



# My life with MS

A step by step guide towards  
maintaining an active lifestyle

*For people newly diagnosed with MS:*

- 1 Multiple Sclerosis – An introduction
- 2 Diagnosis and what happens next
- 3 Symptomatic treatment of MS

*For people with MS on beta-interferon therapy:*

- 4 An introduction to modern MS treatments
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- 9 **Physical exercise and well-being in MS**

## 9 Physical exercise and well-being in MS



## Foreword

Some time ago, early one Tuesday morning when mist was rising from the river, I walked home from the city and took a short cut across the park. In a field that was yellowed by autumn a young lady with dark red Nordic walkers jogged past me. As I am a neurologist by training, I wondered whether the young woman had been diagnosed with multiple sclerosis. How could I tell? She was just one of many people keeping fit in beautiful surroundings. My thoughts went back to the time, about 30 years ago, when I became aware of my personal interest in MS. The disease did not have a sporty image in those days. I have been lucky working with the author of this booklet, Anders Romberg and many other colleagues who have changed my opinion. Recently, a friend of mine, a great guy newly diagnosed with multiple sclerosis, turned to me and asked which I would recommend to him, new MS drugs or exercise. My reply was instant: "Dear fellow, both of them".

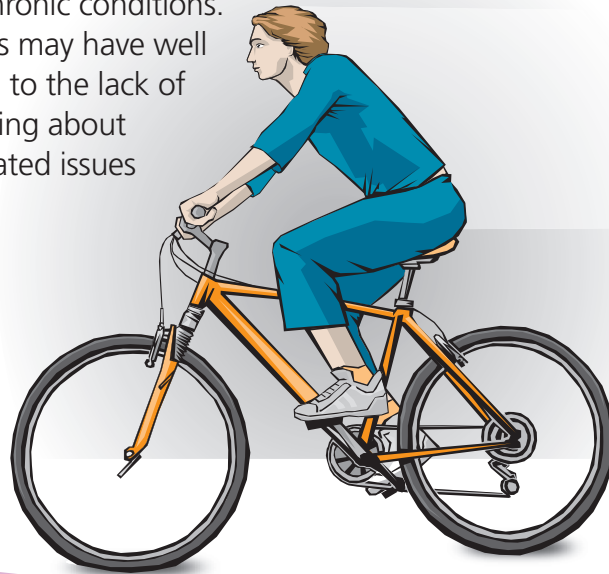
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## Previous attitudes

It is well-known that regular exercise and overall physical activity are essential for health maintenance and disease prevention. In MS, the role of exercise has been a controversial issue for a long time. There was a commonly held belief, for example, that exercise could have a detrimental effect on the condition's activity. Therefore, people with MS were often advised to avoid physical strain because it was thought this would exacerbate the symptoms. These types of negative attitudes towards exercise in MS may well have been related to the unique features of the disease itself, such as worsening of symptoms with the increase of body temperature. Variable progression, excessive fatigue and heterogeneity of symptoms are typical to MS, but rather rare in other common chronic conditions. Such factors may have well contributed to the lack of understanding about exercise-related issues to MS.



## Current thinking regarding exercise in MS

Contrary to previous beliefs, exercise in MS is viewed favourably these days. It is noteworthy that the current positive perception is based on firm scientific evidence. Owing to this, there are a number of good reasons to support exercise recommendations for people with MS. Since 1996, an increasing number of high-quality studies (randomised controlled trials) examining the effects of repeated exercise on people with MS have been published.

The overall message from the research is clear: Regular exercise is beneficial for people with MS in many ways. Also, importantly, studies have shown that exercise has been well tolerated – adverse exercise-related effects in MS have been the exception, rather than the rule.

**Regular exercise has many different benefits for people with MS.**

### **Exercise**

- is helpful in managing several symptoms
- helps to maintain functional ability
- is important for psychological well-being
- complements the effects of drug treatments

## Benefits of exercise in MS

### a) Physical benefits

The most well documented benefits of exercise for people with MS relate to physical fitness. Peak oxygen uptake ( $VO_{2peak}$ ) and lactate threshold are important indicators of cardiopulmonary fitness. An increased  $VO_{2peak}$  is associated with aerobic exercise training and mildly or moderately disabled people with MS can improve their  $VO_{2peak}$  (over a 3-month period) in a similar way to healthy people. Similarly, the lactate threshold can be increased by people with MS in a relatively short training period.

Muscle function can be maintained and increased by resistance training. Studies indicate that people with MS are capable of making favourable improvements in limb muscle strength or endurance using standardised resistance training programmes. These programmes have been equally effective irrespective of whether they have been conducted in a home or a fitness room setting.

