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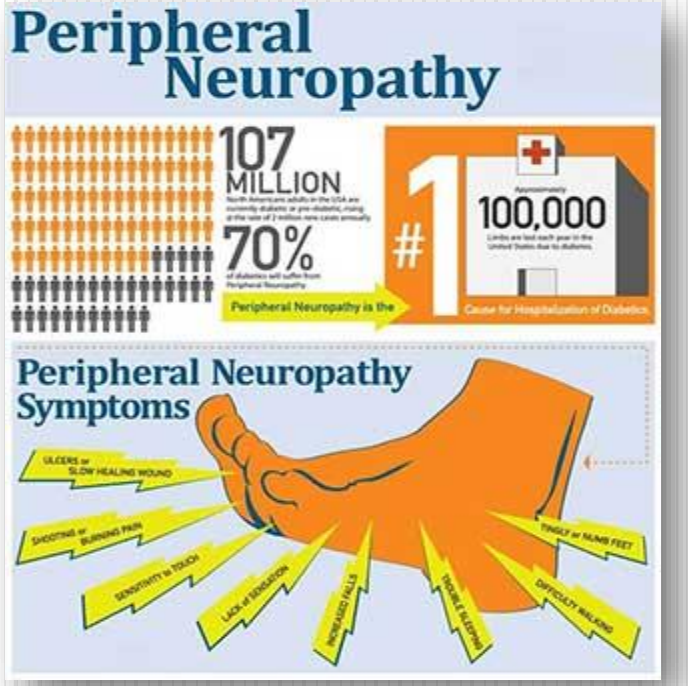
PERIPHERAL NEUROPATHY



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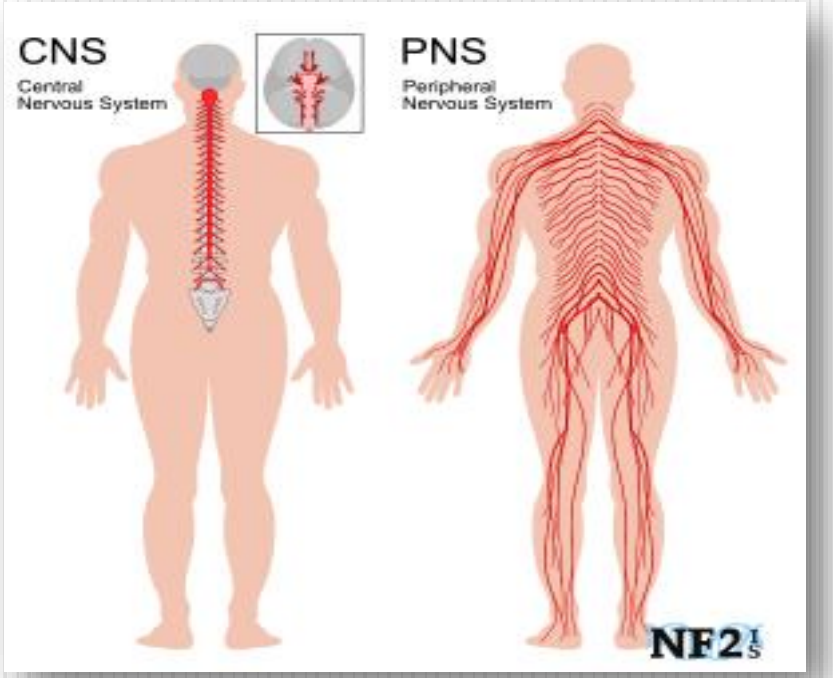
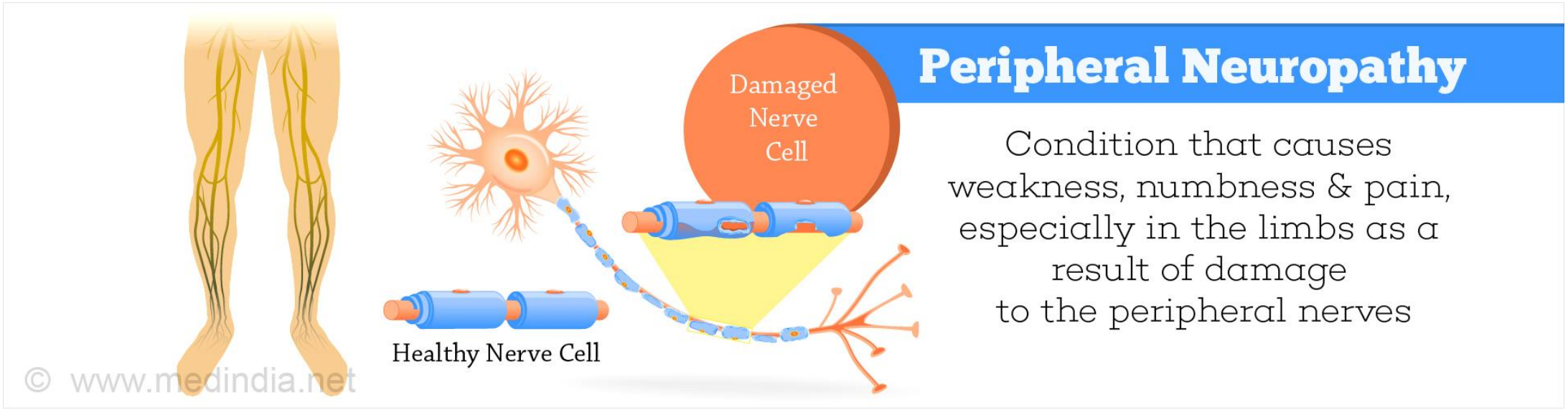
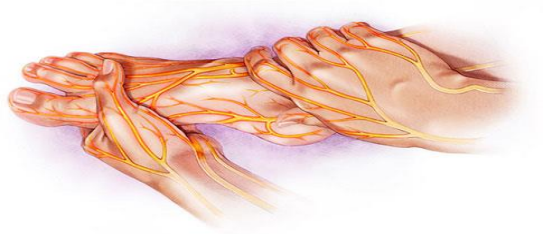


