# Exercise and Multiple Sclerosis

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Your Facilitator is Peter Butler

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## Acknowledgment of Country

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## Introductions

- Graduated Masters of Exercise Physiology at ACU in 2022
- Started working at MS Plus in 2022 as an Exercise Physiologist in Footscray
- Interested in working with Neurological Conditions
- Excited at finding ways to use exercise to assist in improving one's ability to achieve their goals and assist in improving one's quality of life

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1. Introduction
2. What is an Exercise Physiologist?
3. Benefits of Exercise
4. Exercise Guidelines
5. How much Physical Activity?
6. Goal Setting
7. Barriers of Exercise
8. What does it mean to engage with an EP?

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# What is an Exercise Physiologist?

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## What is an Exercise Physiologist?

"AEPs are **university qualified allied health professionals** equipped with the knowledge, skills and competencies to **design, deliver and evaluate safe and effective exercise** interventions for people with **acute, sub-acute or chronic medical conditions, injuries or disabilities**. Pathology domains covered by the services of AEPs include cardiovascular, metabolic, neurological, musculoskeletal, cancers, kidney, respiratory / pulmonary and mental health, and any other conditions for **which there is evidence that exercise can improve the client's clinical status**."

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(Exercise & Sports Science Australia, n.d.)

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# Benefits of Exercise

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## Benefits of Exercise

(Dalgas, Langeskov-Christensen, Stenager, Riemenschneider, & Hvid, 2019)

### Physical Activity

**"Any bodily movement produced by skeletal muscles that result in energy expenditure."**

Occupational

Sports

Household Activities

### Exercise

**"A subset of physical activity that is planned, structured, and repetitive and has a final or an intermediate objective – the improvement or maintenance of fitness"**

Resistance Training

Aerobic Training

Flexibility Training

Balance Training

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# Holistic Benefits

| Physical | Social | Mental |
|---|---|---|
| • Improved balance<br>• Reduction in fatigue<br>• Improved mobility<br>• Increased strength and cardiovascular capacity<br>• Increased ability to complete ADL's.<br>• Reduced risk of comorbidities<br>• Management of any chronic conditions | • Capacity to meet new people in similar life situations.<br>• Develop friendships and relationships.<br>• Develop confidence to go into more social settings | • Improved cognition (memory)<br>• Improved mental wellbeing (reduction in depression and anxiety symptoms) |

(Motl & Sandroff, 2015)

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# Neurological Conditions

- Gait and balance for those with asymmetries
  - Slow memory loss and brain atrophy.
- Optimize function and prevent deterioration.
  - Enhanced motor control.
- Maintain independence and reduce falls risk.
  - Reduce fatigue

Cited by: https://www.flintrehab.com/regaining-balance-after-stroke/

(Farrell, Merkas, & Pilutti, 2020), (American College of Sports Medicine, 2022)

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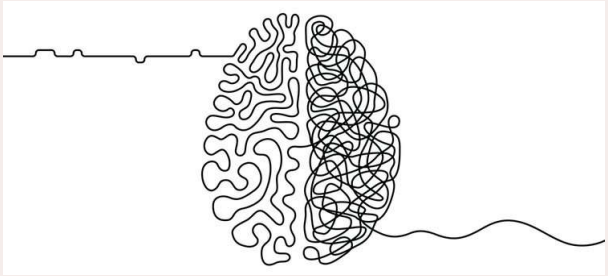
# MS Specific

**Disease-Modifying Effects**

- Although research is still limited in this area, there have been promising signs, including:
- Possible neuroprotective factors of exercise
- Neuroplasticity is possible for MS (ability for the brain to form and recognise connections in response to learning)
- Possible slowing or reversing of total brain atrophy.



