Type 2 Diabetes: Exercise

Summery

Exercise improves glycaemic control in people with type 2 diabetes even without any weight loss. Supervised structured and progressive aerobic and/or resistance training for 150 minutes per week. Any exercise is better than no exercise. However, better outcomes have been shown with supervised structured exercise that progressively increases in intensity over time. Exercise advice without structured exercise has been shown to be beneficial only when combined with dietary advice.

Indication & Benefits

People with type 2 diabetes, with the aim of improving glycaemic control, reducing morbidity, and improving quality of life.
Aerobic exercise has been shown to achieve a similar reduction on HbA1C as either metformin or a sulfonylurea (a reduction of 0.73% with exercise and 0.9% with single medication). Resistance training has a smaller effect.

Contraindication and Adverse Effects

Contraindications

- For patients with hypertrophic obstructive cardiomyopathy (HOCM), heavy weight-lifting and high-intensity aerobic exercise are not recommended.
- For patients with long QT syndrome, exercise may trigger a cardiac arrhythmic event.
- Vigorous exercise is contraindicated for those with proliferative retinopathy, and for 3 months after laser retinal treatment.
- Exercise may be relatively contraindicated in patients with peripheral neuropathy, a history of recurrent falls, or uncontrolled hypertension.

Precautions

People with type 2 diabetes often have silent macrovascular disease. Heavy resistance training may cause temporary increases in blood pressure, increasing the risk of cardiovascular events; however, increasing fitness reduces cardiovascular risk.
People taking insulin or a sulfonylurea may need to increase their carbohydrate intake and/or decrease their insulin before exercise. They also need to be aware of possible delayed hypoglycaemia 6–12 hours after exercise.

Those with peripheral neuropathy or peripheral arterial disease need to take good care of their feet to avoid injury.

Adverse effects

Adverse effects are generally infrequent, mild and transient. They include muscle or joint pain, exercise-related injury and fall-related injury. In trials, musculoskeletal injury was more common from resistance training than from aerobic training.

Practical Description

Training

Structured exercise training that consists of ≥ 150 minutes per week in 2 or 3 supervised sessions of progressive aerobic or aerobic and resistance training.

Tips and challenges:

Adherence

In the research, every exercise session was supervised; however, this is generally not available, affordable or practical for patients. Some patients are able to complete 150 minutes per week of aerobic training on their own, but evidence suggests that many will not adhere to the program without supervision. Lack of adherence can be through inadequate duration or inadequate intensity. The dose of exercise used in the trials was quite high; patients may need to start at a much lower level and work toward a more intensive exercise program over time.

In the community there are many options to achieve adequate duration and intensity of exercise, such as; these include active transport, walking for leisure and sports participation, as well as gym work that is more similar to the research environment.

The implementation challenge is to be able to ensure adequate duration and intensity, for which movement tracking devices such as pedometers or fitness monitors may have a role.

Ask patients about their preference for social support. Some like to do this alone while others prefer the social environment of exercising in a group. See the resources listed below.

Measurable repeatable exercise

For people exercising on a machine at home, it is helpful to have an objective and repeatable measure of work intensity such as power output in watts. This allows the doctor to prescribe a specific intensity and duration and for the patient to track their progress as they gain fitness.

For patients taking a beta blocker, heart rate does not reflect intensity. Therefore a subjective measure of exertion is used instead, such as a ‘walk and talk test’: moderate physical activity will cause a noticeable increase in breathing, however the exerciser should still be able to talk in sentences.

Foot care

Patients need to be aware of the importance of good foot care and the need for comfortable and well-fitting footwear, especially if they have neuropathy, vascular disease or had previous foot problems.

Vascular disease considerations

Many people with type 2 diabetes have vascular disease and may need advice about the benefits of exercise for angina or intermittent claudication and how to exercise within their limitations to gradually increase their exercise capacity.

Impaired fasting glucose

Although the evidence was generated for people with diabetes, similar benefits are expected for people with IFG, and the same dose of exercise should be used.

Availability

Structured exercise programs are available through an exercise physiologist through many community groups as listed at **Consumer resources** below.
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Medicare will fund up to five individual consultations plus up to eight exercise classes under an Enhanced Primary Care (EPC) plan. These are run by exercise physiologists, physiotherapists or diabetes educators.
Aerobic training to a heart rate target requires a heart rate monitor. Monitors using a chest strap detector are generally accurate; many other devices claim to measure heart rate, but their accuracy should be checked. Monitors vary in cost from around $30 to over $600.

Resources

Australian Diabetes Educators Association (ADEA) have 'Find a CDE' to search by postcode.
Diabetes Australia has general advice about keeping active.
The Australian Prescriber details aerobic and resistance activity recommendations for diabetes including guidelines for building up activity levels.
'Lift for Life' is a structured evidence-based resistance training program for people with, or at risk of developing, type 2 diabetes.

Evidence

NHMRC Level 1 evidence.
References

1. Balducci S, Zanuso S, Nicolucci A et al. Effect of an intensive exercise intervention strategy on modifiable cardiovascular risk factors in subjects with type 2 diabetes mellitus. Arch Intern Med 2010;170(20):1794–803.

1. Umpierre D, Ribeiro P, Kramer C et al. Physical activity advice only or structure exercise training and association with HbA1c levels in type 2 diabetes: a systematic review and meta-analysis. JAMA2011;305(17):1790–9.

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