

# Pump Mishaps

# Learning objectives

This session will provide you with some helpful solutions for correcting potential troubleshooting issues for people living with diabetes on a pump.

## We will look at:

- » pumps
- » infusion sets
- » injection sites
- » programming/testing

# Introduction

**Pumps are not without problems.**

**A US study of 608 insulin pump users reported that:**

- » 51% have experienced a pump malfunction
- » 31% worry about the possibility of a malfunction
- » 14% had experienced a problem with crimping of their tubing
- » 17% felt that a pump is more work than multiple daily injections

# Pump malfunctions

## Pump malfunctions may include:

- » power failure, resulting in the stop of insulin supply
- » breakages – all pumps have a 4 year warranty, but like any equipment they can stop working without warning
- » program failure or wizard incorrectly set

Other pump difficulties may relate to infusion sets and injection sites.

# Infusion sets: tubing or cannula kinks

Tubing or cannula kinks can reduce or stop the flow of insulin. The only sign may be increasingly high blood glucose levels (BGLs).

**Solution:** The pump user should check the tubing for signs of kinking that may interrupt the flow of insulin.

# Infusion sets: O-ring leaks

A good seal between the O-rings and the reservoir wall is essential to prevent insulin from leaking. This problem can be caused by storage which can cause pooling of the lubricant.

**Solution:** The pump user should ensure the pump barrel is lubricated before filling and that they are handling the reservoir correctly.



# Infusion sets: air bubbles

**Air bubbles in the reservoir are not a problem unless they are large and replace insulin. 5mm = 1 unit of insulin. The tubing requires visual inspection if BGLs are high.**

## **Solution:**

The pump user:

- can ignore small bubbles
- remove any larger bubbles
- ensure insulin is at room temperature to avoid “champagne bubbles” in the reservoir



# Infusion sets: hub leaks

Insulin leakage from the reservoir or injection set is usually so small it is quite hard to detect. The pump will not alarm for leaks.

The tip of the reservoir may leak when it is not tightened snugly, but may also crack if tightened too much.

**Solution:** The pump user should tighten hubs (connectors) firmly but carefully at pump setup. If a leak is suspected, they should smell/feel the hub for insulin. Insulin usually dries fast and cannot be seen. The reservoir and tubing should be changed if they are unsure about a hub leak.





# Infusion sets: sweating

Excess sweating can cause even well constructed infusion sets to come loose and fall out.

**Solution:** The pump user can brush liquid adhesive onto the skin to increase adhesion.



# Injection sites: surface bleeding

**Bleeding occasionally occurs near the skin surface and is seen as a red area at the injection site. This is more common with metal needles, but can occur with any injection set. This can occur when a blood vessel near the skin surface is nicked as the needle passes through.**

**Solution:** This is not usually a concern as surface bleeding does not usually cause problems (i.e. there is no lump under the skin and the blood glucose does not rise).



# Injection sites: deep bleeding

**A deep bleed or hematoma is a more serious problem.**

**This feels like a hard lump deeper under the skin, is usually the size of a 5 cent piece or smaller, and may feel uncomfortable or slightly warm. Insulin is diverted into this pool of blood.**

**Solution:** The pump user should remove the injection set and pinch the lump under the skin to remove as much of the fluid as possible (to lessen the risk of an infection). They should check that the fluid is red like blood rather than white, yellow or green which indicates an infection. They should apply a warm compress, and take extra insulin if their BGL is high.



# Injection sites: infections

**Much like a hematoma, a lump can be felt under the skin, usually associated with discomfort, warmth, and high blood glucose.**

Anyone can experience an infection, however:

- » It is more likely in someone who has had a previous skin infection (an infected cut or scrape)
- » Infection usually starts when the site preparation is poor, sterile technique is not used, or the injection set is not changed as recommended.

**Solution:** The pump user should remove the injection set, and pinch the lump under the skin to check for infection. They should apply a warm compress and seek medical advice immediately if an infection is suspected.

# Injection sites: other common issues

- » pump bumps – small slightly raised red spots found after a set is removed
- » pump Lipohypertrophy (fatty lumps) – same as injections when a site is overused (see next page for further information)
- » scarred areas – these should not be used as injection sites
- » allergic reaction to the injection set will cause raised red welts. the pump user should see their diabetes team to discuss alternative options including different infusion sets or skin preparation



# Lipohypertrophy or fatty lumps

- » Lipohypertrophy or fatty lumps are a side-effect of repeatedly injecting insulin in the same site over a period of time. Injection sites should be rotated to avoid this.
- » can occur whether injecting or using a pump
- » can stop the insulin from working properly resulting in unpredictable BGLs
- » can be avoided by not using the affected area
- » people should be encouraged to check their sites for lumps and speak to their diabetes team if concerned



# Support for people using pumps

**Insulin pump users should have a pump back up plan and carry essential supplies as outlined in their back up plan.**

This includes:

- » testing equipment for BGLs & ketones
- » spare insulin and insulin pens
- » a plan of management from their diabetes team

They will have a diabetes team, which provides advice on pump set up and management.

Pump suppliers have 24 hour/ 7 days per week telephone based customer support.

# Pump cons: diabetic ketoacidosis

- » Rapid Diabetic Ketoacidosis (DKA) can occur when there is no long-acting insulin on board as a back up if the insulin supply is suddenly disrupted. Causes of disruption to insulin supply can include: clogged tubing, dislodged needle or a pump malfunction.
- » Disruption to the insulin supply can rapidly cause severe hyperglycaemia or DKA.
- » Due to the risk of DKA, frequent blood glucose testing is necessary – BGLs may need to be tested 6 to 12 times/day: before meals, 2-3 hours after meals, and overnight.



# Things to remember

- » Pump users have a diabetes team to support them in their diabetes management. The team may include a range of health professionals including an endocrinologist, diabetes educator and a dietitian who understand insulin pump therapy.
- » Pump supplier are able to provide advice on pumps.

If a pump user needs advice on their pump or their diabetes management, refer them to their diabetes team or the pump supplier.

For general advice and support pump users can speak to a diabetes educator by calling the NDSS Helpline on **1300 136 588**.

**Disclaimer: The information in this resource is intended as a guide only. It should not replace individual medical advice. If your customer has any concerns about their health or further questions, they should be raised with their diabetes team.**