Overview of rehabilitation for multiple sclerosis (II)

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❑ 8.- Comprehensive multidisciplinary rehabilitation

Patients with MS require comprehensive care, which includes expertise in management of the many symptoms, as well as the limitations in their activity (disability) and participation levels, and these are discussed below. This approach incorporates multidisciplinary (MD) input with an efficient, accessible service that is flexible and caters to the changing needs of these individuals, and provides appropriate follow up over time. PwMS and their caregivers therefore need support, education and information, which facilitates involvement in their own care, maintains a sense of control and maximizes their functional independence[101, 103]. The rehabilitation principles are well suited to the fluctuating unpredictable disability seen in pwMS. These principles are based on a thorough understanding of the underlying mechanisms that cause disability and recovery in MS[103]. Rehabilitation interventions involve expert MD assessments, evaluated through appropriate outcome measures[70, 100, 104], using a functional goal oriented approach[105]. Goal setting is an integral part of rehabilitation intervention as it encourages participants to set their own goals and priorities, and supports team communication and coordination[106] (Figure 2).

8.1.- Components and phases of rehabilitation

The subcomponents that comprise comprehensive rehabilitation are listed in Box 1.4, while Box 1.5 shows the phases in the rehabilitation process[107].

Individualized rehabilitation programs encompass all aspects of patient care - including personal, social and physical. As the impact of MS extends to many aspects of a person's life, often inpatient rehabilitation is the most appropriate setting to treat the complex needs of these patients. Community and home based programs have broad outcomes that aim to reduce impairment and disability, facilitate social reintegration and return to work, financial independence, improved participation and psychosocial adjustments.

8.2.- Existing evidence

There is evidence for some components of the rehabilitation package, such as physical therapy[108], while evidence for occupational therapy[109], and psy-

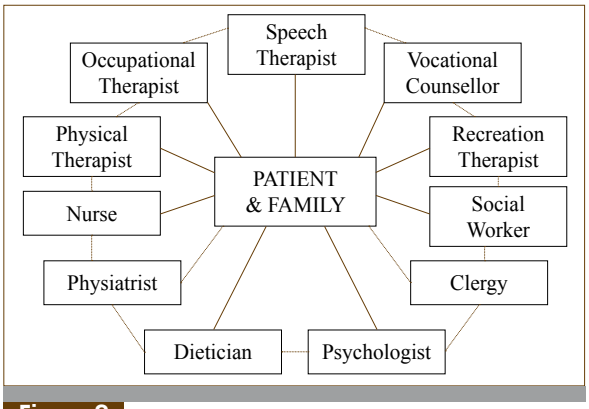

Figure 2 *Rehabilitation team interaction.*

BOX 4 **Subcomponents of comprehensive rehabilitation[107]**

- Individualized patient centred treatment plan, with patient actively participating.
- Prioritized goal setting through an interdisciplinary process.
- Active patient participation to achieve set goals.
- Goals should result in improvement in patients' personal potential.
- Outcomes should demonstrate reduction in impairments and improvement in, activity and participation.

BOX 5 **Phases in rehabilitation process[107]**

- Evaluation - identification and quantifying effects of disablement (limitation in activity and participation) – mediators for adaptive capacity that can be targeted foci for therapy.
- Treatments – arrest the pathophysiologic processes causing tissue injury.
- Therapeutic exercise – focuses on enhancement of organ performance.
- Task reacquisition – emphasizes total body adaptive techniques.
- Environmental modification – directs effort towards environmental enhancement (physical, psychological, social and political) to improve participation.

chological therapies[110] is less compelling. However a recent systematic review[111] of psychological interventions for pwMS suggested reasonable evidence that cognitive behaviour approaches are beneficial for depression, in helping people adjust to, and cope with, having MS. A systematic review provided evidence for MD inpatient and ambulatory rehabilitation programs for pwMS for reducing disability and enhancing participation[112]. Evidence for specific symptomatic interventions is provided in the sections below. A number of studies also provide support for beneficial effects of inpatient and outpatient rehabilitation programs on function and QoL[113-119]. A single cohort study suggests that the benefits in disability persist for about 6 months, and positive effects on QoL and emotional well -being continue for longer[120]. A recent randomized controlled trial[121] showed reduction in disability for up to 12 months in pwMS following multidisciplinary rehabilitation, but not for QoL.

