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INPUT is frequently asked:

How can an insulin pump improve life with insulin-dependent diabetes?

How does it work?

Is it right for me?

Can I get it on the NHS?

How can an insulin pump improve life with insulin-dependent diabetes?

Controlling blood glucose levels tightly takes motivation and commitment. Studies such as the Diabetes Control and Complications Trial (DCCT 1993) have shown this is the best way to prevent or delay complications of type 1 diabetes such as blindness, amputation, heart disease, and kidney failure. These cause pain, disability and are expensive to treat. A pump used well is an effective tool for maintaining blood glucose levels within the normal range and for keeping pump users healthy and in work.

A pump can help you gain tighter control of your diabetes. Pump users can easily adjust their insulin dose according to their changing needs, minimising high and low glucose swings and long-term complications resulting from them.

Because the pump delivers insulin continuously day and night, only rapid-acting insulin is necessary at rates designed to meet basal insulin requirements- this means that you don't need meals at specific times. You may eat when you like, or not at all, without suffering hypos or hypers. You can also exercise without risking high or low blood glucose levels promoting better health and well- being.

Pumps deliver insulin much more precisely than any available pen or syringe. Basal rates are adjustable down to 0.1 of a unit, depending on the make of pump.

The tiny doses of Insulin from a pump are more consistently absorbed than a larger amount from an injection which is sometimes not absorbed properly causing glucose levels to run low or high for several hours.

Injected long-acting insulin can be absorbed differently every day-sometimes too quickly, sometimes too slowly, and sometimes only in part. This leads to variable control. With a pump and rapid acting insulin continuously delivered in tiny drops, absorption is much more reliable and your diabetes more stable and predictable.

Advantages	Disadvantages
Better quality of life and well-being	Being attached to the pump almost all of the time (although it can be disconnected for short times - swimming, showers, sex etc)
Flexible schedule (meal times, lazy days etc)	Increased risk of diabetic Ketoacidosis (that's why you need to do 4 or more blood tests a day)
Eat more/less or not at all	Chance of skin infections, especially if you don't change the infusion set after 3 days
Basal rates are set to meet your body's needs	
Easier to manage exercise without hypos/hypers	
Restored hypoglycaemia awareness	
Easier to manage travelling across time zones	
Easier to manage control before and during pregnancy	
Delays or prevents long term complications	
Manage the dawn phenomenon	

Most experts agree, however, that the advantages of pumping far outweigh the disadvantages.

How does it work?

An insulin pump is a computerised insulin delivery device (that looks like a mobile phone) attached to the wearer by a length of clear plastic tubing (an infusion set) connected to a cannula inserted under the skin. The pump can be kept in your pocket, clipped to your waistband, or tucked into a sock or bra.

The best way to manage insulin-dependent diabetes is to imitate how the non-diabetic body regulates glucose. Whatever way insulin is given, it has to

a) provide enough basal or background insulin;

b) cover glucose levels in response to meals by use of a ***bolus***; and

c) reduce glucose levels to a normal range.

a) In a person without insulin-dependent diabetes, the pancreas releases small amounts of insulin like a dripping tap. Basal insulin controls the release of stored glucose from the liver and regulates release of free fatty acids. In people with insulin-dependent diabetes who are not on the pump, basal insulin is replaced by one or two injections of long-acting insulin every day.

To replace ***basal*** insulin, the pump regularly delivers preprogrammed doses of fast acting insulin. The basal insulin delivery rates are programmed by you, in consultation with your diabetes care team. The rates will vary according to the time of day and your needs -you can programme less insulin at night for example, and adjust basal rates for a short time or reset them completely. All this is carried out at home without visiting a doctor or DSN. Basal levels of insulin can be reduced during exercise when you need less, and increased during illness or stress, when you need more.

b) In a non-diabetic person, the pancreas releases a bolus of insulin to help the body derive energy from food and drink and reserve energy for later, for instance between meals or overnight. In people who are injecting insulin , this ***bolus*** is replaced by a mealtime injection of rapid-acting insulin to lower blood glucose level to a normal range.

With a pump, you programme the pump to deliver a bolus when you eat. Bolus amounts depend on: 1) the current blood glucose level; 2) the amount and type of food you intend to eat; 3) the amount of exercise likely within the next few hours. You will receive training and support from your diabetes care team to help you determine these insulin doses.

c) Outside mealtimes, the pump can be instructed to give a bolus to bring a high blood glucose level back into range.

Is it right for me?

An insulin pump is not suitable for everyone. You have to be motivated enough to care for your own diabetes. If so, and you meet the NICE criteria, you are a prime candidate for a pump.

The most common reasons for recommending insulin pumps are:

Significant highs and lows in blood glucose levels.

Frequent low glucose levels that require someone else's help.

