

YOU AND
YOUR BODY



DIABETES AND ENTERAL FEEDING

➤ WHY IS THIS LEAFLET FOR YOU?

This leaflet is for people with diabetes established on an enteral feeding regimen, and for the people who support them at home, in residential care or in hospital. It explains why enteral feeding is needed, how the feed may affect glucose levels in people with diabetes, and how to manage enteral feeding combined with insulin treatment to maintain safe glucose control. This leaflet contains important information on:

- Enteral feeding
- Types of diabetes
- Insulin therapy
- Managing glucose levels
- Monitoring glucose levels



➤ WHAT IS ENTERAL FEEDING

Enteral feeding is a method of getting fluids and liquid food into the digestive tract of people who are unable to eat and swallow safely. The fluid feed is introduced through a tube which may be inserted through the nose (nasogastric tube) or into the stomach (gastrostomy) or into the small intestine (jejunostomy). The feed contains vital vitamins and nutrients including carbohydrates (sugars and starches). Carbohydrates are needed by the body for energy. They cause the glucose levels in the blood to rise. In people with diabetes, the glucose levels may rise too high and treatment is needed to control this.

Aims of the feed and diabetes treatment:

- To provide adequate nutrition
- Avoid very high or low glucose levels

➤ TYPES OF DIABETES

Glucose is the main source of energy needed for the body to perform all the processes required for life. Insulin is produced by the body to do this and to keep the glucose at the right level in the blood. An absence or reduced amount of insulin means the body cannot use glucose for energy effectively. The amount of insulin produced depends on the type of diabetes:

People with type 1 diabetes produce no insulin and are dependent on insulin injections.

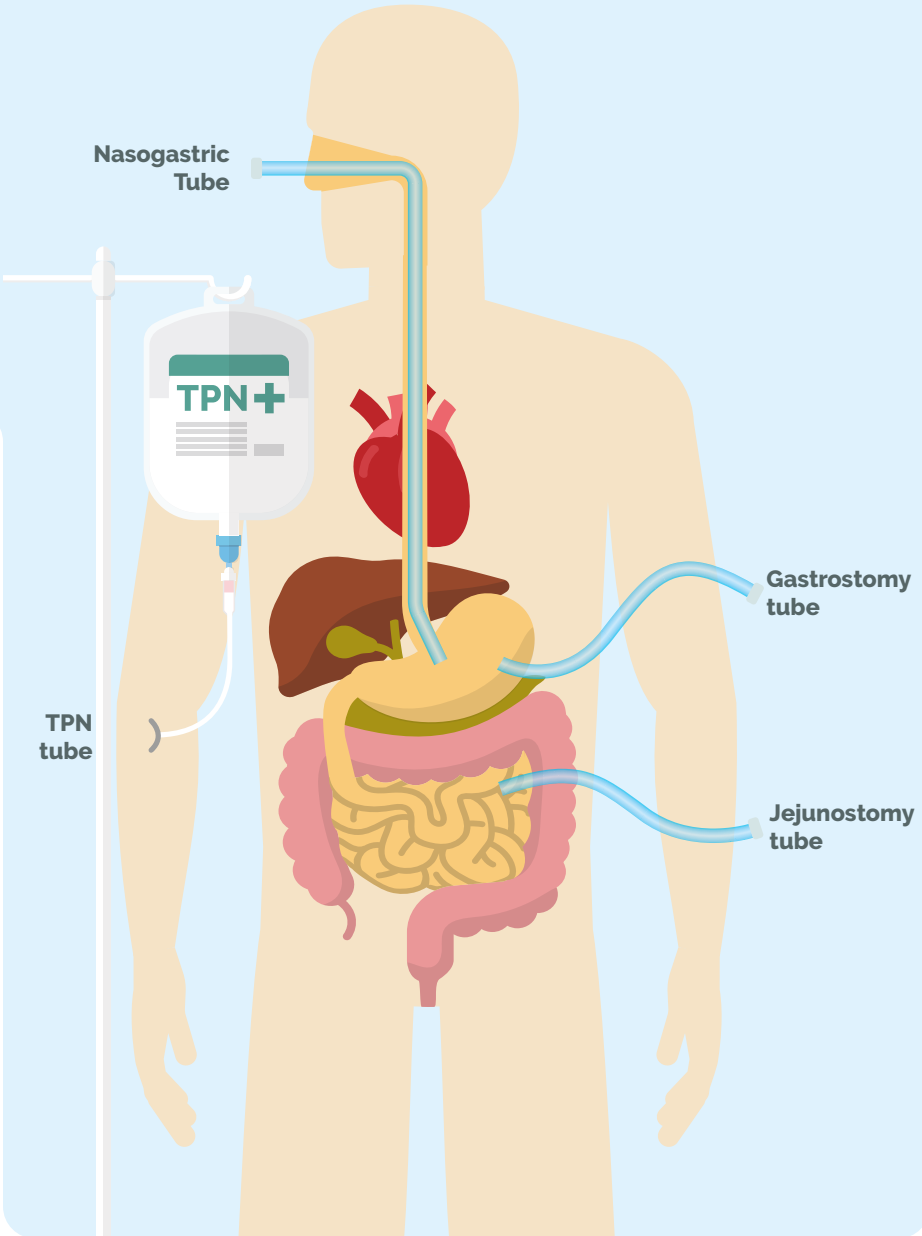
! Insulin injections must never be stopped completely in someone with type 1 diabetes

