

Insulin Pump Therapy

WAKEMED PEDIATRIC ENDOCRINOLOGY



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Overview

- What is an insulin pump?
- Advantages vs Disadvantages
 - Different types of pumps
 - Special features
 - Essentials to success
- Psychological concerns
 - When to call for help
 - Use in School
 - Cost
 - Are you ready?

What is an insulin pump?

- An insulin pump is a small, computerized device that delivers insulin in two ways:
 - **Basal Insulin:**
A continuous, low-level delivery of insulin every few minutes throughout the day and night to maintain stable blood sugar levels.
 - **Bolus Insulin:**
A user-initiated dose of insulin taken at mealtimes or to correct high blood sugar levels.



Advantages vs Disadvantages

Advantages

- Increased time in range
- Fewer injections
- Ease of bolusing
- More precise dosing
- Can customize settings throughout the day
- Automated technology
- Decrease in chronic complications
- Improved satisfaction with treatment and quality of life

Disadvantage

- Can go into diabetic ketoacidosis faster
- Being connected to a device
- Additional responsibilities
- Potential of increased cost
- Remembering to bolus
- Still requires regular bolusing
- Alerts/alarms can draw unwanted attention

Different Types of Pumps

Automated- gives insulin using an algorithm-based formula. Has the ability to pause insulin for low blood sugars and give additional insulin for high blood sugars.

- Omnipod 5
- Tandem Control IQ
- iLet
- Medtronic 780G
- Twiist

Manual – gives insulin using provided pump settings.

- Omnipod Dash
- Tandem Basal IQ

Omnipod 5

- **Algorithm Features:**

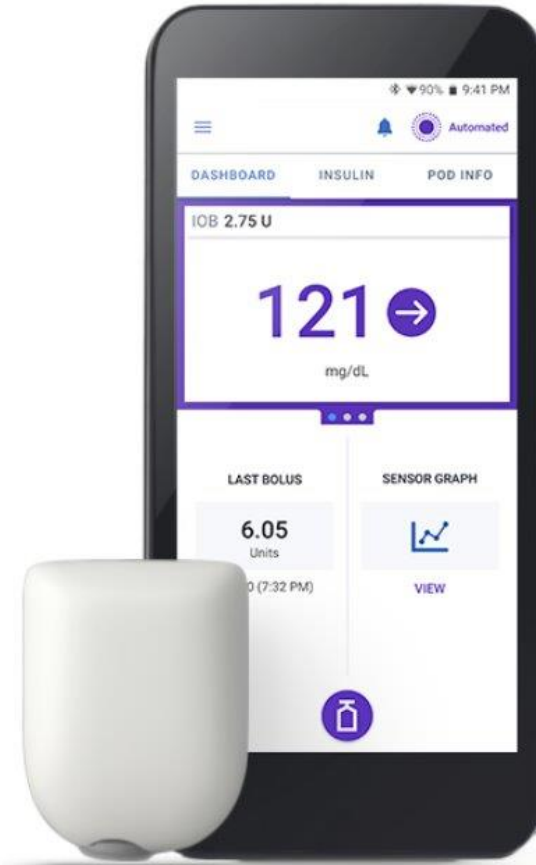
- Automatically delivers basal insulin, aiming for the target glucose value you choose. You can choose a target glucose from 110-150 mg/dL (in 10 mg/dL increments).
- Calculates basal insulin delivery every 5 minutes based on CGM glucose trends and your total daily insulin (TDI) needs. The pod tracks your TDI and updates it with each pod change.

- **CGM Compatibility:** Dexcom G6, Dexcom G7, Libre 2+

- **Indicated Age:** 2 years and up

- **Key Features:**

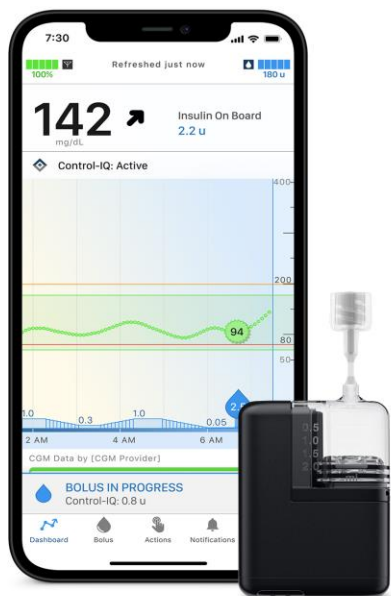
- Tubeless
- Activity Mode
- Can be controlled with compatible Android or iPhone.