PERIPHERAL NEUROPATHY

Peripheral neuropathy is a general term used for any disorder affecting the peripheral nerves .Since peripheral neuropathy can be caused by numerous factors , an investigation into the cause of neuropathy should be undertaken as soon as the diagnosis of neuropathy is made.





CLINICAL FEATURES (Symptoms and Signs)

SYMPTOMS:

Since the peripheral nervous system consists of Sensory, Motor and Autonomic nerves, symptoms can fall into these **3** categories.

1. **Sensory symptoms:** DISTAL DYSESTHESIAS, PAIN AND NUMBNESS.A characterstic pattern of numbness is one in which the distal portion of nerves are the first affected, the so called STOCKING-GLOVE pattern . The pattern occurs because nerve fibers are affected according the length of the axons, without regard to the root or nerve trunk distribution
2. **Motor symptoms:** MOTOR WEAKNESS.

   Motor weakness is once again distal, and typically involves extensor group rather than flexor group of muscles
3. **Autonmic dysfuction :** Autonmic dysfunction is common and includes ORTHOSTASIS, IMPOTENCE in MALES and GASTROPARESIS.

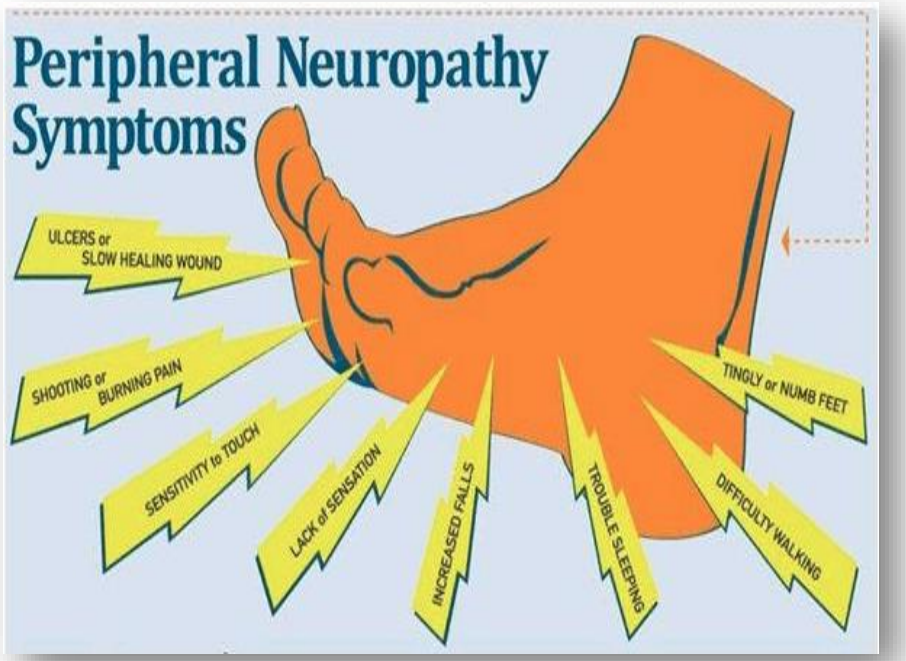
SIGNS:

