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Home Feeding Pumps and IV Pumps

by Susan Agrawal

Home pumps for tube feeding and intravenous infusion have come a long way from the huge temperamental dinosaurs of the last decade. These days, there are several small pumps available that can do amazing things, from working when wet to running upside down. In this article, I will provide some basic information about the most popular pumps currently available in the United States.

Feeding Pumps

Moog Zevex EnteraLite Infinity

Website: <http://www.moog.com/products/medical-pump-systems/enteral-feeding-pumps/>

Manual:

http://www.moog.com/literature/Medical/Enteral/User_Manuals/Infinity_English_Operators_Manual.pdf



The Infinity pump is currently the smallest feeding pump available in the United States. Weighing less than a pound and measuring 4 inches high by 5.5 inches wide by 2 inches thick, it can be carried by toddlers with ease. Options available include a toddler-size Super-Mini backpack to carry the pump, or a Mini backpack for larger children or those who need greater volumes. A full size backpack and fanny pack are also available.

The Infinity is a pretty sophisticated pump that can run in any orientation, even upside down, and can be rinsed under running water. Children do not need to fear getting the pump wet in a rain storm or spilling formula on it, and can run and play, even upside down on monkeybars, with this pump. The pump can even be locked so children cannot

alter the settings.

The pump can be set to deliver a rate of 0.1ml to 600ml per hour. When the rate is set to less than 10ml, it can be adjusted by 0.1ml increments. Above 10ml, it is adjusted in 1ml increments. When fully charged, the pump can run 24 hours on battery at a moderate rate and takes about six hours to recharge. Current modes include bolus feeding, continuous feeding, and scheduled intermittent feeding. Feeding administration sets (feeding bags) come in 500ml and 1200ml sizes.

In general, the Infinity pump is well liked by most families, especially those who have small children, prefer a quiet pump, or require a pump that can run in any orientation. Commonly reported problems include difficulty using the newly designed and occasionally leaky bags, and dealing with “No Food” alarms, as the pump sensors tend to be sensitive. Some families find the pumps to be temperamental, with frequent alarms or problems. Changes made in the software have improved these problems over the past few years. Other families complain that user settings, such as the volume of the alarms, are very difficult to change.

For infants and children needing very small volumes, a separate low volume version of this pump is available, called the Infinity Orange.

Kangaroo Joey

Website: <http://www.covidien.com/criticalcare/pageBuilder.aspx?contentID=157008&webPageID=0&topicID=156963&breadcrumbs=81039:0,73590:0#Features and Benefits>

Manual: <http://www.covidien.com/imageServer.aspx?contentID=12811&contenttype=application/pdf>



The Kangaroo Joey pump is another portable pump, the newest pump from a company that has been making feeding pumps for years. It is somewhat larger and thicker than the Zevex Infinity pump, weighing 1.7 pounds and measuring 4.1 inches by 5.1 inches by 3.6 inches. This pump is suitable for children, but may be too heavy and bulky for toddlers.

A carrying case is available, which is the size of a child's backpack.

The advantage of the Joey is its ability to deliver feedings at a faster rate of speed, and its highly customizable settings. While it can run briefly in any orientation, proper administration requires the formula in the feeding bag be placed six inches above the pump. The pump is splash-resistant but cannot be submersed in water. It can be locked to prevent children from changing the settings.

The Joey can be set to deliver from 1ml to 400ml per hour, with 1ml increment adjustments. A Bolus Max setting is also available, which allows a bolus feed to be given at 999ml per hour. When fully charged, the pump can run for 18 hours at a moderate setting. Feeding modes include continuous feeding, bolus feeding, or scheduled intermittent feeding. The Joey pump allows easy programming to schedule intermittent bolus feeds, permitting you to set the number of boluses, the frequency of feeding, the rate, and the amount/quantity of each bolus. Regular feeding administration sets (feeding bags) are available in 500ml and 1000ml sizes.

The Joey has several features not available on other pumps, many of which offer convenience to the user. For example, it can automatically prime the tubing for you. A KTO or "Keep Tube Open" rate administers a small continuous volume between intermittent feeds for tubes that tend to clog. A Resume setting allows the user to pause the pump for up to 30 minutes, such as when a child experiences sudden discomfort during a feed. This pump also has the ability to flush the tube with water, either after a feed or periodically. Special feeding administration sets that hold both formula and water in separate 1000ml bags are available.

The Joey pump is praised by families who like its reliability and enjoy the extra features. While the Joey pump has many interesting and helpful features, some parents complain that it is heavy and bulky, especially for small children, and that the pump does not work as well for children who are extremely active. Others do not like how loud the pump is, and find it disturbing in a classroom setting.