Cited from: https://ladnervillagephysio.com/blog/how-do-we-learn-neuroplasticity-of-course

(Dalgas, Langeskov-Christensen, Stenager, Riemenschneider, & Hvid, 2019)

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# MS Specific

**Symptom Management**

- Different types of exercise formats have been highlighted to help in assisting many different symptoms.
- Exercises such as, Aerobic Training, Resistance training, HIIT, Balance Training can all lead to benefits

**Symptoms Include:**

Fatigue
Pain
Mobility
Cognition
Balance Impairments
Reduced muscular strength
Mental health

(Dalgas, Langeskov-Christensen, Stenager, Riemenschneider, & Hvid, 2019)

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# Guidelines

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## Australian Physical Activity Guidelines

- **Adults should be active most days, preferably every day. Each week, adults should do either:**
  - 2.5 to 5 hours of moderate intensity physical activity – such as a brisk walk, golf, mowing the lawn or swimming
  - 1.25 to 2.5 hours of vigorous intensity physical activity – such as jogging, aerobics, fast cycling, soccer or netball an equivalent combination of moderate and vigorous activities.
- **Include muscle-strengthening activities as part of your daily physical activity on at least 2 days each week. This can be:**
  - push-ups
  - pull-ups
  - squats or lunges
  - lifting weights
  - household tasks that involve lifting, carrying or digging.
- **Doing any physical activity is better than doing none. If you do no physical activity right now, start by doing some, then slowly build up to the recommended amount.**

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(Australian Government , 2021)

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# MSRA Guidelines

(MS Research Australia, 2020)

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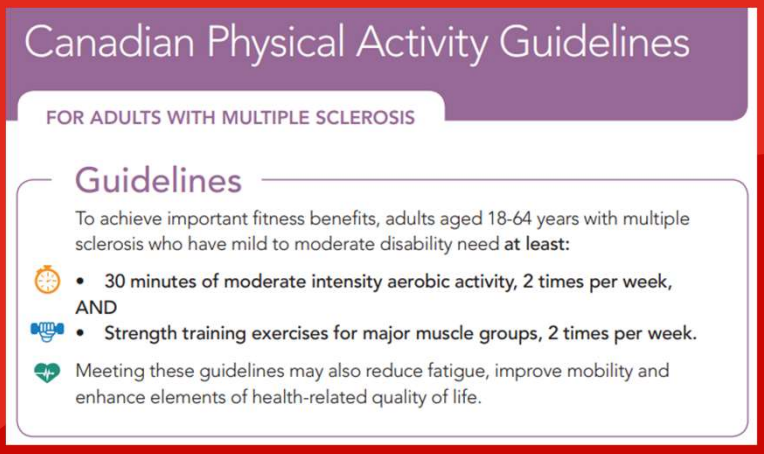


# Canadian Physical Activity Guidelines for MS

(Canadian Society for Exercise Physiology, n.d.)
(Canning & Hicks, 2020)

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HERE IS WHAT IS RECOMMENDED

| | Aerobic Activity | Strength Training Activity |
|---|---|---|
| How often? | Two times per week | Two times per week |
| | • Aerobic and strength training activities can be done on the same day<br>• Rest your muscles for at least one day between strength training sessions | |
| How much? | Gradually increase your activity so that you are doing at least 30 minutes of aerobic activity during each workout session. | Repetitions are the number of times you lift and lower a weight.<br>Try to do 10-15 repetitions of each exercise. This counts as 1 set.<br>Gradually work up to doing 2 sets of 10-15 repetitions of each exercise. |
| How hard? | These activities should be performed at a moderate intensity.<br>Moderate-intensity physical activity is usually a 5 or 6 on a scale of 10, and causes your heart rate to go up.<br>As a general rule if you're doing moderate-intensity activity you can talk, but not sing a song, during the activity. | Pick a resistance (free weights, cable pulleys, bands, etc.) heavy enough that you can barely, but safely, finish 10-15 repetitions of the last set.<br>Be sure to rest for 1-2 minutes between each set and exercise. |
| How to? | Some options for activity include:<br>Aerobic activities<br>• Upper Body Exercises: arm cycling<br>• Lower Body Exercises: walking, leg cycling<br>• Combined Upper and Lower body exercises: elliptical trainer | Strength training activities for the upper and lower body<br>• Weight machines<br>• Free weights<br>• Cable pulleys |
| | Other types of exercise that may bring benefits<br>• Elastic resistance bands<br>• Aquatic exercise<br>• Calisthenics | |

(Canadian Society for Exercise Physiology, n.d.) (Canning & Hicks, 2020)

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**Table 2.** Exercise recommendations and key messages for EDSS 0–9.0.