Even Signs fall into these **3** categories. Sensory, Motor and Autonomic nerves

1. **Sensory symptoms:** Sensory disturbance manifests as distal loss of PIN, TEMPERATURE and VIBRATORY PERCEPTION as well as PROPRIOCEPION , initial sings are frequently confined to the toes and feet. A positive ROMBERG sign is frequently present due to proprioceptive loss in the extremities.
2. **Motor symptoms:** Motor signs includes motor weakness, primarily in extensor group, and most prominent in the lower extremities. Distal muscles are often atropic, one should carefully asses the bulk of the extensor digitorum brevis muscle in the feet and of the intrinsic muscles of the hands. Muscle tone is reduced and often is flaccid.

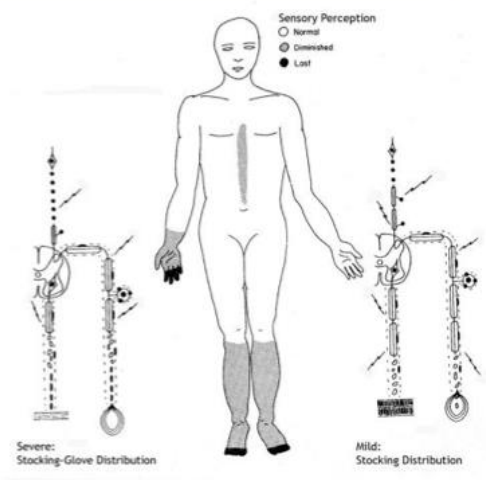
- Muscle stretch reflexes are frequently lost, and most of the patient with peripheral neuropathy have absent ankle jerk as one of the first sign of the disorder

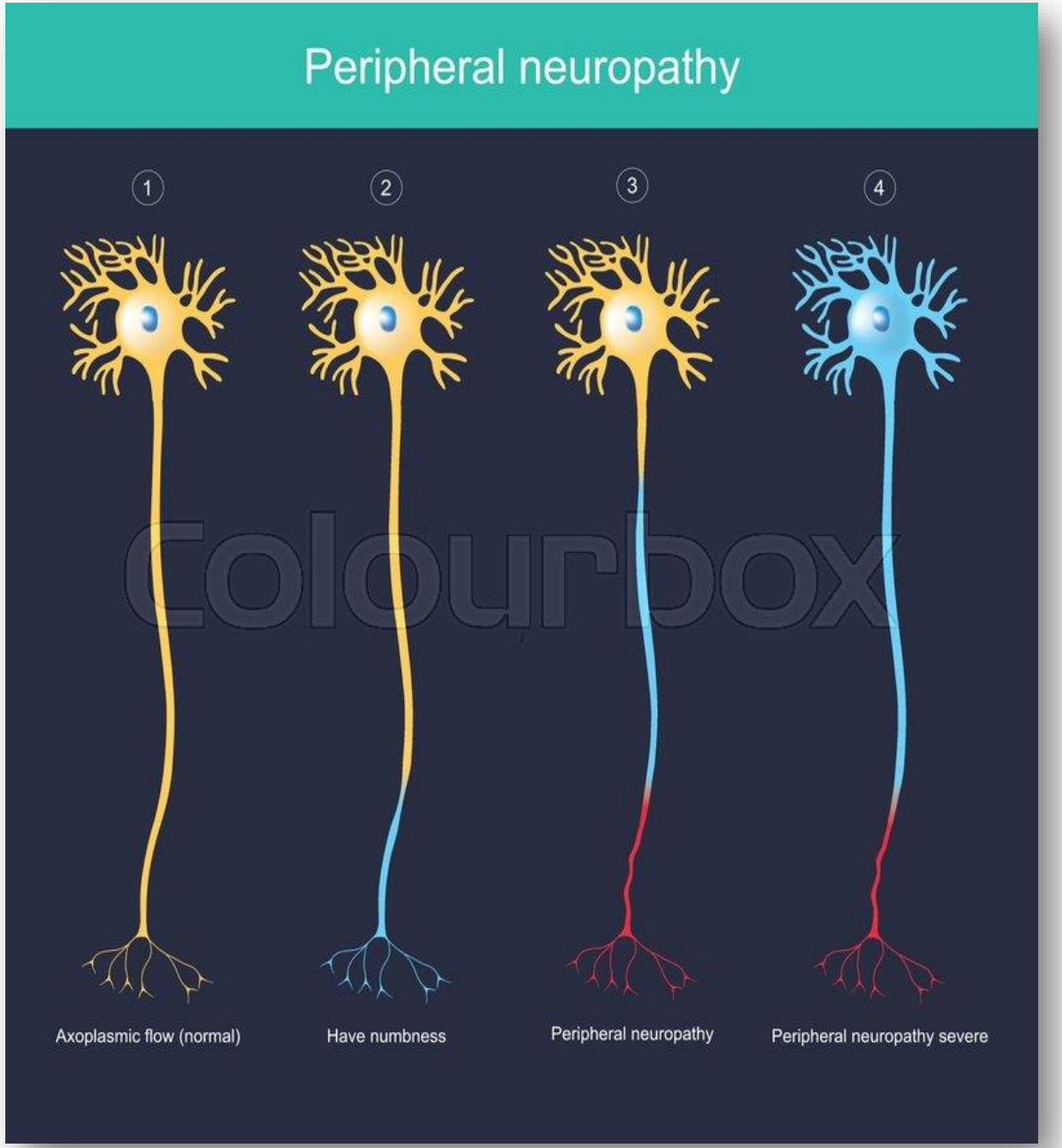
3. **Autonmic dysfuction :** Most common autonomic sign is ORTHOSTASTIC HYPOTENSION