People with type 2 diabetes either do not produce enough insulin or the body is not able to use the circulating insulin as effectively. Type 2 diabetes may be managed by taking a healthy diet but the person may also require tablets and / or other injectable therapies or insulin.

i Please Note: there may be other individuals with alternative diagnosis of diabetes i.e., pancreatogenic (type 3c) diabetes or pre existing diabetes with other coexisting complications who may also require the support of enteral feeding.



➤ ROUTES OF FEEDING



➤ FINDING THE RIGHT INSULIN FOR THE FEEDING REGIMEN

The content of the feed should be agreed following an assessment by a dietitian. It will include adequate vitamins, minerals, fats, proteins, carbohydrates and fluids, as well as the right number of calories to maintain an ideal weight.

However, in people with diabetes, the carbohydrate content of the feed may make the glucose rise above target levels (usually 6-12 mmol/L). The kidneys respond to this by taking the excess glucose from the blood and moving it into the urine, where it is excreted by the body. The loss of glucose in the urine results in a loss of calories and therefore energy source.

Most diabetes tablets are not available in liquid form (the exception is Metformin). Tablets should not be crushed and inserted into the feeding tube as this may block the tube. In addition, the crushing of tablets alters the predictability of absorption, and this is likely to cause erratic glucose control. Therefore, if other diabetes medication is required to control glucose levels, insulin therapy is required.

There are a number of different types of insulin which vary in how quickly and how long they last for. The type of insulin used will depend on the content, duration, frequency of rest periods, current HbA1c level, age, body weight of the individual and frequency of the feeds. The insulin needs to work during the time that the feed is active (and when the glucose levels in the blood are rising). If there is a mis-match, the glucose may drop too low or rise too high.

i Please Note: the best practice guidance suggests glucose targets of 6 to 12 mmol/L

The table below gives some common feed and insulin regimens:

Prolonged feed (e.g. 16-20 hours/overnight): Intermediate insulin or a mixture of intermediate and short-acting insulin given at the start and half-way through the feed depending on glucose levels. The dose is usually split 50-60 % at start of feed and 50-40% at the half way point.

Bolus feeds: a short-acting insulin to be administered at least 15 minutes before administration of feed bolus (wherever possible). A long-acting insulin is also needed in people with type 1 diabetes.

Continuous feed with regular or ad hoc meals: an intermediate or long-acting insulin is given at the beginning of the feed or if using a Pre-mixed biphasic (30/70) insulin 50% would be given at the start of the feed and 50% given at the half way point.

i If you are using this leaflet in hospital, refer to your local guidelines

➤ HIGH GLUCOSE LEVELS (HYPERGLYCAEMIA)

The glucose level will rise too high if the body is unable to produce enough insulin to control it, or the carbohydrate content of the feed is higher than the amount of insulin produced (or injected). Starting insulin therapy, increasing the dose, or changing the type of insulin to match the feed content is the usual way of managing high glucose levels. Occasionally there may be a requirement for correction of elevated glucose levels using rapid acting insulin bolus. It is important that elevated glucose levels are corrected with caution particularly if the feed is due to end (within 4 hours of correction bolus).

However, other factors can cause high glucose levels and need to be identified before a change in the regimen is made:

- Infection
- Pain and stress
- Steroid treatment
- Weight gain –this makes the body less sensitive to the action of insulin
- Changing the feed to one with more carbohydrate without an increase in insulin dose
- Incorrect omission of insulin
- Issues with injection technique and or injection sites / lipohypertrophy
- Equipment failure or educational need to support effective use

Signs and symptoms of high glucose levels:

- Glucose readings are above the agreed target
- Increased urine production
- Thirst and dry mouth
- Dehydration
- Altered levels of consciousness
- Genital itching and thrush
- Weight loss
- Ongoing / repeated infections

Oral hygiene is essential for people having enteral feeding. This is particularly important if glucose levels are high

➤ LOW GLUCOSE LEVELS (HYPOGLYCAEMIA)

In someone without diabetes, the right amount of insulin is produced by the body to keep the glucose within the recommend target range. In someone with diabetes requiring subcutaneous insulin, there can be occasions when there are a miss calculation of insulin doses or mis match between the food consumed and dose or timing of the insulin administered, leading to a drop in glucose levels. The glucose may drop too low If there is a mis-match between the insulin dose or type, and the carbohydrate content of the feed.