8.3.- Standards of care

The standards of care identifying key issues in MS have been previously outlined[101, 122]. These include: a rapid diagnostic phase - with clear diagnosis, education and support; for minimally and moderately affected pwMS and access and continuity of care, self-management, expertise, communication and coordinated care for those with severe disability. In addition to the above, other key issues include respite, community and/ or long-term care and community mobility.

MS was initially thought to be a disease of ambulation but better understanding of MS indicates involvement of multiple systems (cognition, memory, emotional control), and that the sum of impairments in a pwMS leads to greater disability than adding the individual impairments together[4]. This may explain why some pwMS may not perform as well as expected. Patients tend to be referred for rehabilitation when they have lost significant function usually related to mobility. It is recommended that these pwMS be referred earlier, so that rehabilitation strategies can restore / maintain recent functional deterioration[4, 101, 122]. In those severely affected, rehabilitation can provide accommodation, so that some functional independence can be restored in a modified environment, and carers be educated and supported. Rehabilitation in those severely affected can address quality of life issues, ease carer burden and direct care with other health professionals. Importantly 'crisis management' should be avoided. Disability management in MS should be planned, deficits should be anticipated (over time), and appropriate mechanisms that accommodate, and facilitate functional independence should be provided[4].

8.4.- Challenges for rehabilitation

MS is dynamic with a complex moving target of deficits, unlike static events like spinal cord injury or a single event of stroke. The unpredictability of disease progression and lesion distribution makes it difficult for the patient to adjust and compensatory strategies therefore can be more difficult. An important challenge for rehabilitation is the timing of the diagnosis of MS, and its devastating impact, as it usually affects young persons in the prime of their lives, when social and financial consequences are greatest.

❑ 9.- Symptomatic management in MS

Persons' with MS can present with various combinations of deficits, such as physical, cognitive, psychosocial, behavioural and environmental problems. These include impairments (such as strength, coordination, balance, spasticity, memory, urinary urgency), which result in disability or limitation in function (eg, mobility, self care, incontinence, pain, cognitive deficits) and restriction in performing their role in society – participation (such as work, driving). Therefore issues of progressive physical disability, psychosocial adjustment, social reintegration, financial strain and impact on driving, work and family occur over time[29].

A sensible management strategy for the majority of symptoms should therefore include education, therapy input and drug treatment. Since MS is a progressive disease, frequent evaluation and reassessment of treatments need to be considered. A detailed discussion of the symptom management is discussed in many text and review articles[29, 122]. The most common patient reported symptoms are shown in Table VIII. Of these, fatigue, bladder dysfunction and mobility related problems are most disabling in terms of impact. A list of the common disabilities in MS is shown in Box 6.

The patient priorities for treatment are discussed in the section below.

❑ 10.- Fatigue

Fatigue is one of the most common symptoms in MS, reported by up to 95% of pwMS. It is defined as 'subjective' lack of physical or mental energy that is perceived by the individual or caregiver to interfere with usual activities and is present 60% of the time[123]. In a sample of 656 patients with MS, 22% reported limitation in level of physical activity, 14% stated it required them to have more frequent rest breaks and 10% had to discontinue work due to fatigue[124]. It impacts on social life and activities of daily living.

Fatigue is difficult to predict and is unrelated to age, gender, EDSS status or neuroimaging[125, 126]. A number of reviews outline pathophysiology of fatigue in MS[127], see Box 7.

The Multiple Sclerosis Council of the Paralysed Veterans of America has developed clinical guidelines and management of MS related fatigue[123], based on evidence and provides a framework for identifying appropriate care. Non-pharmacologic approaches include education for patient and family, fatigue management and pacing, energy conservation and work simplification strategies, use of assistive devices, cooling (air conditioners), structured exercise programs to improve fitness, aerobic capacity and endurance, and dietary considerations[123, 127].