typical pattern: axonal type

progresses in a *stocking-glove* distribution





TYPES OF PERIPHERAL NEUROPATHY

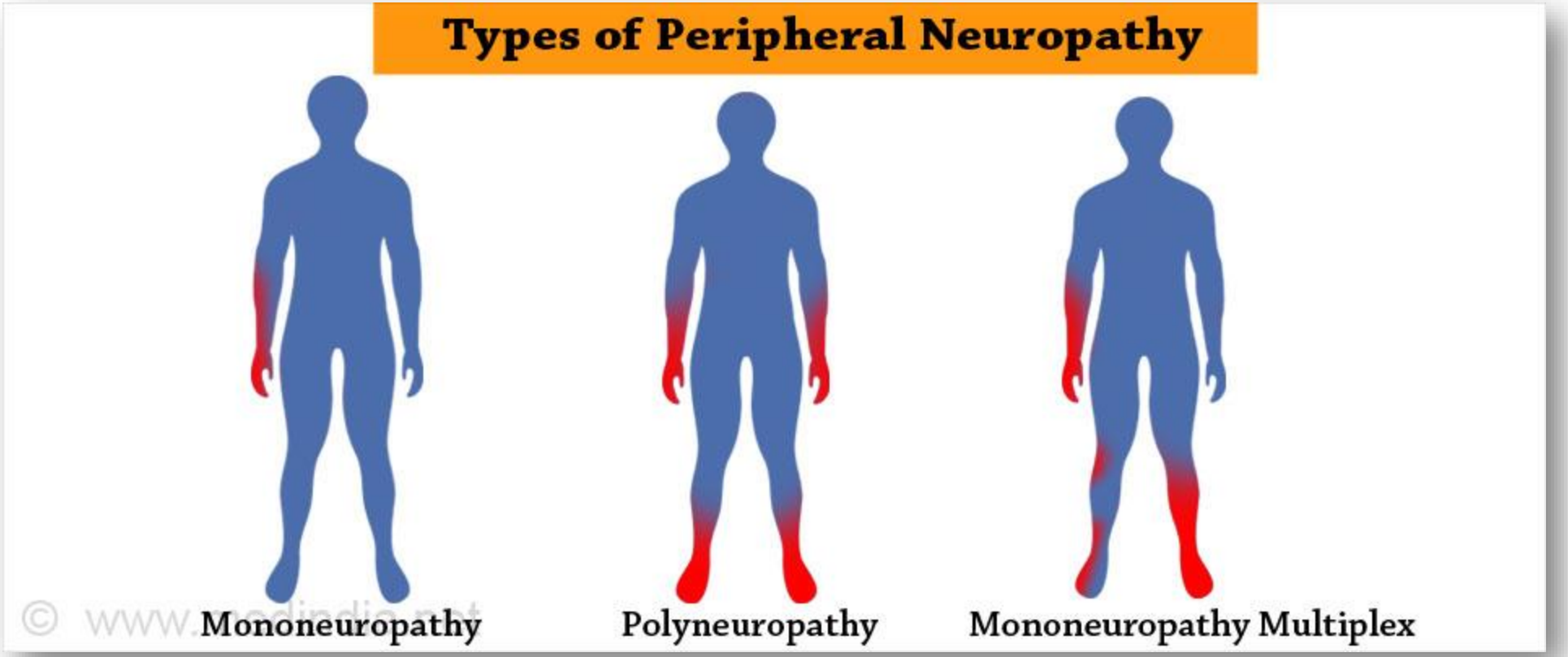
TYPE I

Peripheral Neuropathy:

Demyelinating pathology	Axonal pathology
• Guillain-Barre syndrome • Chronic inflammatory demyelinating polyneuropathy (CIDP) • Amiodarone • Hereditary sensorimotor neuropathies (HSMN) type I • Paraprotein neuropathy	• Alcohol • Diabetes mellitus (±demyelinating picture) • Vasculitis • Vit. B12 deficiency (±demyelinating picture) • Hereditary sensorimotor neuropathies (HSMN) type II

Predominately motor loss	Predominately sensory loss
• Guillain-Barre syndrome • Porphyria • Lead poisoning • HSMN - Charcot-Marie-Tooth • CIDP • Diphtheria	• Diabetes • Uremia • Leprosy • Alcoholism • Vitamin B12 deficiency • Amyloidosis

TYPE II


Types of Peripheral Neuropathy
Mononeuropathy
Polyneuropathy
Mononeuropathy Multiplex

TYPE III

There are many ways to classify peripheral neuropathy. One helpful method is to consider three categories :

- **ETIOLOGY,**
- **DISTRIBUTION,**
- **PATHOLOGY &**

1. : ETIOLOGY:

(Heriditary)-There are a large group of disorders in which the onset of symptoms is insidious and progression is indolent over years or decades. Ex:

- Charcot-Marie-Tooth disease (Hereditary Sensory Motor Neuropathy-HSMN I)
- Dejerine-Sottas Disease (HSMN III)
- Refsum's Disease (HSMN IV)

(Toxic / metabolic)-numerous drugs and toxins can cause peripheral neuropathy – for example

Drugs: Amiodorone, Dapsone, INH, Phenytoin, Pyridoxine, Vincristin, Nitrofurotine etc.