EDSS 0–4.5 (mild impairments)

Key messages
- Exercise is beneficial even if a person must do it differently than in the past
- Referrals to exercise specialists/programs for individuals with chronic conditions can facilitate participation
- Exercise recommendations should be tailored to address a person's needs/capacity, as well as personal preferences
- Supervised training generally provides better results than non-supervised training
- Exercise may temporarily worsen symptoms in patients who are heat-sensitive

Recommended exercise strategies (existing guidelines)
- *Aerobic*: 2–3x/week; 10–30 minutes at a moderate exercise intensity (40%–60% of maximum HR[a] or aerobic capacity), 11–13 RPE (on a 20-point RPE);[19,20,22] modalities might include arm, leg, or combined cycle ergometry; treadmill or overground walking, rowing, running, or jogging;[23] aquatic activities or upright stepping
  - Advanced aerobic strategies:
    - 5x/week, up to 40 minutes, 70% of peak aerobic capacity or 80% of maximum HR[a], RPE approaching 15 out of RPE 20 (or 5 out of RPE 10);[19] modalities may include running, road cycling, and pole walking
    - HIIT: 1x/week, five 30–90-second intervals at 90%–100% maximum HR, with equivalent rest, to replace a continuous bout of exercise; modalities similar to aerobic[24–26]
- *Resistance*: 2–3x/week, 1–3 sets for each exercise, 8–15 repetitions/set, 5–10 exercises;[19] modalities might include weight machines, free weights, resistance bands, or body weight exercises
- *Flexibility*: daily, 2–3 sets of each stretch, hold 30–60 sec/stretch; modalities might include yoga and stretching exercises[27]
- *Neuromotor*: 3–6x/week, 20–60 minutes, interventions individualized for intensity and duration, targeting fall prevention,[28] postural stability, coordination, and agility at various levels of challenge (seated, standing, walking, upper limb); modalities might include Pilates,[29] dance[30,31] yoga,[32] Tai chi,[33] hippotherapy,[34] virtual reality,[35] and balance and motor control training[36]

# Exercise and lifestyle physical activity recommendations for people with multiple sclerosis throughout the disease course

(Kalb, et al., 2020)

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| EDSS 5.0–6.5 (increasing mobility impairments) | |
|---|---|
| Key messages<br>Same as above, plus<br>• Exercise is possible for people with increasing disability<br>• When balance is affected, adaptations to the exercise or the environment can reduce the risk of falls<br>• Referrals to specialists are more essential as disability increases, to assure safety, proper form, and appropriate intensity | Recommended exercise strategies (existing guidelines)<br>Same as above |
| Expert Opinion (in the absence of published data):<br>• Adaptive exercise may be desirable for some (e.g. recumbent hand-cycle or three-wheel bike for cycling, pole-walking)<br>• With the Borg 10-point scale, intensity would typically be between 2 and 6<br>• *Aerobic*: heat sensitivity in some patients may require cooling interventions<br>• *Resistance*: functional/multi-joint movements (sit-to-stand, stair climbing, reaching); neuromuscular electrical stimulation<br>• *Neuromotor*: good clinical practice incorporates training in posture, coordination, and agility to prevent secondary impairments (i.e. rotator cuff impingement, Trendelenburg gait, low back pain, falls) | |

# Exercise and lifestyle physical activity recommendations for people with multiple sclerosis throughout the disease course