There is limited evidence supporting drug efficacy in MS related fatigue[134, 135]. A systematic review found inconsistent improvement in MS fatigue using Amantadine (an antiviral agent), and was unable to recommend its efficacy or safety in pwMS[134]. Amantidine is however preferred to Pemoline (a CNS stimulant) for treating fatigue in MS[136]. Modafinil is a 'wake promoting' agent that selectively works in the hypothalamic pathways, and has been reported to improve fatigue in progressive MS[137]. Depression may contribute to fatigue in some cases and there is empiric support for use of antidepressants in MS related fatigue[127]. Aminopyridines (potassium channel blockers) have been used to treat fatigue[131]. A systematic review[135] however, failed to find evidence for efficacy or safety of aminopyridines. A recent pilot study[138] evaluated efficacy of Prokarin, a transdermal blend of histamine and caffeine for improving fatigue. The trial was methodologically flawed, and further studies are required.

❑ 11.- Bladder, bowel and sexual dysfunction

11.1.- Bladder and bowel dysfunction

Disturbances in bladder and bowel function occur in >80% of pwMS, and is primarily as a result of neurogenic dysfunction[139-143] causing urinary urgency, frequency, incontinence, urinary retention, increase risk of infections, hydronephrosis and renal failure. Risk factors for upper urinary tract damage in MS, which require longer-term follow up include: detrusor sphincter dyssynergia, age over 50 years and male gender[141]. Bowel dysfunction has been reported in 50% of pwMS, with constipation and faecal incontinence[142, 144-146]. These result from autonomic dysfunction and abnormal rectal function[144, 147, 148]. A recent study identified female sex, higher disability (EDSS scores) and urinary dys-

Table VIII Most frequent symptoms of MS

Fatigue	88%
Walking problems	87%
Bowel and bladder problems	65%
Pain and other sensations	60%
Visual disturbances	58%
Cognitive problems	44%
Tremors	41%

Aronson K, Goldbenberg E, and Cleghorn G. Socio-demographic characteristics and health status of persons with multiple sclerosis and their care givers. MS Management 1996;3(1):5-15.

BOX 6 Wide range of MS related disabilities - Impact on patient, family, work & society

- Physical: ambulation, transfer skills, Activities of Daily Living (ADLs).
- Pain: musculoskeletal, neuropathic, mixed.
- Incontinence: urinary frequency, urgency, constipation.
- Cognitive: memory, attention, information processing, executive dysfunction.
- Communication and swallow: dysarthria, dysphagia.
- Affective: mood, affect, coping ability, self-efficacy, stress.
- Psychosocial: patient/family dynamics, social maladjustment, support and assistance packages, adjustment issues.
- Sexuality and fertility.
- Driving and transport.
- Vocational: return/maintain work, assessment of work capacity.
- Avocational: hobbies, participation in activities.

BOX 7 Phases in rehabilitation process[107]

Primary factors:

- Immune dysregulation – changes in neuroendocrine function[128, 129].
- Central nervous system mechanisms – neuronal dysfunction due to immune injury, demyelination and inflammation, impaired innervation and activation of muscle groups leading to compensatory increase in central motor drive exertion and more energy depletion[130, 131].
- Endocrine factors – abnormalities in hypothalamic/ pituitary/ adrenal axis[132].
- Neurotransmitter dysregulation – dopaminergic, histaminergic and serotonergic pathways may contribute to fatigue[133].

Secondary factors:

- Physical deconditioning from failure to get adequate exercise.
- Sleep dysfunction – may also be due to nocturnal spasms, pain, incontinence and depression.
- Pain – sensory disturbances, neuralgia, dysesthesia and spasms.
- Depression – in closely related to poor sleep, pain and fatigue.
- Medications – can worsen fatigue (antispasticity agents, eg. Baclofen).

function as independent predictors of developing anorectal dysfunction[146].