Toxins: Heavy metals including mercury, Arsenic, Lead, Zinc and Thalium, Alxcohol and Organophosphates.

(Neuropathy associated with systemic disease)-Numerous systemic diseases are associated with neuropathy. Among the most common systemic disorders are: Uremia, Prophyria, Vit B12 deficiency, Amylodiosis, Hypothyroidism, Lymphoma including Hodkin's diseases, multiple myloma, vasculitis icludig systemic lupus erythrometosis(SLE), Rheumatoid arthritis, etc.

2: **DISTRIBUTION:**

Nerve damage in peripheral neuropathy may be symmetrical generalized, multifocal, or focal.

Symmetrical generalized polyneuropathies produce signs and symptoms in a distal-to-proximal gradient, the so called Stocking-glove pattern. The reason for this is that offending agent causing neuropathy affects protein synthesis in the cell body of the peripheral nerve. Hence the neuronal dysfunction will occur in the distal portion of the longest axos ad thus produces symptoms of the weakness and numbness and numbness in the most distal portio of the extremities. i.e feets and hands.

Multifocal neuropathies : patients with these forms of neuropathy develop more or less simultaneous dysfunction of the several peripheral nerves. the underlying pathological dysfunction is felt to be ischemic infarction of the vasa nervorum due to vasculitis (may occur in SLE, Rheumatoid arthritis, Diabetes, Hypertension). These neuropathies are frequently painful and cause profound weakness. Prognosis for recovery is good. Assuming that underlying disease process leading to nerve infarction can be suppressed.