Other factors can increase the risk of hypoglycaemia with insulin therapy:

- Increased activity (e.g. physiotherapy, restlessness due to pain)
- Feeding tube is blocked or positioned incorrectly preventing feed to be commenced safely
- The carbohydrate content of the feed is reduced but the insulin dose or type is not adjusted
- Insulin is injected into muscle instead of fat. This results in the insulin working faster than expected and may start working before the food is absorbed.
- Feed is interrupted or stopped
- Adjustment of other medication such as a reduction in steroid and/or antibiotics commenced dose
- Vomiting
- Mal-absorption
- Insulin is not given at the correct time
- If the person has experienced severe or persistent issues with ongoing hypoglycemia.

Signs and symptoms of low glucose levels (less than 4 mmol/L):

- Shaking
- Sweating
- Pallor
- Confusion
- Drowsiness
- Coma
- Hunger
- Palpitations
- Blurred vision
- Dizziness
- Irritability,
- Headache
- Fatigue
- Feelings of anxiety

How to treat hypoglycaemia:

❗ If unconscious (or concern regarding the safe placement of feeding tube), lie the person on their side and maintain airway. Give glucagon injection if available and trained to do so. Contact emergency services

❗ If conscious and feeding tube in place:

- Stop the feed
- Give 15 to 20g quick-acting carbohydrate to enteral feeding tube (e.g. 60ml Gluco juice or Lift, 50-70ml of Fortijuice or Ensure Plus juice or 3 to 4 teaspoons of sugar dissolved in warm water)
- **Or** 2 tubes of 40% Glucogel (not for fine-bore tubes as may cause a blockage)
- Flush tube with 30ml water
- Wait 10 to 15 minutes and re-check glucose levels
- If still less than 4 mmol/L, repeat treatment
- Once glucose levels are above 4 mmol/L, resume feed
- If hypoglycaemia occurs between feeds, treat as above and once glucose levels are above 4 mmol/L, connect. If bolus feed regimen consider giving additional feed equivalent of 15-20g of carbohydrate.
- Consider what caused the low glucose and take action to avoid a recurrence. Contact the diabetes specialist nurse if no obvious cause.

➤ HOW OFTEN TO TEST CAPILLARY BLOOD GLUCOSE LEVELS

Glucose monitoring frequency will depend on:

- Type of diabetes
- Treatment (particularly treatments that carry a risk of hypoglycaemia)
- Frequency of feeds and number of rest periods
- Stability of blood glucose and general condition
- Level of activity

General guidance for monitoring would suggest 4 to 6 hourly glucose monitoring is adequate (if not already using CGM). However, if a feed is interrupted, the frequency of monitoring should increase to every hour until the feed is recommenced or if evasive action is required more rapidly i.e., if the person displays symptoms of hypoglycaemia (e.g. intravenous fluids commenced). An appropriate glucose target should be agreed. For most people, this is 6 to 12 mmol/L. This gives a safety margin above hypoglycaemia but does not tolerate persistently high levels that can cause symptoms.

Ketones should be tested in people with type 1 diabetes if the glucose level rises to 12 mmol/L, or the person is unwell or showing signs of infection. Ketones develop when the body is either in fasting state (nutritionally deficient) or circulating insulin levels are insufficient leading to a reduction in the body's ability to use the glucose as energy. High levels of ketones can lead to the development of an emergency condition called diabetic ketoacidosis. Ketones can be tested using a blood or urine testing kit. If the blood ketone level is 1.5 mmol/L or higher, or the urine ketones are ++ or higher, urgent medical attention is needed

Eating and its many benefits:

Eating and food does not just provide nutrition. For example, it plays an important part in social interaction, and gives feelings of pleasure and enjoyment. People who are unable to eat normally and using enteral feeding miss out on these benefits.

Also, food plays an important role in the self-management of diabetes, and so enteral feeding may be associated with a feeling of loss of control, loss of choice and loss of enjoyment of eating. If communication problems are present as well, it is not surprising if low mood and depression sets in. Discussion with the GP and referral to counselling services in the community may be helpful.



> KEY MESSAGES

- ❗ Keep safe:
 - Regular glucose monitoring (and ketone monitoring, if required)
 - Know how to identify and treat hypo and hyperglycaemia
- ❗ Avoid prolonged episodes of high glucose levels: this will result in a loss of the calories and nutrients required
- ❗ People receiving enteral feeding miss out on the many benefits of food and the pleasure of eating. Food is an important part of diabetes management and the loss of control over this part of their diabetes can be stressful



> USEFUL RESOURCES:

- **Trend Diabetes:** www.trenddiabetes.online
- **Diabetes UK:** www.diabetes.org.uk
- **JBDS** Glycaemic management during the in-patient enteral feeding of stroke patients with diabetes available at abcd.care/resource/current/jbds-05-glycaemic-management-during-enteral-feeding-people-diabetes-hospital



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