Clinical guidelines for neurogenic bladder management are available[141]. In addition, those developed by the Multiple Sclerosis Council of the Paralysed Veterans of America[149] are effective, and widely used approaches to care. Pelvic floor exercise may be useful, especially in women[150]. Hyperactive bladder can be treated with anticholinergic medications (oxybutynin, imipramine)[151-153], and in severe cases with intravesical oxybutynin[154] or intravesical capsaicin[155]. Urinary retention may respond to medications like bethanecol. Incomplete bladder emptying can be managed with Credes technique, and intermittent catheterization. If these are unsuccessful, then continuous catheterization may be needed[149]. Dorsal spinal cord stimulation in 10 pwMS improved urinary urgency and hesitancy[156]. A bladder stimulator may improve emptying of bladder in mobile patients[157]. Nocturia can be managed by antidiuretic hormone desmopressin (DDAVP), by nasal spray but can cause hyponatremia especially in elderly patients[158]. Bladder infections should be treated based on patients' symptoms, and urine microscopy and culture. Acidifying agents are also recommended. Cranberry can reduce risk of recurrent urinary infections in neurogenic bladders[159]. Cannabis extracts were reported as safe and effective treatment for urinary problems in MS[160].

Bowel programs include dietary fibre and laxatives. Frequent use of enemas should be avoided[161]. More recently the iso-osmotic laxative polyethylene glycol (Movicol) has been shown to be effective[162].

11.2.- Sexual dysfunction

Sexual dysfunction in MS has been widely reported[142, 163, 164] especially in patients with urinary symptoms. Men commonly report diminished libido and erectile and ejaculatory dysfunction[165]. Women report diminished genital sensation and lubrication and difficulty achieving orgasm[166]. Causes of sexual dysfunction therefore may be primary (lack of lubrication, diminished genital sensations, erectile dysfunction), secondary (spasticity, pain, catheter care) or tertiary, psychosocial causes (marital difficulty, fear, lack of confidence and self worth). Rehabilitation includes education about intimacy and sexuality, management of fatigue, positioning and mechanics, information about aids (tumescence devices), specific suggestions and techniques, and referral for sexual counselling. The use of Sildenafil (Viagra) has been a breakthrough in erectile dysfunction in men[167]; its role in women is under investigation. In addition, intracorporeal pharmacotherapy, papaverine has now been replaced by prostaglandin E1[168].

❑ 12.- Mobility related symptoms (motor, sensory and visual disturbances)

Corticospinal tract involvement can result from widespread MS lesions within the spinal cord, medulla, internal capsule or deep hemispheric white matter[169, 170]. In one large patient series, 87% reported problems with walking[171], with complaints of weakness, 'heaviness' and 'stiffness'.

12.1.- Spasticity

Spasticity is a form of hypertonia characterized by dependence of the degree of resistance upon the velocity of muscle stretch. Muscle shortening and restricted movements lead to decreased tissue compliance and biomechanical difficulties (such as muscle contractures), which can limit a person's activity (mobility, ability to transfer, perform self care tasks, pain) and participation (unable to drive or work).

The goal of managing spasticity is not simply removal of spasticity, but to improve a person's function, relieve pain and discomfort, and facilitate ease of care. A recent review[122] outlines management involving patient education, therapy intervention and judicious drug treatment. These include: awareness of specific symptoms; presence of noxious stimuli that can worsen spasticity (urinary tract infection); correct positioning and alignment in lying, sitting and value of standing; and a stretching program; avoidance of postures that facilitate spasticity and abnormal movement patterns. Drugs are an adjunct to these interventions and may be given orally or by injection (intramuscular, intraneural or intrathecal)[122].