Focal neuropathy: Traumatic injuries and entrapment of the peripheral nerves at the usual sites of compression are the most common cause of neuropathy. Most frequent ones are :

Compression of median nerve: CARPAL TUNNEL SYNDROME

Compression of Ulnar nerve : TARDY ULNAR PALSY

Compression of Radial nerve : SATUARDAY NIGHT PALSY

Compression of Peroneal nerve: PERONEOL NERVE PALSY.

Compression of distal brach of Tibial nerve : TARSAL TUNNEL SUNDROME

3: **PATHOLOGY:**

There is major pathological mechanism causing peripheral neuropathy.

Distal Axonopathy,

Mylinopathy and

Neuropathy

Distal Axonopathy : In this form of neuropathy, a metabolic abnormality causes failure of protein synthesis and axonal transport and resulting in degeneration of the distal regions of the axons. For this reason, axonal neuropathies characteristics produce a **stocking glove** distribution of the numbness and weakness.

Myelinopathy: An Immune-mediated attack on peripheral nervous system, mylelin has the characteristic changes in this group of neuropathies. Example: Guillian-Barre syndrome (GBS), Chronic Inflammatory Demyelinating Polyneuropathy(CIDP).these are the most two common forma of demyelinating polyneuropahty.

Neuropathy:Selective inolvement of the cell bodies of motor, sensory and autonomic nerves is the major hallmark.

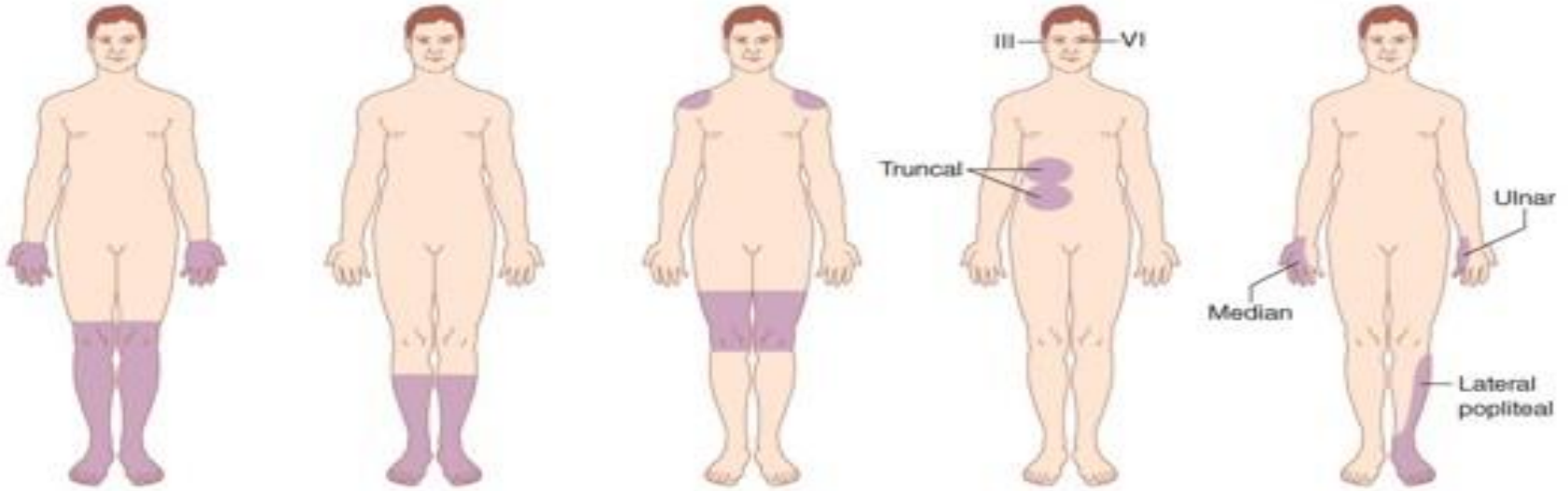
Motor: ex- in Amyotropic Lateral Sclerosis, Spinal Muscular Atrophies.

Sensory: ex- in Paraneoplastic Subacute Sensory Neuropathy(PNSSN), Sjogren's Syndrome.