(Kalb, et al., 2020)

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| EDSS 7.0–7.5 (diminished ability to perform ADLs—non-ambulatory) | |
|---|---|
| Key messages<br>• At this level of disability, all recommendations are expert opinion except where noted, due to lack of published evidence<br>• Exercise is beneficial and achievable regardless of a person's level of disability<br>• Exercise can be independent (e.g. breathing exercises, arm movements) or facilitated by trained assistants (e.g. stretching, range of motion, transfers)<br>• Exercise at this level of disability needs to be guided by a specialist, but may be carried out by trained family or caregivers | Recommended exercise strategies, EDSS 7.0–7.5<br>Up to 20 min/day, 3–7 days/week (with each person working to her or his own maximum in order to make gains)—can be accumulated across several shorter sessions, with rest breaks between repetitions and gradual progression in small increments toward the goal:<br>Breathing<br>• Every second day, 3 sets, 10 repetitions/set; resistive breathing apparatus (e.g. spirometer)[38]<br>Flexibility<br>• 1x/day, ≥30–60 seconds, hold/stretch all affected upper and lower extremity joints—combining stretches when possible<br>Upper extremities<br>• Six 3-minute intervals at 70% target HR, active range of motion with resistance as able (e.g. arm cycling)[39]<br>• 3x/week, 3 sets, 10 repetitions/set or 10 sets, 3 repetitions/set, as able, with rests as needed; weights or resistance bands |

# Exercise and lifestyle physical activity recommendations for people with multiple sclerosis throughout the disease course

(Kalb, et al., 2020)

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# How Much Physical Activity?

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## How Much Physical Activity?

| | |
|---|---|
| **Frequency** | **Aerobic**: 2-3 days / week<br>**Resistance**: 2 days / week<br>**Flexibility**: Daily<br>**Neuromotor**: 3-6 days / week<br>*These can all be combined* |
| **Intensity** | **Aerobic and Resistance**: Moderate Intensity initially<br>**Flexibility**: Light<br>**Neuromotor**: Varied |
| **Time** | **Aerobic**: 10-30 minutes<br>**Resistance**: 1-3 sets, 6-15 repetitions, 5-10 exercises<br>**Flexibility**: Hold for 20-30 seconds<br>**Neuromotor**: 20-60 minutes |

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(Kalb, et al., 2020), (Canadian Society for Exercise Physiology, n.d.), (Australian Government , 2021), (MS Research Australia, 2020)

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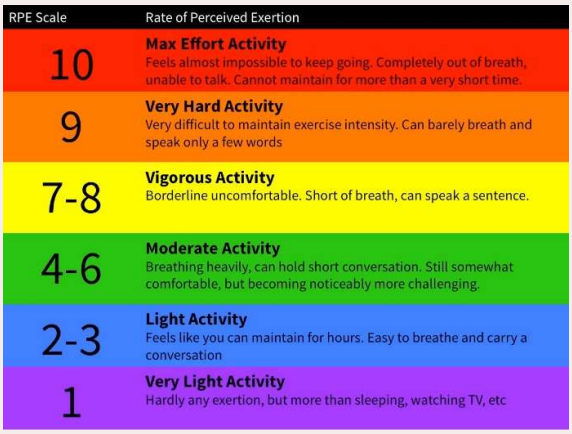
# Intensity

| Borg's Rating of Perceived Exertion (RPE) Scale | |
|---|---|
| Perceived Exertion Rating | Description of Exertion |
| 6 | No exertion; sitting and resting |
| 7 | Extremely light |
| 8 | |
| 9 | Very light |
| 10 | |
| 11 | Light |
| 12 | |
| 13 | Somewhat hard |
| 14 | |
| 15 | Hard |
| 16 | |
| 17 | Very hard |
| 18 | |
| 19 | Extremely hard |
| 20 | Maximal exertion |

