

# Multiple Sclerosis



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**Multiple Sclerosis:** Multiple Sclerosis (MS) is an autoimmune demyelinating disease of nerve cells in brain and spinal cord characterised by various neurological disorders.

## Causes:

- Genetic - Mutations in alleles of Human Leukocyte Antigens
- Infections - Epstein-Barr virus infection
- Vitamin D deficiency

## Pathophysiology:

- B cells produce antibodies that bind to myelin proteins
- Macrophages recognise myelin proteins and engulf oligodendrocytes
- Initially, T cells reduce inflammation → oligodendrocytes heal + renew myelin
- Later on, there is repetitive extensive damage → death of oligodendrocytes → loss of myelin → damage + loss of axons

## Presentation

Signs and symptoms:

- Dysarthria
- Nystagmus
- Intention tremor
- **Lhermitte's sign** (neck flexion - electric shock radiates down back + radiates to limbs)
- Poor concentration
- Depression + anxiety

Types of MS:

1. **Relapsing-remitting MS (RRMS):**
  - Episodes of autoimmune attacks - improvement after attack - disabilities do not increase between episodes
2. **Secondary progressive MS (SPMS):**
  - Begins as RRMS - over time episodes become constant - progression of disabilities
3. **Primary progressive MS (PPMS):**
  - One constant episode - progression of disabilities over lifetime
4. **Progressive-relapsing MS (PRMS):**
  - One constant episode - intense attacks - faster progression of disabilities

- Pain can be managed through warm water **hydrotherapy** + relaxation techniques
- Spasticity can be managed through **unloaded leg cycling, stretching** and **limb positioning** - important to stretch lower limb flexors
- Fatigue can be managed through **energy conservation techniques** + **graded endurance training**
- Repetitive **gait + balance rehabilitation** - reduces rate of falls
- **Assessment:** 1. Fatigue, 2. Activities of Daily Living, 3. Falls history, 4. Quality of Life, 5. Cognitive function, 6. Gait, 7. Global strength

Medical: Corticosteroids, IV immunoglobulin, cyclophosphamide (immunosuppressant), manage urinary incontinence, vitamin D supplementation, prednisone, plasmapheresis

## Want to learn more?

With AcePhysio the learning journey doesn't stop here! Take a look at our further reading recommendations below to become an expert in Multiple Sclerosis:

1. Halabchi F, Alizadeh Z, Sahraian MA, Abolhasani M. Exercise prescription for patients with multiple sclerosis; potential benefits and practical recommendations. BMC neurology. 2017 Dec;17(1):185
2. Blikman LJ, van Meeteren J, Twisk JW, de Laat FA, de Groot V, Beckerman H, Stam HJ, Busmann JB; TREFAMS-ACE study group. Effectiveness of energy conservation management on fatigue and participation in multiple sclerosis: A randomized controlled trial. Mult Scler. 2017 Oct;23(11):1527-1541
3. Khan F, Amatya B. Rehabilitation in Multiple Sclerosis: A Systematic Review of Systematic Reviews. Arch Phys Med Rehabil. 2017 Feb;98(2):353-367.

## Diagnosis

- Clinical diagnosis: neurological symptoms with relapsing-remitting pattern
- MRI of brain and spinal cord: areas of demyelination (lesions or plaques)
- Cerebrospinal fluid analysis: oligoclonal bands and elevated CSF immunoglobulin G
- Visual evoked potentials: prolonged conduction in optic nerve and sensory nerves



## Management

Physiotherapy:

- **Resistance training program** - adapt the intensity, frequency and duration of exercise to the patient accordingly