Autonomic: Idiopathic Orthostatic Hypotension.

diabetes Medicine Matters

Schematic representation of different clinical presentations of diabetic neuropathy



Large fiber neuropathy

Sensory loss: 0→ +++ (touch, vibration)
Pain: + → +++
Tendon reflex: N → ↓↓↓
Motor deficit: 0→ +++

Small fiber neuropathy

Sensory loss: 0→ + (thermal, allodynia)
Pain: + → +++
Tendon reflex: N → ↓
Motor deficit: 0

Proximal motor neuropathy

Sensory loss: 0→ +
Pain: + → +++
Tendon reflex: ↓↓
Proximal motor deficit: + → +++

Acute mono neuropathies

Sensory loss: 0→ +
Pain: + → +++
Tendon reflex: N
Motor deficit: + → +++

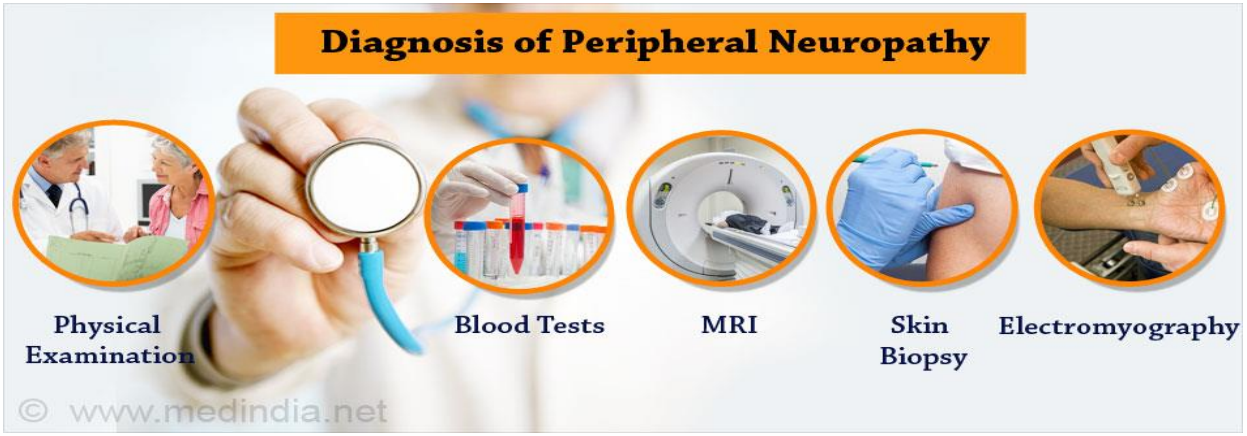
Pressure palsies

Sensory loss in nerve distribution: + → +++
Pain: + → ++
Tendon reflex: N
Motor deficit: + → +++

LABORATORY INVESTIGATION:

Laboratory investigation plays an important role I diagnosing and categorizing the peripheral neuropathies. Electro-diagnostic studies are helpful in quantitating the neuropathy, while blood and urine studies are helpful in identifying an etiology.

1. Nerve Conduction Study
2. Electromagnatography(EMG)
3. Nerve biopsy
4. Blood studies
5. Blood studies (Complete blood count, ESR, Thyroid function tests, Vit B12 level, ANA profile, Rheumatoid factor, Serum Protein. Serum Immuno-electrophoresis etc..)
6. Urine studies
7. Chest x-ray



Treatment:

Neuropathies associated with systemic illness frequently results in improvemet in neuropathic symptoms. Since the nerve fibers regenerate slowly, at the rate of about 1mm per day, recovery is often prolonged ad may take months to years.

Immune –mediated neuropathies includes those associated with vasculitis and Immune mediated demyelinating neuropathies.