[Video: Diabetotech | Omnipod 5: According to the CARES Paradigm | Diabetes Technology Expert Program](#)



Tandem T:slimX2



Tandem Mobi

Tandem

- **Algorithm Features:**

- Automatically increases or decreases programmed basal rates to maintain glucose levels of 112.5-160 mg/dL.
- Automatically delivers a 60% correction up to once per hour if glucose is predicted to be >180 mg/dL.

- **CGM Compatibility:** Dexcom G6, Dexcom G7, and Libre 2+

- **Indicated Age:** 2 years and up

- **Key Features:**

- Activity Mode & Sleep Mode
- Multiple types of infusion sets
- Option for extended bolus
- Two options: Tandem T:slimx2 & Tandem Mobi
- Compatible iPhone app that can be used for bolusing. *iPhone is required for Mobi.*

[Video: According to the CARES Paradigm | Tandem Mobi System | Diabetotech](#)

Beta Bionics(iLet)

- **Algorithm Features:**

- The iLet Bionic Pancreas automates all insulin delivery, including basal insulin doses and meal and correction bolus doses. Insulin automation is initiated by programming your weight.
- Insulin doses adapt over time based on your daily glucose patterns. You can request a meal bolus from the iLet by entering a meal announcement, where you indicate which meal you are eating, (breakfast, lunch, or dinner) and the amount of carbohydrates in the meal relative to what you typically eat (“Usual for Me”, “More” than usual or “Less” than usual).

- **CGM Compatibility:** Dexcom G6 & Dexcom G7, Libre 3+

- **Indicated Age:** 6 years and up

- **Key Features:**

- No carb counting
- Only settings are Target Blood Glucose & weight

[Video: Diabetotech | iLet System: According to the CARES Paradigm | Diabetes Technology Expert Program](#)



Medtronic 780G

- **Algorithm Features:**

- *SmartGuard* automatically delivers basal insulin, aiming for the target glucose value you choose. You can choose a target of 100, 110 or 120 mg/dL. It adjusts the basal insulin every 5 minutes based on your total daily insulin (TDI) and the current CGM glucose trends.
- If the glucose levels are rising quickly, *SmartGuard* may deliver stronger auto correction bolus dose if it thinks the rise in glucose values is related to a meal. This is referred to as “Meal Detection”.

- **CGM Compatibility:** Guardian 3 & 4

- **Indicated Age:** 7 years and up

- **Key Features:**

- Meal detection technology
- Option for 7-day infusion set



[Video: Diabetotech | MiniMed 780G AID System: According to the CARES Paradigm](#)

Twiiist



- **Algorithm Features:**

- Adjusts basal insulin delivery in real time based on CGM data, predicted glucose values, and individualized targets.
- Target can range from 87mg/dl-180 mg/dl.

- **CGM Compatibility:** Libre 3+

- **Indicated Age:** 6 years and up

- **Key Features:**

- Can bolus from device, iPhone or Apple watch
- The iiSure™ Technology in the twiiist AID System uses sound waves to make insulin delivery more reliable and accurate. It can detect blockages (called occlusions) up to nine times faster than other systems.

- Video: [twiiist AID System - YouTube](#)

Special Features

- *Exercise Mode*: Most automated pumps now have a feature that raises the target blood sugar, reducing insulin on board. This feature works best if turned on 1 hour before exercise.
- *Extended Bolus*: Gives the ability to deliver a bolus over a set time.
- *Temp basal*: Allows you to override your current active basal rate in order to add or subtract a specified amount of insulin from each basal dose, for a specified period of time.
- *Pump Profiles*: Allows users to save different settings and switch as needed between profiles (ex. School day, sports, weekends etc.).