Antispasticity agents have been reviewed extensively[172-174]. Baclofen (gamma aminobutyric acid agonist) is used most commonly, and is effective for spasticity of spinal origin and for flexor spasms. It can cause weakness, lethargy and fatigue; side effects should be monitored (truncal weakness, drowsiness, fatigue). Abrupt withdrawal may result in hallucinations and seizures. Diazepam and Clonidine are effective for nocturnal spasms. Dantrolene sodium acts at the level of the muscle and can be used with any of the above agents for severe generalized spasticity. It can however cause irreversible liver damage. Gabapentin, vigabatrin and memantine have also been studied. Cannabis extracts are reported to have positive effects on spasticity, pain and urinary symptoms[160].

Intrathecal Baclofen (ITB) is effective for severe spasticity and requires lower doses. However, ITB withdrawal syndrome (incorrect dosage, pump failure) can be life threatening[175]. For focal spasticity (uncommon in MS), Botulinum toxin injected into the affected muscle can be effective. Hyman *et al*[176] showed benefit in adductor spasticity, despite limited functional

benefit. Other localized spasticity (adductor muscles) can be treated with phenol neurolysis. Surgical options (such as tendon release surgery) are reserved for severe spasticity, causing pain, interfering with care and /or limiting activities of daily living.

12.2.- Ataxia

Cerebellar problems such as tremor, ataxia and incoordination were reported by 41% of persons in a large MS cohort[171]. Intention tremor can be disabling, while truncal ataxia interferes with balance and mobility, increasing predisposition to falls and injury. Ataxia is difficult to treat. A recent systematic review[177] failed to suggest efficacy and tolerability of pharmacotherapies, and neurorehabilitation strategies to treat ataxia in MS, as indications and methods used in various studies were not standardized or validated. Improvement in posture and alignment, proximal stabilization and coordination exercises, with or without distal weights to dampen tremor are usual strategies for ataxia. Medications are equally ineffective (isoniazid, clonazepam, propanolol, gabapentin and ondansetron)[177, 178]. Ondansetron appeared useful only when given intravenously[179]. Surgical interventions such as thalamotomy or thalamic stimulation in MS have produced limited success[180], and are being evaluated.

❑ 13.- Pain and paroxysmal symptoms

Pain can be acute or chronic. The underlying mechanisms of pain in MS are unclear and have been linked with the deafferentation and disinhibition of central and pain pathways[181, 182] with CNS lesions causing hyperexcitability, and with increased neuronal activity at the site of the lesion in the spinal cord[183]. Acute pain may be associated with active inflammatory process. Chronic pain may be due to the MS process itself or from complications that arise from it such as trigeminal neuralgia, spasms / spasticity, and musculoskeletal posture and gait related problems[184].

In one recent Australian series (n= 94) 60% of patients reported chronic pain. Of these 61% had dysesthetic pain and 70% had episodic increases in pain[185]. Chronic pain in MS impacts on activities of daily living[184] and interferes with ability to work[186]. The severity of depression is reported to be higher in persons with MS with chronic pain than those without pain. There is also increased interference with daily activities, more severe symptoms of depression and negative effect on relationships with partners and family[184]. Treatment of chronic pain has been discussed elsewhere[187]. A MD team approach may be needed and referral to pain clinic may be helpful.

Amitriptyline is effective for chronic dysesthetic pain. Carbamazepine is the drug of choice for trigeminal neuralgia. If not tolerated then alternatives include gabapentin, lamotrigine and phenytoin[188]. Transcutaneous electrical nerve stimulation to the lower back of pwMS appears promising[189]. Surgical options are percutaneous procedures and rarely, microvascular surgery[190, 191]. Carbamazepine and gabapentin are agents of choice for other paroxysmal symptoms (tonic spasms, ataxia or sensory symptoms like Lhermittes). Cannabis based preparations are effective for pain in pwMS[192, 193].

❑ 14.- Cognitive deficits

Current estimates of the prevalence of neuropsychological problems in MS are approximately 50%[194, 195]. The neurocognitive and behavioural deficits in MS, and suggested treatments are discussed in a recent review[196]. Cognitive problems result from affected pathways in the cerebral white matter (limbic system, the midbrain, brainstem), which transmit to, and communicate with higher-level cortical regions throughout the brain. These deficits can be a major impediment to rehabilitation and include: inability to store and to retrieve information, decreased memory, attention and speed of processing, and limitations in emotion, personality and behaviour[29, 196, 197].

