| Seddon Classification of nerve injury | | |
|---|---|---|
| **Neurapraxia** | **Axonotmesis** | **Neurotmesis** |
| 1. 1st degree nerve injury.<br>2. There is temporary (reversible) loss of motor & sensory function due to blockage of nerve conduction.<br>3. Nerves and their related structures are intact (no damage to epineurium, perineurium or endoneurium).<br>4. There is no Wallerian degeneration (this is exclusive for 2nd & 3rd degrees of nerve injury).<br>5. Conduction is intact except at the area of injury.<br>6. Recovery is full and requires days to wks depending on the extent of injury.<br>7. EMG shows positive sharp waves. | 1. 2nd degree nerve injury.<br>2. There is loss of the relative continuity of the axon and its covering of myelin sheath.<br>3. Epineurium and perineurium are preserved.<br>4. Wallerian degeneration occurs distal to the site of injury.<br>5. There is no nerve conduction distal to the site of injury (sensory & motor functions are lost).<br>6. Axonal regeneration occurs and recovery is possible with or without surgical treatment.<br>7. EMG shows fibrillation potentials & positive sharp waves (2-3 wks postinjury). | 1. 3rd degree nerve injury.<br>2. There is a total disruption of both the nerve and nerve (epineurium, perineurium & endoneurium).<br>3. Wallerian degeneration occurs distal to the site of injury.<br>4. There is no nerve conduction distal to the site of injury (sensory-motor problems are severe).<br>5. lack of nerve repair and surgical intervention is necessary.<br>6. EMG shows fibrillation potentials & positive sharp waves (2-3 wks postinjury). |

## Wallerian degeneration

1. **Is a process that results when a nerve fiber is cut or crushed, in which the part of the axon separated from the neuron's cell body degenerates distal to the injury.**
2. **It occurs after axonal injury in both peripheral and central nervous systems and usually begins within 24 hours of a lesion.**
3. **Axonal degeneration is followed by degeneration of the myelin sheath (myelin inhibits the process of nerve regeneration thus it must be removed) and infiltration by macrophages. The macrophages, accompanied by Schwann cells, serve to clear the debris from the degeneration.**
4. **Within 4 days of the injury, the portion of the nerve fiber proximal to the lesion sends out sprouts towards those tubes in the portion of the nerve fiber distal to the lesion (these sprouts are attracted by growth factors produced by Schwann cells in the tubes such as: neuregulin and NGF).**

- ***When the axon of a nerve cell is cut***, synaptic transmission of nerve signals will shutoff and the cut ends will swell (within minutes). Within hours of injury, the synaptic terminal of the injured nerve cell will degenerate. Within days to weeks after injury, Wallerian degeneration and degeneration of the myelin sheath will occur mediated by Schwann cells and macrophages which will infiltrate the site of injury.
- Electromyography (EMG): it is a diagnostic procedure to assess the health of muscles and the nerve cells that control them (motor neurons).