METABOLIC SYNDROME AND EXERCISE

WHAT IS METABOLIC SYNDROME?

Metabolic syndrome (MetS) occurs when a person has a cluster of related cardiovascular and metabolic disease risk factors, such as: (i) raised blood glucose (≥ 5.6 mmol/L), (ii) elevated blood pressure (≥ 130/85 mmHg), (iii-iv) dyslipidaemia (blood triglycerides ≥ 1.7 mmol/L, and/or low high-density [HDL-c] cholesterol), and (v) central obesity. Central obesity reflects increased fat deposits around the abdominal organs (visceral adiposity), and measurement of waist circumference can be completed using a simple screening tool, with different gender and ethnicity-specific thresholds indicating elevated readings (between 85-102 cm or more for men, and 80-90 cm or more for women). The presence of 3 or 5 of these risk factors constitutes a diagnosis of MetS (1).

Adults with MetS have a significantly increased risk of developing cardiovascular and metabolic disease, although it is unclear whether MetS is an independent predictor of these beyond the effects of its individual components (1). It is estimated that up to 30% of Australian adults have MetS (2).

HOW IS METS TREATED?

Management of MetS aims to reduce the risk of cardiovascular disease and type 2 diabetes by improving any abnormalities in body weight, blood pressure, blood lipid profiles and blood glucose (3). Management should include lifestyle changes such as taking regular exercise, improving the diet and, ideally reducing body weight, especially waist measurement and visceral fat. All people, especially those at high risk, should aim for these changes (1,3). Medications may be prescribed by a physician to help improve lipid profile (e.g. statins, ezetimibe, fibrates), blood pressure (e.g. antihypertensive agents) and glucose control (e.g. insulin sensitizing and glucose lowering agents), particularly when lifestyle changes alone are insufficient.

WHY IS EXERCISE IMPORTANT FOR METABOLIC SYNDROME?

There have been numerous large randomised controlled trials involving exercise in adults who have one or more of the MetS abnormalities. The consensus evidence from these investigations (3, 4, 5, 6, 7, 8) shows that regular exercise can:

- improve blood glucose control (~ 0.3 to 0.9% reduction in the long-term marker of average glucose known as HbA1c);
- lower systolic and diastolic blood pressure (~ 2-5 mmHg);
- decrease blood triglyceride levels (~ 0.1 to 0.3 mmol/L) and modestly increase HDL-cholesterol (~ 0.1 mmol/L);
- reduce body weight (~ 1-5 kg) and waist circumference (~ 2–5 cm).

Although there is less overall evidence from studies specifically in individuals with MetS, the available data generally confirm these findings (8). Lifestyle interventions involving exercise can significantly reduce the risk of progression to type 2 diabetes in adults with MetS abnormalities, which may exceed the benefits of insulin sensitising medication (9). Although the combination of weight loss and exercise usually produces superior outcomes and should be encouraged, weight loss is often mistakenly considered the main reason for doing regular exercise. Of great importance, evidence shows that the improvement in MetS abnormalities (including visceral fat reduction) can be achieved without weight loss. This is relevant to clinical care given that weight loss from most therapies is usually modest and difficult to sustain in the long-term (10).

WHAT ARE KEY CONSIDERATIONS FOR PEOPLE WITH METS IN EXERCISE?

All individuals with MetS should be screened by an appropriately qualified health professional (e.g. Physiotherapist or Accredited Exercise Physiologist), prior to initiating a new exercise program, or significantly altering or changing the approach to a current exercise program. As MetS is a condition commonly associated with metabolic and other cardiovascular dysfunction, exercise should be prescribed as appropriate for other primary diagnoses (e.g. type 2 diabetes, chronic kidney disease, cardiovascular disease) with consideration of other co-morbidities. If an individual with MetS is also being managed by another health professional such as a cardiologist or an endocrinologist, it is important to communicate the exercise management plan with them.

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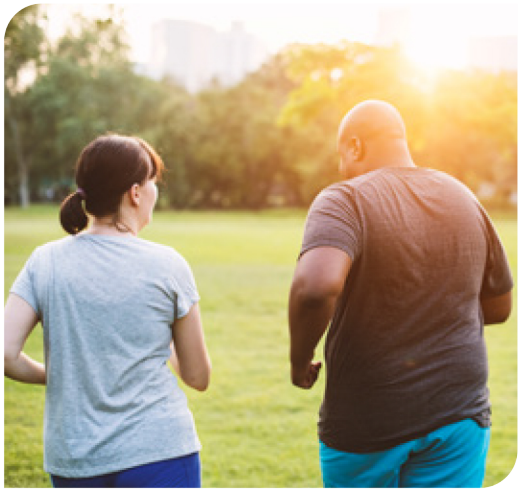
WHAT TYPES OF EXERCISE ARE RECOMMENDED?

Individuals should target 150-300 minutes per week of moderate intensity aerobic exercise (such as brisk walking, cycling, swimming, jogging, dancing, and team sports). It is recommended that exercise should occur on at least three days per week, spread across the week. Exercise should be undertaken at a moderate intensity (55-69% HRmax or rating of perceived exertion 3-4/10). There is less research evidence regarding vigorous exercise, including high intensity interval training (HIIT) approaches. Benefits on blood pressure, glucose control and visceral fat may be superior with vigorous versus moderate exercise, although there is little evidence regarding the efficacy of vigorous exercise on lipid profile. Vigorous intensity exercise (70-89% HRmax or rating of perceived exertion 5-6/10) involving 75-150 minutes per week, or a combination of moderate and vigorous aerobic exercise may be considered where appropriate according to individual preferences and safety considerations.

Progressive high intensity resistance training is usually effective for improving persisting elevated blood pressure, blood glucose and blood lipid profile, whereas evidence suggests there is little benefit on visceral fat; however there is limited overall evidence regarding resistance training in people with defined MetS. Notably, the combination of aerobic exercise and progressive resistance training significantly reduces the risk of progression to type 2 diabetes (9). To complement aerobic exercise, two to three resistance training sessions each week can be undertaken, involving 2-4 sets of exercises at a moderate to vigorous effort equivalent to ~ 70-85% of 1 repetition maximum (1-RM), each for 8-12 repetitions. Examples of exercises that have been demonstrated to be effective and can be tailored to the individual are: squats, calf raises, lunges, leg press, chest press, seated row, shoulder press, biceps curl and triceps extension. People with MetS may also be at increased risk of falls, and regular resistance exercise can help to reduce falls occurring, and injury from falls if they do occur.



Prepared by Associate Professor Nathan Johnson and Professor Stephen Twigg.

If you have any concerns about the safety of your patient in commencing an exercise program, please consider referral to a Sport and Exercise Physician.

FURTHER INFORMATION

Find a Sport and Exercise Physician www.acsep.org.au

Exercise is Medicine Australia
www.exerciseismedicine.org.au

Exercise Right www.exerciseright.com.au

Find a Physiotherapist www.choose.physio

Find an Accredited Exercise Physiologist www.essa.org.au

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