A continually high HbA1C despite best efforts on injections.

Children and teenagers may keep better control of their diabetes through adolescence using a pump. Female pump users can control glucose levels more closely during the menstrual cycle and

pregnancy.

Beyond strictly medical considerations, you may also thrive on a pump because it fits your lifestyle. Having a job that requires shift work or long-distance travel, for instance, are good reasons for considering a pump.

Successful pump users (or their carers) must:

- Carefully manage their own diabetes on a day to day basis.
- Count carbohydrates and adjust insulin doses to cover food.
- Check blood glucose levels ***at least 4 (often 7 to 8) times, a day*** before eating, taking insulin, or exercising, and 2-3 hours after a bolus to ensure glucose levels are in single figures.

And if you are still in doubt about the real advantages of a pump, try doing the following on MDI!

1. dealing with the dawn phenomenon.
2. delivering a 0.8 correction dose.
3. giving a precise bolus (from a tenth of a unit upwards) to match carbohydrate intake.
4. instantly reducing basal level to cover activity.
5. increasing basal dose to cover illness.

Can I get it on the NHS?

Yes, if you meet certain criteria, and your diabetes consultant agrees that a pump is the best treatment for you.

The 2008 National Institute for Health and Clinical Excellence (NICE) guidance on insulin pump therapy says:

Continuous subcutaneous insulin infusion… therapy is recommended as a treatment option for adults and children 12 years and older with type 1 diabetes mellitus provided that:

- *Attempts to achieve target haemoglobin A1c (HbA1c) levels with multiple daily injections (MDI) result in the person experiencing disabling hypoglycaemia. For the purpose of this guidance, disabling hypoglycaemia is defined as the repeated and unpredictable occurrence of hypoglycaemia that results in persistent anxiety about recurrence and is associated with a significant adverse effect on quality of life*

OR

- *HbA1c levels have remained high (that is, at 8.5% or above) on MDI therapy… despite a high level of care.*

OR

- *for children younger than 12 years with type 1 diabetes mellitus provided that MDI therapy is considered to be impractical or inappropriate.*

The final decision rests with the diabetes consultant and the patient. If a diabetologist recommends an insulin pump, a PCT cannot refuse it on grounds of cost, or set up pump "waiting lists" . If you believe this is happening, contact INPUT for advice.

If you are self-funding at the moment, contact INPUT to find out if you are entitled to NHS support.

How do you obtain a pump?

First steps:

1. Ask your GP to arrange a referral to a diabetologist (if you don't see one at least twice a year).

2. Show that you are committed to good blood glucose control. This may mean taking 4 or more injections a day, and 4 or more blood glucose readings a day (and acting on the results), carbohydrate counting, and adjusting your insulin dose to food intake, exercise, illness etc. You may also need to go on a structured education programme such as DAFNE.

3. Tell your consultant that you are interested in a pump. You may need to explain why you think it is necessary and show that you have considered both the drawbacks and benefits.

Then one of 3 things will happen:

Either:

He/ she will support your need for a pump and obtain funding. You will be given a start date for training.

or

He/she will support your need for a pump but warn that funding is difficult to obtain or that there is a long waiting list. Point out that NICE Technology Appraisals are mandatory so the PCT is obliged to provide funding as long as the consultant agrees you meet the criteria. (Ask your consultant / DSN to contact INPUT for assistance if they are having problems with a PCT's support.)

or

He/she will not support your need for a pump if, for instance, he/she thinks you don't meet the criteria. You should ask why not, taking responsibility for your own care. He/ she may think insulin pump therapy is unnecessary or unsafe – don't accept this either; ask what up-to-date research there is to support this view, and offer to provide clinical evidence that pump therapy is safe and effective (available from INPUT).

If you cannot reach agreement with your current consultant, ask to see another who supports pump therapy within the clinic. Otherwise, ask your GP to refer you to another clinic. You have the right to ask for a second opinion. (For your nearest hospital offering insulin pump therapy, contact INPUT (www.input.me.uk or 0800 228 9977).

About INPUT

INPUT is a patient advocacy group for diabetes technology, including insulin pumps. We are an independent organisation with no allegiance to any manufacturer. Our objectives are to increase awareness and understanding of insulin pump therapy and to ensure everyone who needs it can get it.

INPUT provides information on insulin pump therapy and is an advocacy group for consistent funding for insulin pump therapy across the UK. Inadequate supervision of the implementation of NICE Technology Appraisals by government has made NICE guidance on insulin pump therapy difficult to implement.

INPUT works with Diabetes UK, JDRF, the Department of Health, Members of Parliament, the diabetes care industry, consultant diabetologists, diabetes specialist nurses and general practitioners to bring about full adoption of NICE guidance on insulin pump therapy.

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