Other components of physical fitness include bone strength, body composition and flexibility. There is little information on precise exercise responses in people with MS on these particular issues. Based on the overwhelming research on healthy people, it is likely that physically active people with MS can also prevent bone osteoporosis, succeed in weight control and maintain or improve muscle/joint flexibility.

Functional performance can also be attained by exercise. One MS study, with 611 participants, showed that higher exercise levels at baseline were related to slower accumulation of functional limitations over a 5-year follow-up period. Further good news is that various aspects of walking, such as speed, endurance or effort, can be improved by either short- or long- term exercise.



## Benefits of exercise in MS

### b) Psychological benefits

At the same time as physical benefits, exercise has various psychological outcomes. Such outcomes should not be underestimated or forgotten. However, the psychological mechanisms of exercise are as yet not properly understood in chronic conditions such as MS. Nevertheless, regular exercise helps to reinforce self-esteem, strengthens self-efficacy, is enjoyable, is valuable in keeping up the spirits, and – at its best – may lead to so-called flow-experiences in which the sense of time disappears in a highly positive manner.

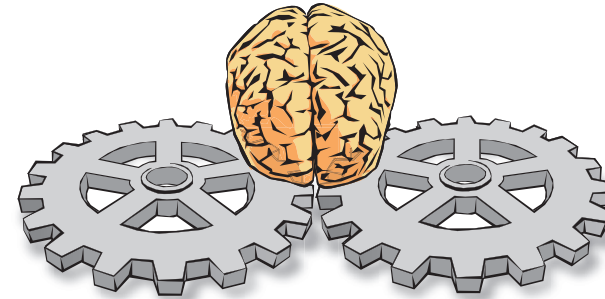
Psychological factors also have an important role in exercise behaviour and participation in physical activity. For example, self-efficacy has been consistently found to be important in determining exercise behaviour across diverse populations, including MS. Outcome expectancies and perceived benefits of exercise are among other psychological issues known to affect exercise adherence significantly.

**“I can, I am capable of – in spite of my condition, in spite of its symptoms” Exercise may induce strong positive thinking and thus enhance self-efficacy (= a belief in one’s ability to successfully carry out a course of action).**

### c) Benefits for overall health

There is a wide array of scientific evidence to show that regular physical activity helps to maintain health and protects against common chronic diseases such as hypertension, coronary heart disease or type 2 diabetes. Similar protective effects can also be expected in people with MS. In an American study including 123 women with MS, participation in light, moderate or heavy physical activity was associated with reduced risk of coronary heart disease. Another smaller study suggested that resistance training could promote coronary artery disease risk reduction in mildly or moderately disabled MS subjects.

Lately, extensive research has suggested that exercise could enhance and protect brain function in ageing humans. Parallel observations have been found in MS. Preliminary evidence suggests that exercise could be a promising strategy to activate brain repair mechanisms and could be a potent protective factor for cognitive decline in people with the condition.



## Benefits of exercise in MS

### d) Benefit for quality of life

Owing to its progressive nature, MS tends to reduce health-related quality of life. Experience from research so far indicates that participation in exercise really has a positive impact on this multi-dimensional construct in people with MS. Exercise programmes have frequently led to improvements in vitality or social functioning among the various sub-categories connected to health-related quality of life.

Social interaction and peer support seem to be the key components in promoting quality of life by exercise. In other words, exercise in groups, not alone, most likely induces positive changes on quality of life in people with MS. In addition, the type of exercise may have an influence, aerobic endurance exercise is more suitable for improving quality of life than resistance training.



## Exercise and symptoms

Many of the symptoms in MS can be affected positively by exercise. Awareness of exercise responses on various symptoms is helpful when building up an exercise programme. Awareness is also important in preventing exercise-related misconceptions in MS.

MS-related fatigue may vary considerably and it is perceived to interfere with usual and desired activities. Reduced physical activity may sometimes make it worse. Among the treatments shown to alleviate fatigue are aerobic exercise and yoga. Other forms of exercise may also be helpful. Because physical strain in itself causes at least some “natural” sense of fatigue, there are a number of practical measures to prevent an excessive build-up of MS-related fatigue (see table page 13).

Muscular weakness is a major feature of MS. The primary origin for weakness in MS lies in the affected central nervous system mechanisms, but it may also occur from disuse atrophy, brought on by inactivity resulting from the condition. Resistance training in any form is effective and suitable for maintaining muscle mass and combatting deterioration in muscle function in people with MS.

