



Management of type 2 diabetes

What is type 1 diabetes?

Type 2 diabetes is thought to result from the interaction between genes and the obesogenic environment we live in. There are non-modifiable risk factors such as age, gender and familial risk. Whilst type 2 diabetes is not exclusive to people with obesity, there is a significant correlation between weight gain and development of diabetes in those at risk. The management of type 2 diabetes typically therefore involves a combination of lifestyle changes, monitoring, medication, and insulin therapy especially with longer duration of disease. The goal is to maintain blood glucose levels within a healthy range to prevent complications such as heart disease, kidney damage, nerve damage, and other serious conditions. Some of the key management strategies are outlined below.

Lifestyle modifications

• Dietary changes:

- Maintaining a balanced diet rich in whole grains, lean proteins, healthy fats, vegetables, and fruits with a low glycemic index (GI).
- Reducing or avoiding intake of processed foods, sugars, and refined carbohydrates.
- Portion control and eating regular meals throughout the day to maintain steady blood glucose levels.
- Working with a specialist dietitian to arrive at a balanced meal plan to achieve adequate diabetes control as well as addressing any other key health goals (e.g. lower salt intake for blood pressure, moderating calories for weight loss etc.)

• Physical activity:

- Exercise - regular physical activity (e.g. 150 minutes of moderate-intensity aerobic exercise per week, such as brisk walking, cycling, or swimming) can help improve insulin sensitivity and lower blood glucose levels.
- Strength training and resistance exercises are also recommended to increase muscle mass, which helps with glucose uptake and reducing high blood glucose levels.

• Weight modifications:

- Weight loss can significantly improve blood glucose control. Even a 5-10% reduction in body weight can lead to improved insulin sensitivity.
- Achieving and maintaining a healthy weight should be a long-term goal.
- The results of the DIRECT study demonstrated that weight loss through calorie reduction was able to improve glycaemic control and even achieve remission of diabetes in a proportion of cases.
- Those with significant obesity (BMI>35 kg/M²) may benefit from interventions such as weight loss injections and/or bariatric surgery to achieve significant weight loss over a longer period of time.

Blood glucose monitoring

- Self-monitoring of blood glucose - regularly checking blood sugar levels allows individuals to understand how their body responds to different foods, activities, and medications.
- Glycated haemoglobin (HbA_{1c}) testing - this provides a snapshot of average blood glucose over the past 2-3 months. The target for most adults with type 2 diabetes is an HbA_{1c} of <58 mmol/mol (7.5%), although individualised targets may apply.

- Continuous Glucose Monitoring (CGM) - Some people may benefit from using a CGM, which provides real-time data on blood glucose levels throughout the 24 hour cycle.
- A member of the diabetes specialist team will be able to advise on the best monitoring strategy for an individual with type 2 diabetes.

Pharmacologic treatment

- Several classes of medications can be used, depending on the individual's needs and health status and co-morbidities:
 - Biguanides (e.g. metformin) - the first-line therapy for most people with type 2 diabetes. It reduces hepatic glucose production and improves insulin sensitivity.
 - Sulfonylureas (e.g., glimepiride, glipizide) - stimulate the pancreas to release more insulin.
 - Incretin mimetics: (e.g., liraglutide, semaglutide, tirzepatide) - these drugs help lower blood sugar, promote weight loss, and may have cardiovascular benefits.
 - SGLT-2 Inhibitors (e.g., dapagliflozin, empagliflozin, canagliflozin) - these medications help lower blood glucose by preventing the kidneys from reabsorbing glucose and promoting its excretion through urine, whilst offering benefits to the heart and kidneys.
 - DPP-4 Inhibitors (e.g., sitagliptin, linagliptin) - help to increase insulin secretion in response to meals and reduce glucose production.
 - Insulin therapy - While people with type 2 diabetes typically starts with oral medications, insulin therapy may be necessary if blood glucose control is not achieved with oral medications, at times of acute illness, or where rapid glucose control is desired (e.g. around a planned or emergency operation). Different types of insulin are:
 - Basal insulin - slow acting and lasting for the best part of a day. This provides steady, background insulin levels.
 - Bolus insulin - rapid acting and given with meals to control blood glucose spikes after eating.
 - Pre-mixed insulin - a mixture of rapid and intermediate acting insulin which is usually in a 25/75, 30/70 ratio or a 50/50 ratio.

Monitoring and managing complications

- Cardiovascular health - people with type 2 diabetes are at higher risk for heart disease, so managing blood pressure, cholesterol, and avoiding smoking and moderating alcohol intake are crucial. Medications such as statins (for cholesterol) and angiotensin converting enzyme (ACE) inhibitors/ angiotensin receptor blockers (ARBs) are commonly prescribed for blood pressure and kidney protection.
- Kidney health - regular assessment of kidney function (e.g., urea and electrolytes in blood and urinary microalbumin status) is important to detect early signs of kidney damage.
- Eye health - diabetic retinopathy is a common complication, so annual eye exams are recommended.
- Foot care - diabetes can impair circulation and nerve function in the feet and lead to neuropathy and diabetic foot disease. Having regular foot inspections and maintaining good foot hygiene important.
- Dental care - periodontal health and overall dental health are important aspects of overall health maintenance in diabetes. Daily mouth care and regular visits to the dentist and good dental hygiene are essential.

Psychosocial support

Managing a chronic condition like type 2 diabetes can be emotionally and mentally challenging. Support can be obtained through:

- Diabetes education programs that help individuals understand the disease and treatment options and find peers and details of local services.

- Counselling or therapy for emotional support, especially for those dealing with diabetes distress or mental health conditions such as depression or anxiety. These can be accessed through self-referral or through the local healthcare team.
- Peer support groups or online communities can provide encouragement and shared experiences and hints and tips on practical aspects of self-care.

Periodic review and adjustments

The management plan for type 2 diabetes should be regularly reviewed with a healthcare provider to ensure:

- Blood glucose levels and test results are within target ranges.
- Medications are effective and not causing significant side effects.
- Lifestyle changes are being maintained.
- There are no signs of complications or new health concerns.

Special considerations

- Elderly patients may have different treatment goals, with a focus on avoiding hypoglycemia and managing quality of life.
- Pregnancy (gestational diabetes) - tight blood sugar control is essential, and insulin is typically the preferred treatment during pregnancy.
- Comorbidities - managing conditions such as hypertension, dyslipidaemia, and sleep apnoea in addition to diabetes is essential for overall health.

Emerging therapies

Research continues to explore newer treatments, including advanced medications and surgical options (e.g. bariatric surgery), which can lead to remission or significant improvement in blood glucose control for some individuals. Tackling diabetes early brings the maximum benefits - including the chances of reversal, remission and reducing future complications.

Summary

Managing type 2 diabetes is a lifelong commitment involving multiple strategies. While medication may be necessary for most, lifestyle changes such as diet, exercise, and weight management remain cornerstones of effective treatment. Regular monitoring, working with healthcare providers, and addressing complications early are crucial to maintaining good health and preventing long-term complications.