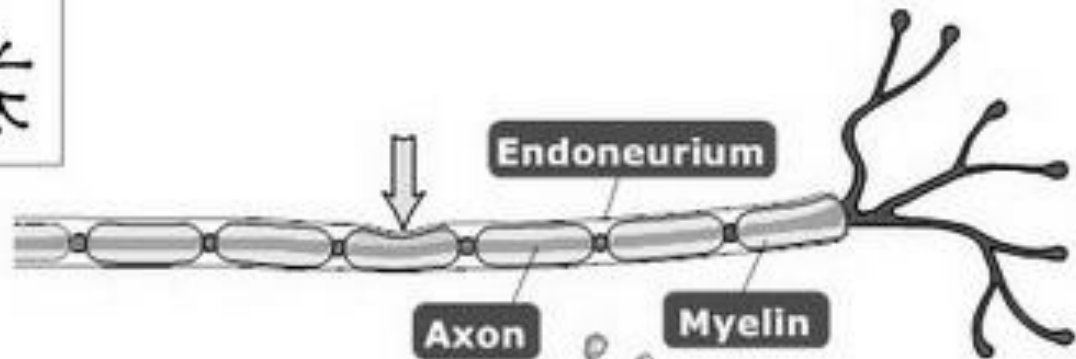
- Epineural sheath
- Epineurium
- Perineurium
- Endoneurium





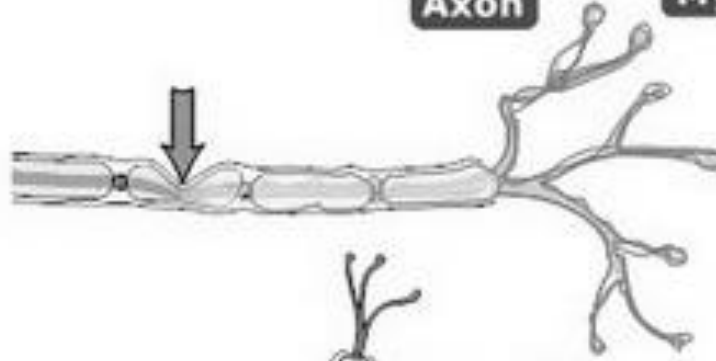
Neuropraxia

- Injury - Mild
- Recovery



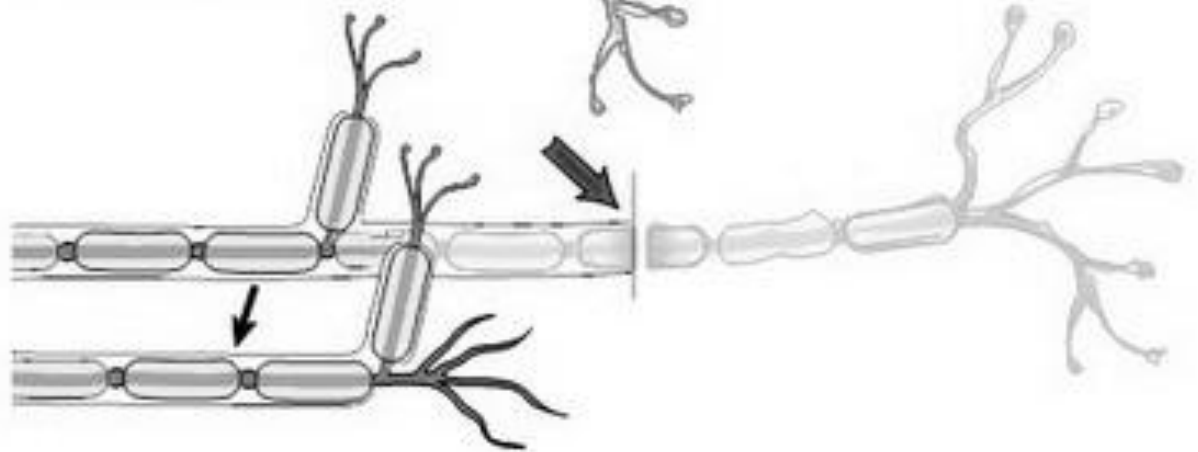
Axonotmesis

- Injury - Severe
- Regeneration (1 mm/day)
- Recovery



Neurotmesis

- Injury
- Degeneration
- Neuroma Formation



Classification of Nerve Injuries Described by Seddon^o and Sunderland^o

Seddon	Sunderland	Injury	Neurosensory Impairment	Recovery Potential
Neurapraxia	I	Intrafascicular edema with conduction block and possible segmental demyelination	Neuritis and paresthesia	Full/good; 1 wk to 2 mo
Axonotmesis	II	Axon severed, endoneurial tube intact	Paresthesia, episodic dysesthesia	Full/fair; 2–4 mo
Axonotmesis	III	Endoneurial tube torn	Paresthesia, dysesthesia	Incomplete/fair; 12 mo
Axonotmesis	IV	Only epineurium intact	Hypoesthesia, dysesthesia, neuroma formation	Incomplete/poor; neuroma in continuity
Neurotmesis	V	Loss of continuity	Anaesthetic, intractable pain, neuroma formation	None

Adapted with permission from Juodzbalys G, Wang HL, Sabalys G: Injury of the inferior alveolar nerve during implant placement: A literature review. *J Oral Maxillofac Res* 2011;2(1):e1.