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# Type - Standing

| Aerobic | Resistance | Flexibility | Balance |
|---|---|---|---|
| 10 minutes of running | Lifting weights | Static | SL Balance |
| 20-minute walk | Body weight | Dynamic | Eyes Closed |
| 30s:30s cycling | Resistance bands | Passive | Dynamic Balance |

| Targeted Area | Exercise | Sets x Reps | Intensity | Progression | Safety Note |
|---|---|---|---|---|---|
| Hamstring | RDL | 3 x 8 | 4kg @5/10 RPE | Dead Lift | Not locking knees, not using back to lift, keeping neck neutral |
| Cardiovascular - HIIT | Cycling | 30s:30s x 6 | @8/10 RPE | Increase number of reps, decrease rest time | Holding on to handles when sprinting, choose the appropriate bike for you (recumbent vs stationary), enforce slower pace or complete rest |
| Balance | Standing with Eyes Closed | 3 x 30s | @3-5/10 RPE | Standing on Foam, Single Leg | Standing in rails or near a bench, spotting via EP |
| Flexibility | Seated Hamstring Stretch | 3 x 20s | @3/10 RPE | Hamstring PNF | Completed on a stable surface, going to where it is comfortable |

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# Type - Seated

| Aerobic | Resistance | Flexibility | Balance |
|---|---|---|---|
| 10 minutes of running | Lifting weights | Static | SL Balance |
| 20-minute walk | Body weight | Dynamic | Eyes Closed |
| 30s:30s cycling | Resistance bands | Passive | Dynamic Balance |

| Targeted Area | Exercise | Sets x Reps | Intensity | Progression | Safety Note |
|---|---|---|---|---|---|
| Hamstring | Ankle Weight Seated Hamstring Curl | 3 x 8 | 4kg @5/10 RPE | RB Hamstring Curl | Not locking knees, activating hamstrings |
| Cardiovascular - HIIT | Arm Crank | 30s:30s x 6 | @8/10 RPE | Increase number of reps, decrease rest time | Holding the handles tightly, ensuring that breaks are on wheelchair |
| Balance | Postural Training | 3 x 30s | @3-5/10 RPE | Moving back off chair, reducing level of support | Breaks on wheelchair, have therapist spotting |
| Flexibility | Foam Calf Stretch | 3 x 20s | @3/10 RPE | Active Assisted | Complete till you feel a stretch and no pain |

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# Goal Setting

| | |
|---|---|
| Specific | • Making a direct goal<br>• Is it clear and meaningful? |
| Measurable | • Quantifiable<br>• Use an objective measure |
| Achievable | • Making it realistic<br>• Is it possible to accomplish? |
| Relevant | • Does it align with what you're seeking to achieve?<br>• Is this important to you? |
| Timely | • Set a time frame<br>• When will you achieve it by? |

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(Lachman, Lipsitz, Lubben, Castaneda-Sceppa, & Jette, 2018), (Beauchamp, Crawford, & Jackson, 2018)

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# Barriers

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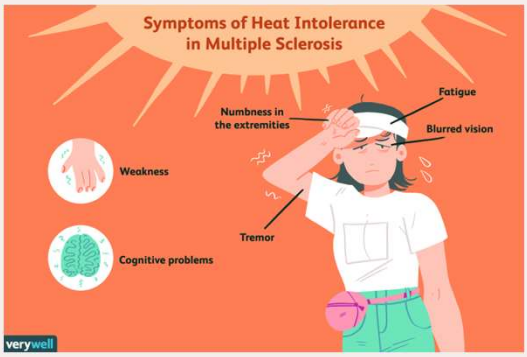
## Heat Sensitivity

- Cooling garments
- Air conditioning or fans
- Water and sprays
- Taking frequent breaks while exercising




