

Metabolic Syndrome and exercise

What is metabolic syndrome?

Metabolic syndrome (MetSyn) is a cluster of related metabolic abnormalities and risk factors that considerably increase the risk of developing type 2 diabetes and cardiovascular (heart and blood vessel) problems. These include raised blood glucose (≥ 5.6 mmol/L), raised blood pressure ($\geq 130/85$ mmHg), dyslipidaemia (blood triglycerides ≥ 1.7 mmol/L and lowered high-density [HDL-c] cholesterol) and central obesity. Central obesity reflects increased fat deposits around the abdominal organs (visceral adiposity), and measurement of waist circumference can be used a simple screening tool for this with different population and country-specific thresholds recommended (between 85-102 cm for men and 80-90 cm for women). The presence of 3 or 5 of these risk factors constitutes a diagnosis of MetSyn (1). About 19–29% of Australian adults have MetSyn (2).

How does exercise help?

MetSyn needs managing to reduce the long-term risk of type 2 diabetes and cardiovascular disease. Fortunately, the syndrome can usually be reversed with lifestyle changes. The combination of weight loss and exercise produces the best effect (3). Blood glucose levels, blood lipid levels and blood pressure all improve. The risk of progressing to type 2 diabetes also reduces by 29–68% (3–5). This improvement may exceed the benefits of current diabetes medications (3).

Although weight loss remains fundamental to the management of MetSyn, it is mistakenly thought of as the main reason for doing regular exercise. However, the results of several major lifestyle intervention trials show that although benefits increase with weight loss, regular exercise itself also improves glucose and HDL-c levels, and reduces the risk of type 2 diabetes even without weight reduction (3, 5, 6). Recent evidence has also confirmed that exercise therapy reduces central obesity, including visceral fat levels, with or without weight loss (7, 8). This point is important given that weight loss from all current therapies is usually modest (1–8 kg) and is not sustainable (6). Therefore, a focus on 'fitness' rather than 'fatness' is an important message for both healthcare professionals and people with MetSyn.

What exercise is best for people with MetSyn?

People with MetSyn can exercise safely if the exercise program begins slowly and progresses appropriately. An accredited exercise physiologist can prepare an exercise program for people with MetSyn, who may also have other medical conditions. The general recommendation for adults to participate in at least 30 minutes of aerobic exercise 'on most, if not all, days of the week' holds for people with MetSyn, because improvements in glucose levels and insulin effectiveness can be lost within 24–48 hours of last exercising. Aerobic exercises that use the large muscle groups (e.g. brisk walking, jogging, cycling, swimming, dancing, skiing, playing ball games or other sporting activities) are appropriate and effective (3–5). Although there is emerging research investigating the effectiveness of more intense, less frequent exercise therapy currently the consensus from available evidence suggests aiming for a minimum of 2.5 hours each week; however for weight loss, or to prevent regaining weight, exercise for 4 hours or more each week.



For overweight and obese people, the recommended level of exercise can significantly:

- reduce waist measurement by 2–5 cm without weight loss (7);
- lower systolic and diastolic blood pressure (by approximately 5.5 mmHg each)
- improve control of blood glucose levels;
- lower blood lipids (by 0.2 - 0.3 mmol/L, up to 1.39 mmol/L); and
- increase HDL-c (by 0.02 - 0.13 mmol/L, up to 0.20 mmol/L) (9,10).

While resistance exercise (e.g. weights training) can also benefit people with MetSyn, this type of exercise may not reduce central obesity. However, a combination of aerobic exercise and progressive resistance training reduces the risk of progressing to type 2 diabetes (3, 4). Therefore, use resistance exercise to complement, but not replace, aerobic exercise training.

Moderate intensity aerobic exercise is probably best for overall improvement in MetSyn (11) and may be more likely to be sustained than a program of vigorous exercise. A simple rule of thumb is to exercise at a level that increases your breathing and heart rate but still allows you to maintain a conversation. Do 5–10 minutes of warm-up exercises (light aerobic activities) before your exercise sessions. A resistance exercise program performed at least twice a week can improve insulin action, 'good' cholesterol and blood pressure. You need to do 2–3 sets of 8–10 different exercises, at a load that can be performed for 12–15 repetitions of each exercise. Correct exercise technique is essential to minimise the risk of injury.

What goals should I set?

Some people struggle to adopt or adhere to exercise programs. Because benefits are possible even with exercise levels below the recommendations (3–5, 7, 8, 11), clinicians should encourage sustainable lifestyle changes that incorporate some regular physical activity. Set achievable goals to develop the habit of regular physical activity, rather than striving for unsustainable goals.

References and further information

Exercise is Medicine Australia www.exerciseismedicine.org.au

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

Exercise Right www.exerciseright.com.au

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