Essentials to success

- Bolus for all carbs (before meals is best!)
- Closely monitor your blood sugars
- Charge your pump/controller
- Change your infusion site as directed
- Change your cartridge and insulin as directed
- Have insulin pens for back up
- Family Support
- Have your pump company's customer support number saved
- Reach out with questions or concerns

Psychological considerations

- Overconfidence/Noncompliance
 - With automated insulin delivery systems, patients may develop a false sense of security that the pump does everything for them. They may bolus without checking blood sugars, miscount carbs, or not enter carbs at all.
 - Remembering to bolus
 - Most common problem with pump use
 - Younger children may rush through bolus calculator & forget to hit the pump button that actually delivers the insulin bolus
 - Overconfidence or noncompliance can not only mean discontinuation of pump therapy but can be harmful to the health of the pump user

When to call for help

- Seeing a pattern of high or low blood sugars
- High blood sugars that are not responding to corrections
- Moderate to Large Ketones
- Pump failure/malfunctions
- Concerns of DKA
- Site issues

Other Considerations

- Pump Vacation
 - Patient wants to go back to injections for a period of time, such as over the summer when they are swimming frequently. ***We do not recommend switching between pump and injection therapy frequently as a consistent regimen is needed to stabilize blood sugars.***
 - Initiated by patient and family; must contact office 3-5 business days before pump vacation start date to get prescriptions and doses
- Back-up Plan
 - Pumps are not infallible; sometimes they can malfunction or fail
 - Imperative to be prepared:
 - Have short-acting insulin pens or syringes, Lantus (or other long-acting insulin) prescription, and your child's insulin regimen (this can be found in the letters section of Mychart)
 - Rule of thumb for long-acting dose: sum total of basal rates (ex: 12A-12A basal rate is 0.5 units/hour → 12 units of Lantus)

Costs

- Costs of insulin pumps can greatly vary with some pumps being considered a pharmacy benefit and others being covered under durable medical equipment(DME).
- Investigate your insurance coverage
 - It will be up to you to determine which pump your insurance company will prefer
 - Insulin pump warranties usually last four years if covered under DME.
 - Most insurances will not pay for a new pump until warranty is out
 - Upgrading to a newer model is an option with most companies but may be an out-of-pocket expense

Use in School

- Use in Schools Instructions for devices should be outlined in the student's diabetes medical management plan (DMMP). A backup plan should be included in the DMMP for potential device failure (e.g., BGM, CGM, and/or insulin delivery devices). School nurses and designees should complete training to stay up to date on diabetes technologies prescribed for use in the school setting.
- It is important to set up a 504 plan that ensures access to your student's medical device.

Are you ready for an insulin pump?

Pump Readiness

- Self-monitoring of blood sugar levels
- Motivation
- Compliance
- Family involvement and support
- Pump knowledge
- Adequate diabetes knowledge
- Adequate communication with diabetes team
- Realistic expectations
- Problem solving skills
- Manual dexterity
- Health insurance
- Accurate carbohydrate counting

• Clinical Criteria needed to start:

- Insulin dosing compliance
- Ability to calculate insulin doses
- Testing blood sugar **at least** four times a day or wearing a CGM
- Appropriate carbohydrate counting
- <2 No Show's for appointments (per rolling year)
- Pass Pump Quiz
- Provider approval

Are you ready for an insulin pump?

- Responsibilities
 - For pump user and parents:
 - Continue checking blood sugars at least four times a day and bolusing for meals and high blood sugars.
 - Make appropriate insulin adjustments in line with comfort level of doing so
 - Appropriate infusion set placement.
 - Know how to troubleshoot with insulin pump.
 - Know when to contact our office and your pump company/pump representative.
 - Keep track of insulin pump supplies (usually done through separate mail-order company).

Contact

- When you feel ready to explore insulin pump therapy, we encourage you to connect with our diabetes educators. They will guide you through the various types of insulin pumps available and provide hands-on demonstrations to help you make an informed decision based on your individual needs.
- To schedule an appointment, please reach out via **MyChart** or call us directly at **(919) 350-2297**.

Resources

- [Diabetes Research, Education, Advocacy | ADA](#)
- [Diabetes Technology. Deciphered. | PANTHER Program](#)
- [Home » DiabetesWise](#)
- [Omnipod | Insulin Pump Therapy, Simplified](#)
- [Tandem Diabetes Care | Diabetes Management](#)
- [Makers of the first and only, fully automated bionic pancreas](#)
- [Insulin Pump Therapy | Medtronic](#)