



CURRENT UNDERSTANDING OF MULTIPLE SCLEROSIS

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ABSTRACT

Multiple Sclerosis is a chronic demyelinating disorder of Central Nervous System. Frequency of MS varies in different populations. The precise cause of MS is still unknown. Pathophysiology of neurological tissue destruction in Multiple Sclerosis results from a complex interaction between the neurons, glia and immune system. There is a wide range of symptoms seen in MS including weakness, spasticity, gait and balance problems, urinary incontinence, postural sway, dysarthria < dysphagia and sensory loss etc. Disease-modifying drugs are the long-term treatment for MS but cannot cure the disease itself but only aid in slowing the progression and preventing new attacks, symptom flare-ups and delay the advance of the disease. These may reduce nerve inflammation and manage the flare-ups. The rehabilitation team works with patients and their family on physical and psychosocial aspects in order to promote a superior QoL. A regular and well planned physiotherapy program helps in increasing stability and with appropriate drug treatment, over a period of about time leads to an improvement in stability along with a consecutive decrease in the relapse number. A well designed rehabilitation program along with necessary precautions should be used to improve the overall conditioning of the patient.

KEYWORDS :

INTRODUCTION

Multiple Sclerosis is a chronic demyelinating disorder of Central Nervous System. MS prevails in a total of 2.8 million people worldwide according to a study conducted in 2020 with an estimation of one person being diagnosed with MS every five minutes.<sup>1</sup>

Prevalence

Geographical:

Frequency of MS varies in different populations. In the USA and UK, the frequency is about 90 to 150/100,000. Studies suggested an approximate prevalence rate of only 0.17 to 1.33 per 100,000 in different parts of India<sup>2</sup>, except in Parsi Community<sup>3</sup>.

Age:

MS affects the young (25-30 years)

Gender:

Female is seen more commonly in women than in men. Female to Male Ratio is 2:1

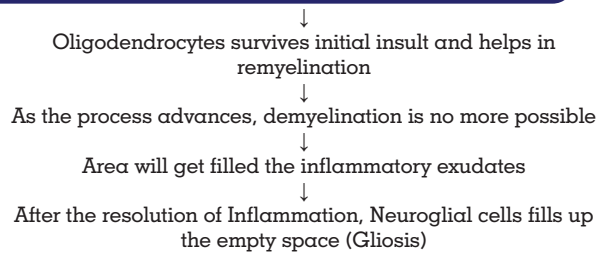
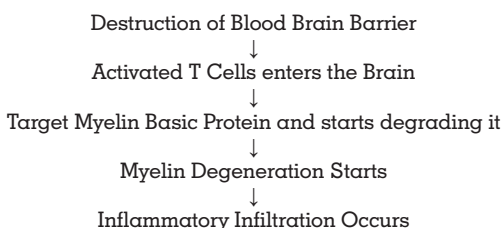
Aetiology

The precise cause of MS is still unknown because although the exact pathogenesis and aetiology is not fully understood.

Studies have suggested that both environmental and genetic factors play a significant role.<sup>4,5</sup> Autoimmune process and neuro-degeneration is considered to be the main culprit behind the disease<sup>6</sup>.

Pathophysiology

Pathophysiology of neurological tissue destruction in Multiple Sclerosis results from a complex interaction between the neurons, glia and immune system. Pathogenesis of this condition includes breach in blood-brain barrier followed by invasion of immune cells leading to damage restricted to focal areas of involvement in white matter.<sup>7</sup>



Course Of The Disease

There are basically six types or pattern in which the disease progresses:

- Benign Multiple Sclerosis (least Severe)
- Relapsing Remitting Multiple Sclerosis (Present in majority of cases)
- Secondary Progressive Multiple Sclerosis
- Primary Progressive Multiple Sclerosis
- Progressive Relapsing Multiple Sclerosis
- Malignant Multiple Sclerosis (Most Severe form, "Marburg's Disease")

Clinical Features

There is a wide range of symptoms seen in MS including weakness, spasticity, gait and balance problems, urinary incontinence, postural sway, sensory loss etc<sup>6</sup>.