Many guidelines exist for neuropsychological research in MS[196, 198, 199]. Neuropsychological interventions are designed to enhance a person's ability to function in all areas of family and community life, which are meaningful for pwMS. A neuropsychological assessment can be helpful to delineate problems and suggest compensatory techniques. These include functionally oriented therapies based on specific deficits: compensatory strategies (using intact skills or external aids to improve function); substitution (learned use of intact cognitive abilities to circumvent a problem); or scheduling (templates and structured programs) may assist with everyday living tasks.

A systematic review reported that cognitive behaviour therapies (CBT) were beneficial for pwMS in terms of coping with, and adjustment to MS[111]. Although the evidence for individual interventions is limited, computer based retraining program were shown to improve deficits related to attention[200]. Medications such as amantadine and glatiramer acetate failed to improve cognitive function in MS[201, 202], and others such as methylphenidate have not yet been studied in MS.

❑ 15.- Visual and brainstem symptoms

Visual disturbances were reported by 58% of pwMS in one large Scandinavian cohort[171]. Referral to 'low

vision clinic' may be required for decreased visual acuity (optic neuritis). The visual dysfunction may also result from involuntary eye movement disorders (nystagmus, opsoclonus)[122]. Patient education, use of adaptive visual aids (prisms, magnifying lens), and occasionally medications such as baclofen, isoniazid and gabapentin may be helpful[203].

Vestibular involvement in MS is frequent and causes vertigo, and is often associated with other signs of brainstem dysfunction. Specific physiotherapy exercises such as the Cawthorne-Cooksey protocol may be helpful. Effective speech therapy for dysarthria for MS includes control of speech rate, voice emphasis and power and reduction in phrase length[204-206]. Dysphagia occurs in about 34 - 43% of pwMS[207, 208]. Fatigue, tremors, weakness and incoordination exacerbate dysphagia, and dysarthria. Videofluroscopy and clinical assessment is recommended for more disabled persons[209]. Speech therapy can provide compensatory strategies to avoid aspiration, correct posture (sitting up when eating), alter food consistency and provide education to prevent complications (pneumonia)[207].

❑ 16.- Psychiatric and psychological dysfunction

The prevalence of major depressive disorder in pwMS is reportedly between 27 - 54%[210, 211]. The relationship between depression and cognitive dysfunction, and treatment are discussed elsewhere[184]. Depression impacts' on all aspects of life and can amplify symptoms and lead to further limitation in function[212]. Major depressive disorder is linked to objective cognitive difficulties (attention, memory)[213, 214].

Selective serotonin reuptake inhibitors are widely used to treat depression in rehabilitation[215, 216]. One study (n=63) compared CBT, the antidepressant Sertraline and group psychotherapy[217]. CBT and Sertraline were more efficacious than group therapy, and improvement in depressive symptoms persisted at 6 months follow up. Symptoms of depression also improved in persons who received an alternate approach – an eight-week telephone cognitive behavioural intervention compared to usual care[218]. This approach was adapted to address barriers such as transportation and access to pwMS. Exercise improves mood, fatigue and quality of life[218-221] and is as effective as standard antidepressant medication and psychotherapy[222], and has lower relapse rates[223].

Other approaches to treat depression include: behaviour activation (which treats depression by increasing access to positive reinforcement and decreasing frequency and intensity of aversive events and consequences)[224]; interpersonal therapy - an evidence based approach that focuses on role disputes, and role transitions as a framework for therapy[225].

Psychosocial issues include inability to cope (patient and family), stress, financial considerations and marital discord. Education and support, stress management and coping skills can positively influence health and wellbeing and may require clinical psychology and psychiatry. Neuropsychological counselling was found to improve insight and social skills training compared with standard counselling, and reduced disinhibition and socially aggressive behaviour in cognitively impaired pwMS[226].