Cited by: https://www.verywellhealth.com/heat-intolerance-and-ms-2440799

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# Fatigue

- Maximise your energy via increased sleep, reduce anxiety and stress, good nutrition, manage heat sensitivity, and regular exercise.
- Plan ahead and minimise energy expenditure when possible
- Pacing
- Organise rest breaks / naps into your day.
- With exercise, include frequent rests, alternate muscle groups.
- Find what time works best for you

**If you had 12 spoons in a day, how would you use them?**


Image cited from: https://agrainofsalt1.wordpress.com/2019/12/03/battery-low-communication-aids-and-cognitive-fatigue/

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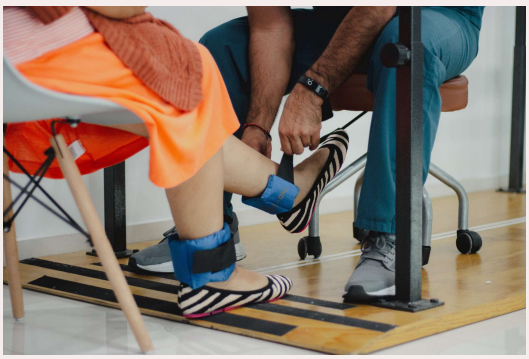
# Reduced Mobility

- There are always exercises and movements one can do.
- Something is better than nothing, so focus on what you can do.
- Work on the areas that are troublesome and aim to make them easier.



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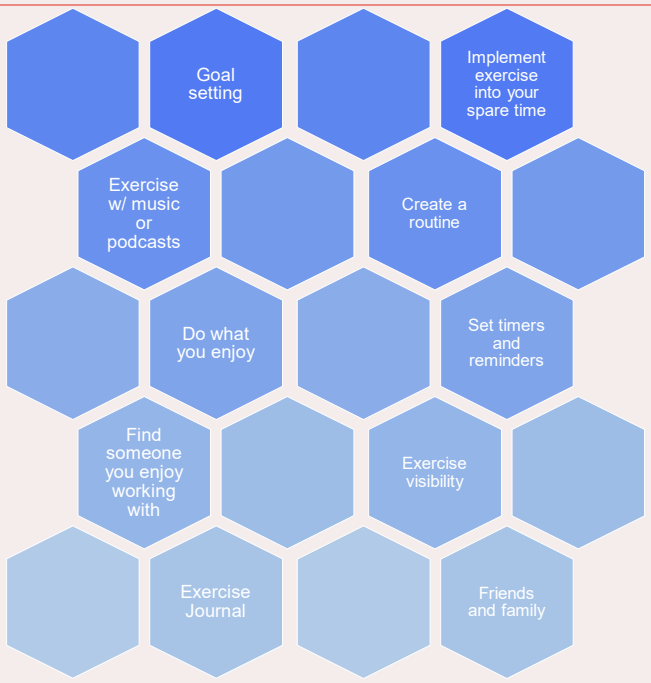
# Motivation

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# Apprehension

- Exercise is safe and beneficial.
- If you are unsure, ask for assistance from health professionals.
- Completing group classes to witness others and receive support.

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# What does it mean to engage with an Exercise Physiologist?

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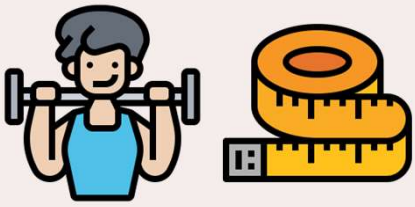
## What does it mean to engage with an Exercise Physiologist?