Symptoms Related To Sensory Impairments

Skin:

- Numbness
- Paraesthesia

Vision:

- Blurring and Greying of Vision,
- Diplopia
- Ophthalmoparesis<sup>1</sup>
- Eye Pain
- Marcus Gunn Pupil

Pain:

- Trigeminal Neuralgia
- Paroxysmal Limb Pain
- Musculoskeletal Pain
- Headache
- Lhermitte's Sign

Symptoms Related To Motor Impairment

- Muscle weakness,

- Spasticity,
- Exaggerated Deep Tendon Reflexes
- Clonus
- Fatigue, around 75 % rate Fatigue as most disabling symptom

#### Symptoms Related To Cerebellar Pathology

- Ataxia,
- Incoordination
- Nystagmus
- Asthenia
- Tremors

#### Symptoms Related To Bulbar Pathology

- Dysarthria,
- Dysphagia

#### Other Symptoms

- Imbalance of gait,
- Incontinence and
- Cognitive dysfunction.

All of the above mentioned symptoms results to a poor health-related quality of life (HRQOL)<sup>6</sup>.

#### Diagnosis

- Clinical Findings
- History
- Laboratory Findings:

Advances in magnetic resonance imaging (MRI) have played a key role in the last four alterations of the criteria, with clear provisions for lesion number, site of lesions, and their contrast enhancement.<sup>7</sup>

OCBs are thought to be products of clonal expansion of B cells in CSF. Presence of OCBs is one of the most consistent and characteristic findings in Ms<sup>7</sup>

Evoked Potential

#### Management

Disease-modifying drugs are the long-term treatment for MS but cannot cure the disease itself but only aid in slowing the progression and preventing new attacks, symptom flare-ups and delay the advance of the disease.

The injectable medication includes:

**Beta-interferons:** These are the most commonly prescribed medications for treatment of MS. They reduce the frequency and severity of relapses or flare-up of symptoms.

#### Glatiramer Acetate<sup>9</sup>

#### Managing the Relapses

Drugs such as corticosteroid are known to be effective. These may reduce nerve inflammation and manage the flare-ups.<sup>9</sup>

Symptomatic Management:

#### Medications For Managing Symptoms

- Muscle relaxants: help with muscle stiffness or spasms
- Fatigue and weakness
- Depression: Antidepressants are used
- Bladder problems
- Neuro-rehabilitation, counselling and exercising<sup>15</sup>

#### Advancement In Management

*Stem cells Transplant for Multiple Sclerosis* is a proving to be a promising treatment option with positive results in preventing Multiple Sclerosis progression. Hematopoietic Stem Cell Transplant is one of the treatment approaches for Multiple Sclerosis which aims to improve the disease course and prevent neurological episodes<sup>9</sup>.

#### Physiotherapy Rehabilitation In Multiple Sclerosis

The rehabilitation team works with patients and their family on physical and psychosocial aspects in order to promote a superior QoL. A regular and well planned physiotherapy program helps in increasing stability and with appropriate drug treatment, over a period of about 6 months leads to an improvement in stability along with a consecutive decrease in the relapse number<sup>10</sup>.

Rehabilitation interventions should be patient-centered and used with other medical interventions to address MS symptoms that impact ADLs, speech, mood disorders and cognition<sup>11</sup>.

#### Multidisciplinary Team

Communication between the Multidisciplinary team members facilitates high quality, comprehensive care. Team includes:

- physical therapy,
- occupational therapy,
- speech language pathology,
- neuropsychology,
- Social Worker
- Orthotists.<sup>15</sup>

The rehabilitation program should take into consideration the phase of the disease, degree of disability and neurological deficits. The rehabilitation in this phase of the disease is conducted in hospitals, outpatients and the home, depending on the functional status of the patient<sup>12</sup>

#### Theoretical Basis Of Physical Rehabilitation Practice

- Muscle re-education, e.g. bio-feedback, aerobic training, and muscle strengthening<sup>13</sup>
- Neurotherapeutic facilitation, e.g. Vojta reflex locomotion, Brunström, Rood, Bobath, proprioceptive neuromuscular facilitation<sup>13</sup>
- Task-oriented approach, e.g. Petö concept, Constraint-Induced Movement Therapy, Motor Relearning Programme, "contemporary" (modified) Bobath concept, locomotor training and Dual Tasking methods.<sup>13</sup>

#### Steps To Be Followed In Rehabilitation

- **Evaluation and problem identification:**

This needs a thorough assessment of the patient to evaluate the exact amount of disease impact on patient's overall functioning

- **Goal setting**

The goals should be as specific as reasonable, and time frames to reach the goals should be estimated. Goals can be formulated as:

- To minimize the impact of pathophysiology
- To prevent the secondary complications
- To make the patient independent and improve his quality of life
- To educate patient, caregiver or family about the diagnosis, prognosis and plan of Care
- To improve patient's satisfaction

#### Specific Treatments:

Many interventions contribute to increase functional capacity, including:

- General conditioning
- Improving physical impairments (strength, balance)
- Training to compensate for deficits (bowel training programs, cognitive retraining)
- Incorporating medications as needed
- Incorporating adaptive equipment
- Learning new skills (vocational re-training)
- Psychosocial adaptation
- Continual practice with designated regimens
- Motivational strategies
- Follow through: ongoing planning

- Adherence to the program initiated
- Reassessing and monitoring progress and progression, or identifying new issues
- Continuous availability of the team and open communication
- Interaction with community resources (MS organizations, visiting nurses)
- Re-evaluation by the team in 3–12 months
- Reasonable long-term program<sup>14</sup>

#### Types Of Intervention

- Restorative Intervention
- Compensatory Intervention, and
- Preventive Intervention

Choose the best possible type of intervention to be followed in case of your patient.

#### Plan your Plan of Care

##### Sensory Impairments

- Improve awareness of the presence of sensory deficits
- Promotes Safety
- Compensate for Sensory Loss
- Use environmental strategies to manage Visual deficits
- Pressure relieving techniques and Patient education to reduce the chances of developing the Bed Sores

##### Pain

- Massage
- Ultrasound
- TENS
- Cervical Collar for Lhermitte's Pain
- Postural Correction for Musculoskeletal Pain

##### Tone Abnormality

Manage Spasticity with the following:

- Cryotherapy
- Hydrotherapy with Cold
- Stretching
- Passive Movements
- PnF technique of Rhythmic Initiation

##### Fatigue

- Energy Conservation Technique
- Energy Effectiveness Strategies
- Activity Pacing
- Adapt the task or the environment
- Environmental Modification
- Non-invasive brain stimulation a safe and effective method of treating MS-related fatigue<sup>17</sup>
- pulsed magnetic field therapy (PMFT) has also been evaluated among this group of patients and it seems that it might be helpful in alleviating fatigue. In the study performed by Lappin et al., a daily exposure to a small, portable pulsing electromagnetic field generator caused improvements in fatigue and overall quality of life<sup>18</sup>

##### Balance And Coordination Impairments

- *Pool Therapy* - Some studies indicate a positive influence of aquatic exercises on MS-related fatigue. This method also provides the relief and ideal resistance for light strengthening exercises. The additional benefit of exercising in water is a sense of security in case of losing balance and the risk of falling.<sup>16</sup>
- Holding one position for static balance
- Reaching and weight shifting for dynamic balance
- Balancing activities on mat surface
- Approximation
- PnF technique of Slow Reversals and Dynamic Reversals
- Frenkle's Exercises

##### Gait Impairments

- Locomotor Training using Motorized Treadmill and Body

##### Weight Support

- Use Orthosis to support weak muscles and to improve alignment
- Assistive Devices, if needed
- Wheelchair or Scooters for locomotion
- Wheeled Walker

##### Swallowing Impairments

- Modify Food
- Use Strategies for swallowing such as Power Swallow
- Make proper schedule to consume food
- Avoid food that irritates throat
- Teach Heimlich Manoeuvre

##### Cognitive Impairments

- Handouts of exercise instruction
- Ask patient to use strategies such as Pill Dispenser, Alarms<sup>15</sup>

##### Exercises In Multiple Sclerosis:

###### Strengthening Exercises:

- There are evidences suggesting the benefit of exercises in Multiple Sclerosis
- Use FITT Principle
- Follow the precautions such as Avoid Fatiguing, maintaining temperature
- Use discontinuous form of exercises
- Exercise at submaximal intensity
- Current studies support the statement that training programs in MS cause positive effects, especially for those with mild and moderate disability levels. There is some evidence that physically active MS persons are characterized by better results in fatigue scales than non-exercisers<sup>17</sup>

###### Flexibility Exercises:

- To reduce the chances of developing contractures and to maintain joint and soft tissue integrity
- Perform each movement at least for 10 repetitions, thrice a day
- More Focus on involved joints
- Use active ROM and Passive ROM exercise
- Stretching<sup>15</sup>

A well planned and coordinated rehabilitation will help the patient in improving their quality of life and lead a independent life.

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