Spasticity often occurs together with weakness, particularly in the lower limb muscles. Its consequences include limited range of motions, discomfort and sometimes muscle/joint contractures. Stretching exercises, along with medication and physiotherapy, form the cornerstones for symptomatic treatment of spasticity. Stretching of muscles is greatly encouraged, right from the early stages of the condition.

Balance disorders are typical of MS and they tend to restrict exercise participation. There are many ways to manage the problems encountered by impaired balance. Aids, exercising in water, or exercising in a sitting position instead of standing (e.g. in fitness rooms) are examples of practical solutions which can be helpful. Because balance is regulated by multiple factors it is good to notice that almost all types of exercise “challenge” mechanisms of balance in a highly appropriate manner.

Bladder and respiratory problems are examples of other symptoms that can be influenced by regular exercise training. Some bladder problems can be alleviated by specific pelvic floor exercises. Breathing exercises are known to be helpful for respiratory function and they can improve respiratory muscle endurance as well.

Some of the symptoms may limit exercise performance, especially in advanced stages of the condition. These

include ataxia, pain, heat sensitivity, sensory disturbances, visual disturbances and cognitive deterioration. None of these, though, is a complete barrier for exercise, and for most symptoms there are practical solutions to cope with them when

exercising. Heat sensitivity – very common in MS – is a good example of this. A rise in core body temperature may slow nerve impulse conduction and increase the number of neurological signs. This is especially problematic because exercise normally tends to increase core body temperature. Fortunately, heat-induced disadvantages, including excessive fatigue, can be effectively prevented by cooling or other techniques (see table).



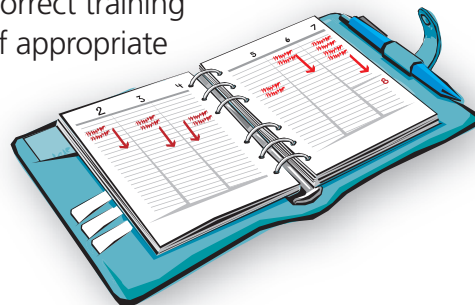
#### **Practical advice on overcoming problems caused by heat and preventing excessive fatigue during exercise.**

- Hydration (drinking of fluids) before and during training
- Pre-cooling; cold/cool shower or bath, cooling vest and/or cap
- Appropriate (not too warm) clothing
- Wipe-down skin e.g. using a wet towel
- Exercise in the morning is often better tolerated than in the afternoon
- For indoor activities the facilities should be well air-conditioned
- Interval training; take regular (short) breaks during exercise

## Safety

Research has consistently shown that exercise is safe in persons with MS. There is no evidence that exercise makes the condition worse. However, the individual must be healthy and any cardiovascular disease must have been excluded. When it comes to symptom exacerbation, for example in a large Finnish exercise study musculoskeletal symptoms (joint/back pain, muscle soreness etc.) were as common as MS symptoms in over 4000 exercise sessions.

Precautions should be taken under certain conditions. Should a relapse occur, the exercise programme may require modification or be temporarily discontinued. Proceeding exercises during relapse requires agreement with/ advise from the treating physician. During an infection, particularly during the first few days, exertion should be avoided. Some people with MS experience side-effects while under disease-modifying medication. In such cases it is not sensible to perform exercises as soon as the drug has been taken. Sports injuries or falls are not excluded in people with MS, they can certainly be prevented by a number of measures, including correct training techniques and use of appropriate sportswear.



## Practical issues

The level of disability, symptom variation, previous exercise experiences and motivational factors should be individually taken into account to build up an optimal training programme for a person with MS. From time to time, it is important to modify the programme to ensure the training stimulus is as variable and appropriate as possible.

For people with minimal impairment, the general exercise prescription may closely resemble that for healthy people and, typically, mainly competitive sports and very intensive or long-lasting physical efforts are restricted. In advanced stages of the condition exercise becomes more adapted. By now, the training programme should be built considering the various deficits such as restricted mobility and increasing symptoms. Supervision by rehabilitation professionals is often very helpful, in particular, the role of a skilled physiotherapist as a "personal trainer" may be crucial.



A well-rounded exercise programme for a person with MS should include aerobic endurance and resistance training complemented by flexibility and balance exercises. The recommendation for the amount of aerobic endurance training is at least 2-3 sessions/ week for at least 20-30 minutes/session with a moderate intensity. Training duration and intensity are, however, interdependent. Thus, training on low-intensity should be conducted over a longer

period of time (over 30 minutes). For resistance training, a convenient starting point (for people who have not trained before) would be 2 sessions/week consisting of 2 sets of exercises for major muscle groups with 8-15 repetitions for each exercise. It is good to keep in mind that, in parallel with these recommendations for development of physical fitness, 30 minutes of all physical activity, preferably on most days of the week, contribute to maintenance of health.