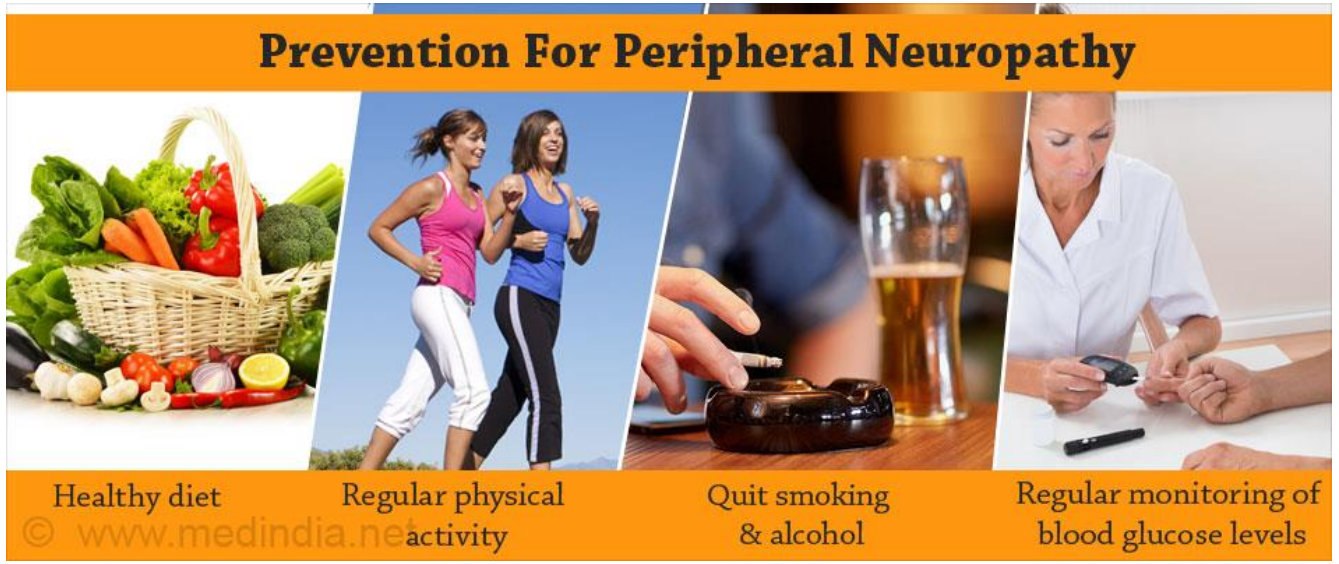
1. CORTICOSTEROIDS: by the virtue of their immunosuppressive effects corticosteroids have been found effective in training the vasculitic neuropathies. Corticosteroids may be given daily or every other day regimen, depending on the severity of the tempo of the disease.
2. IMMUNO-SUPPRESSIVES: **Azathioprine** is frequently used, I combination with steroids, to treat autoimmune neuropathies because of its **Steroid-Sparing-Effect.** Concurrent use of these two medications allows corticosteroids to be trapped more quickly.
3.
4. Plasmapheresis: In this procedure , blood is removed from the patient , plasma is separated from blood cells and discarded, and the blood cells are re-suspended to colloid solution are re-infused. Plasmapheresis is effective in treating patients with **Immune-Mediated-Neuropaties**
5. Intra venous Immunoglobulin (IV-Ig):

5: Symptomatic treatment Tricyclic compounds, Anticonvulsants, topical medicines.

Drugs	Dosage
Duloxetine	30 mg/day for 1 wk, increase to 60 mg/day
Tricyclic antidepressants	Amitriptyline: 25-100 mg/day; max dose 200 mg/day Nortriptyline: 10-25 mg/day initially; titrate to effective dose (usually 75 mg/day)
Anticonvulsants	Gabapentin: 300-900 mg/day; titrate to 3,600 mg/day Pregabalin: 150 mg/day initially; may titrate up to 600 mg/day (max dose)
Topical products	Compounded gel containing baclofen 10 mg, amitriptyline 40 mg, and ketamine 20 mg applied bid
NSAIDs	Ibuprofen 600 mg qid
Opioids	Tramadol slow-release tablets: 200-400 mg/day Oxycodone CR: 10 mg tablet q12h; may titrate every 3 days to a max dose of 60 mg q12h

6: Surgery.

Prevention of Peripheral Neuropathy



The best way to prevent peripheral neuropathy is to manage underlying medical conditions that increases the risk of peripheral neuropathy.

1. Other factors that help prevent peripheral neuropathy are making healthy lifestyle choices like:
2. Including a diet rich in fruits, vegetables, lean meat and whole grains
3. Taking care of deficiencies especially vitamin B12 deficiency by eating meats, fish, eggs, low-fat dairy foods and fortified cereals
4. Engaging in regular exercise will help improve muscle strength
5. Avoid smoking and alcohol intake as they interfere with circulation and affect nerves
6. Regular monitoring of blood glucose levels

Thank you!!!

Any Query.....???

18