- Objective Measurements
- Guidance
- Semi-regular vs regular reviews
- Having a tailored program specific to you and your goals



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# Resources

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## Resources

- Adapting Your Lifestyle:  A Guide for People with MS
  - https://www.msaustralia.org.au/modifiable-lifestyle-guide-2020/for-people-with-ms/
- Find an Exercise Physiologist (ESSA, GP, NDIS, MyAgedCare)
  - https://www.essa.org.au/Public/find-aep.aspx?WebsiteKey=b4460de9-2eb5-46f1-aeaa-3795ae70c687&ss360SearchTerm=find%20an%20AEP
- MS Plus Resource Hub
  - https://www.msplus.org.au/resource-hub?keywords=exercise


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# Summary

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## Summary

- Doing something is better than nothing – so finding ways to move in your day will largely benefit you.
- If following guidelines, try and achieve 2 days of cardiovascular and resistance-based training.
- Setting specific goals
- All barriers have ways to be managed and/overcome.
- An Exercise Physiologist or other Allied Health Professional focuses on you

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# We're here to help you thrive – with a comprehensive suite of emotional and practical support

**Plus Connect** – is the gateway to information, advice, support and services

**Plus Occupational Therapy** – provides equipment, technology, home modifications and strategies for daily living

**Plus Support Coordination** – helps you connect with your NDIS services

**Plus Physiotherapy** – helps you improve your physical wellbeing

**Plus Engagement** – helps you understand and apply for the NDIS

**Plus Continence** – empowers you to take control of your bladder and bowel

**Plus Advisor** – provides personalised advice from an MS nurse or social worker

**Plus Exercise Physiology** – helps you create an exercise plan tailored to your goals

**Plus Employment Support Service** – helps you succeed at work

**Plus Diet and Nutrition** – helps you feel your best with nutritional support

**Plus Peer Support** – connects you with a community of other people living with neurological conditions, their family and carers

**Plus Residential** – provides long-term living options with full time care

**Plus Education** – empowers you with support and information to build your skills and knowledge

**Plus Respite** – provides a chance for people living with neurological conditions and their carers to have a break

**Plus Financial Assistance Program** – provides one-off funds for financial crisis

**Plus Plan Management** – helps you manage your NDIS payments

**Plus Volunteering** – giving back to your community can improve your wellbeing and give you purpose

**MS Go for Gold Scholarships** – provide one-off grants to follow a personal dream

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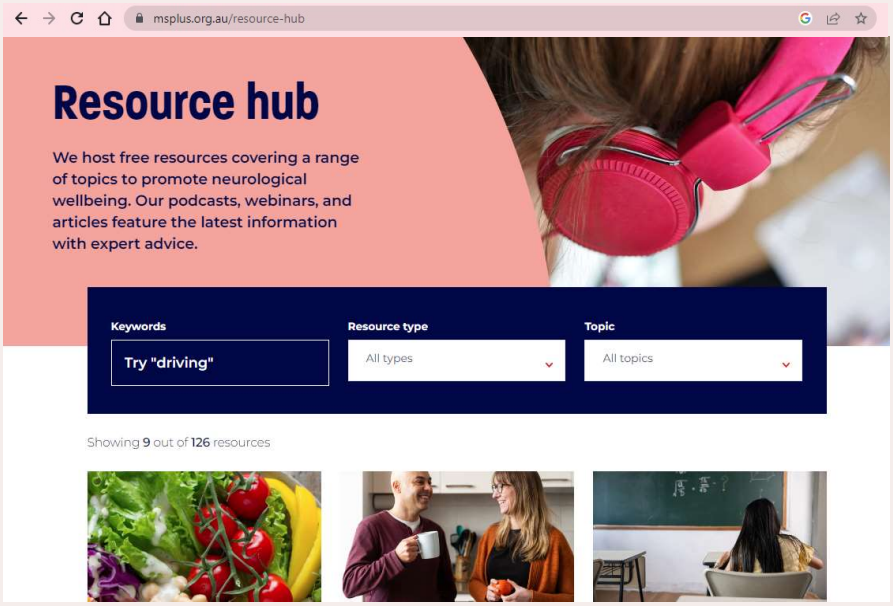
# Resources

## Website:

- Webinars
- Podcasts
- Articles
- InTouch newsletter

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# Speak to someone who understands

**Call Plus Connect**

**Call 1800 042 138**

**Email us**

**connect@msplus.org.au**

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# Thank You!

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