To maintain flexibility and to reduce stiffness, stretching exercises are recommended, preferably on a daily basis and in conjunction with other training. Slow, gentle and prolonged stretches for 20 – 60 seconds are recommended, especially for the lower limb and back muscles. It is good to incorporate balance exercises to the overall fitness programme. For example, functional muscular strength exercises such as forward lunges or heel-toe raises train postural balance as well.

Many of the common exercise modes are suitable for people with MS. In some stages of the condition, adaptations may be necessary, however. For example, cycling with an ordinary bike can be replaced by a tricycle or alternatively by a bicycle ergometer. Some of the exercise modes are particularly feasible in MS. Aquatic exercise in its many forms is a good option because water provides ideal exercise conditions for a person with MS. Lately,



Nordic walking and yoga have – for many good reasons – become increasingly popular with people with the condition. Group exercise classes are widely used because of the multiple benefits they offer. Socialisation, peer support and sharing of exercise experiences are important aspects for the maintenance of exercise motivation, which may be put to the test sometimes in a person living with a chronic condition. A variety of other factors have also been shown to be useful in maintaining motivation about exercise. These include: support from spouse, participation in rehabilitation, use of exercise diaries, use of devices and equipment (e.g. pedometers), and pertinent information about the subject.

### Summary

Benefits associated with regular exercise contribute greatly to the well-being of people with MS. Exercise should be seen as one of the key elements of self-management in the condition. There are many good reasons why exercise is suitable and can be recommended for people with MS. Taken together, exercise in MS:

- is effective in improving/maintaining a number of aspects of physical, mental and overall health
- enhances quality of life, especially when conducted in groups
- may prevent functional decline in the long-term
- may potentially have a protective effect on brain function
- is safe, and the advantages far outweigh the drawbacks
- leads to maximum benefits when performed regularly, is variable and is enjoyable

## Exercises

### Exercise 1

Forward lunge. Stand with legs slightly apart. Step forward with one leg, bend the knee and lower your body. The lunged knee should not go in front of the toes. Then push back off the lunged leg to the starting position. Hands may be held to the sides too.



### Exercise 2

Leg curl with the use of an ankle weight to strengthen knee flexor muscles.



### Exercise 3

Alternate heel-toe lifts to train lower leg musculature. If hand support is reduced, the exercise becomes increasingly demanding for balance.



### Exercise 4

Elastic resistive bands are easy to adjust and provide resistance for users at any level of strength and ability. The figure shows an example of how to improve hip extensor muscles.



**Exercise 5**

Step-ups sideways is a functional exercise for the core muscle groups of the lower limbs. Note the balance support provided by the chair.



**Exercise 7**

Rhythmic bouncing on the ball with simultaneous handclaps provides a good aerobic workout.



**Exercise 6**

A gymnastic ball can be effectively used for a large variety of training purposes such as development and maintenance of balance and coordination.



**Exercise 8**

A challenging alternative to strengthen abdominal muscles as well as to improve stability of the pelvis.



**Exercise 9**

*Biceps curl with a resistive band. The wrist should be kept straight and rigid.*



**Exercise 10**

*A comprehensive exercise for the entire arm with a resistive band.*



**Exercise 11**

*An exercise which develops balance, co-ordination and strength all at the same time. Back should be straight with face looking down at the floor while the opposite arm and leg are lifted into a horizontal position.*



**Exercise 12**

*One of the various ways to strengthen abdominals. Hands may also alternately be kept behind the neck.*



**Exercise 13**

Stretching of the knee flexor muscles. Keep the back straight and bend the entire trunk forward. Don't forget to breathe!



**Exercise 14**

Stretching of the back muscles. The position also relieves lower limb spasticity.



**Exercise 15**

Stretching of the inner thighs.



**Exercise 16**

Stretching of the knee extensor muscles.



**Exercise 17**

Stretching of the calf muscles. By placing a board under the ball of the feet the stretch is made more effective.



**Exercise 18  
Nordic walking**

Nordic walking is ideal for people with MS. When walking, the poles always move diagonally behind the body.

The correct pole length (= walker's height multiplied by 0.68) is critical to being able to use the right walking technique.



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Physiotherapist at  
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