❑ 17.- General reconditioning and ambulation

Reduced physical activity and exercise due to MS limitations have been discussed in detail elsewhere[227-229]. Factors include decreased muscle strength, aerobic capacity, maximal vital capacity, and an increase in neuromuscular tension, fatigue, anxiety and depression. Exercise programs do not alter the MS disease course, but do prevent the secondary effects of inactivity, and improve fatigue and the sense of wellbeing. An integrated exercise program incorporates: a daily passive range of motion; an active range of motion with gravity eliminated or against gravity as allowed by strength; and specific muscle training (three sets of 10 repetitions) which is recommended for focal weakness, when fatigue and heat sensitivity are issues[95, 227, 230, 231]. Active exercise for 20 - 30 minutes 3 times per week, with a 5 minute warm up and cool down, stretching for lower limbs and back is effective[227], while aerobic exercises for cardiovascular fitness are important for overweight persons[232].

Gait is impaired by weakness, spasticity, incoordination, balance, fatigue and visual disturbances. For ambulation, a graded program should improve trunk control and balance, followed by normalizing tone, flexibility and range of motion and then strength[29]. A graded sitting and standing tolerance program, and tilt table routine prior to gait training might be required. Proprioceptive, tactile and visual cues are also helpful. Specific ambulation aids (elbow crutches, walking frames, ankle foot orthoses)[233] and mobility devices (wheel chairs, scooters) can decrease energy expenditure; improve safety and endurance[234]. A person's strength, motor control, cognition and emotional response are all considered prior to prescription. Wheelchairs are customized for each person, such as appropriate seating, posture support, tilt in space mechanism and manipulation of components (arm rests, foot plates). Scooters assist those with ataxia and fatigue[228]. Weighted wrist cuffs and walkers may help dampen tremors[234, 235].

❑ 18.- Activities of daily living

Improvement in functional independence and maintenance is a key rehabilitation goal. Principles of occupational therapy (OT) in MS have been previously discussed by others[230, 236]. OT was effective in improving function in pwMS, using retraining techniques for personal, domestic and community tasks, mainly in inpatient settings[113, 115, 120]. However, in a recent systematic review[109] patient education and energy conservation strategies in MS were found to be inconclusive due to methodological weakness of included studies. OT should concentrate on activities that pwMS would use in practice, rather than on activities that people may not value because of environmental or behavioural circumstances[227].

Although a recent study did not find excessive risk for fatal road accidents in pwMS[237], many issues impact on driving, especially cognitive and perceptual considerations[238-240]. Driving assessments may be required based on each individual's deficits.

❑ 19.- Employment

An estimated 65% of pwMS were working at the time of their diagnosis, and between 25-35% of these persons remain in the work force 5 -10 years after diagnosis[241]. Fatigue, urinary urgency and incontinence, visual and mobility issues are the main barriers for continued employment. Many pwMS leave the workforce prematurely, or on advice of a well-meaning health care provider or family member. A systematic review of vocational rehabilitation for pwMS supported job retention strategies for pwMS rather than retraining in new jobs[242]. Rehabilitation input may assist in continued employment. Reasonable accommodations for MS include flexible working hours, work at home options, transportation, accessible work environment (bathroom, desk), memory aids (planners, diaries), vision aids (voice recognition software), air-conditioning and others. Return to work programs are customized, graded (gradual increase in working hours) or altered to suit the individual with MS[243]. At times retraining in a new vocation may be required. In Australia, these programs are coordinated by the Commonwealth Rehabilitation Service (CRS), in collaboration with the employee, employer and the rehabilitation team.

❑ 20.- Summary

The multiple concurrent MS-related physical, cognitive, emotional and social issues make rehabilitation challenging. Rehabilitation measures do not alter the course of MS disease. The overriding principle in setting goals for a pwMS is to maximize functional independence and safety, minimize complications and problems that result from decreased mobility, compensate for loss of function and improve quality of life[29]. Rehabilitation should be viewed as an ongoing process to maintain, restore maximum function and quality of life for pwMS[4].

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