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IV Pumps

For a handy comparison of the main pumps available, see the following chart from ThriveRx, a home infusion company: <http://www.thriverx.net/PDFs/IV%20PUMP%20COMPARISON%20CHART%203%20%20FINAL.pdf>

Bodyguard 323

Website: <http://cme-infusion.com/cme/20/67/>

Manual: <http://www.cmeamerica.com/BG323ptgSM0013.pdf>

Online Tutorial:

http://www.mckinleymed.co.uk/images/Tutorial_323_v2_CMEUK.swf



The Bodyguard pump is currently the smallest and most energy efficient pump available on the market. It is notable for its ease of use, quiet function, and environmental friendliness. The pump weighs just 13.75 ounces and measures 4.5 inches by 3.5 inches by 1.6 inches. A small shoulder carrying case is available with the pump, though most families find this case too small to be of value.

Like most ambulatory IV pumps, the Bodyguard can run in several different modes, including Continuous, Intermittent, TPN, PCA, and a programmable mode of 25 steps. The available flow rate is from 0.1ml per hour to 1200ml per hour, in 0.1ml increments up to 100ml and in 1ml increments thereafter. You can infuse up to 9999ml at a time. The KVO (Keep Vein Open) setting can be adjusted from 0.1ml per hour up to 5ml per hour in 0.1ml increments. It includes adjustable air and pressure sensors.

What is unique about the Bodyguard is its use of rechargeable Lithium-ion batteries and a charging dock. The pump can be placed on a pole mounted docking station, charged with a tabletop battery recharger, or plugged directly into a wall outlet. Charging takes approximately six hours if fully depleted, and the battery life is about 16 to 18 hours at a moderate rate. A separate battery pack using disposable 9V batteries is also available.

For families with children who like to push buttons or change settings, the pump has three modes of locking access, including fully locked, partially locked, and unlocked.

Other helpful features of this pump include an automatic priming mode and administration sets that are designed for easy manual priming. A wide variety of standard bore and microbore administration sets, with and without filters, are available.

For children requiring multiple infusions, a double version of the pump, the Bodyguard 121, is available and runs two separate infusions concurrently. This version of the pump is still only 15.9 ounces.

Families remark that this pump is the easiest, quietest, and smallest pump available, and most praise its nice features and style.

Curlin 4000 CMS

Website: <http://www.moog.com/products/medical-pump-systems/infusion-pumps/>

Manual: <http://www.moog.com/products/medical-pump-systems/infusion-pumps/infusion-pump-literature-download-page/>



The Curlin pump is a small pump with many customizable and adaptable features not found on other ambulatory IV pumps. While not as small as the Bodyguard, it is still quite small, weighing 17.5 ounces and measuring 5.1 inches by 4.0 inches by 2.5 inches.

The Curlin pump runs in five different modes, Continuous, Intermittent, TPN, PCA, and Variable. The available flow rate is from 0.1ml to 400ml per hour, in 0.1ml increments. You can infuse up to 9999ml at a time. The KVO (Keep Vein Open) setting can be adjusted from 0.1ml per hour up to 10ml per hour in several preset increments. It includes adjustable air and pressure sensors. A notable feature is continuous real-time line pressure readings, which can be useful to assess the function of a central line.

The Curlin pump typically runs off of two disposable C batteries. A separate external charging pack with rechargeable batteries is available but is bulky. The pump can also be plugged directly into the wall with a power cord to run on regular AC current. Battery life is about 30 hours at a moderate rate.

For children who like to press buttons or change settings, the pump has four levels of

locking access, ranging from unlocked to fully locked.

Other helpful settings and features include programmable occlusion sensors, hour-by-hour and shift guides to the amount infused (very useful for home nurses), and a simple continuous display for time and volume remaining. Unused modes are blocked out to prevent user error, and help screens are continuously available directly on the pump. Another nice feature is the Delay Start mode, which allows you to program the pump to start at a particular time in the future, allowing the pump to run on the KVO setting until the infusion begins. There are a wide variety of standard bore and microbore administration sets available, with and without filters.

A newer version, the 6000 CMS, is very similar to the 4000 CMS, with a larger screen and increased font size.

Families who like to customize their pumps and sensors tend to prefer this pump, as it offers the most user adjustable features.

CADD PrizmVIP Pump

Website: <http://www.smiths-medical.com/catalog/ambulatory-pumps-sets/cadd-ambulatory-infusion-pumps/cadd-prizm-vip/cadd-prizm-vip-system-1.html>

Manual: <http://www.smiths-medical.com/education-resources/downloads/pain-management/cadd-prizm-vip-system.html>



The CADD pump is a simple pump with fewer features that works well for patients with limited technological sophistication and simple infusion needs. While still small, it is larger than both the Bodyguard and Curlin pumps. It weighs 20 ounces and measures 4.1 inches by 5.6 inches by 1.7 inches. Several different sizes of backpacks and carrying cases are available for this pump.

There are four medication administration modes available, Continuous, Intermittent, TPN, and PCA. The available flow rate is 0.1ml per hour to 350ml per hour, in 0.1ml increments up to 100ml and in 1ml increments thereafter. The KVO (Keep Vein Open) setting is 1/10 of the rate up to 5ml per hour in TPN mode, and is adjustable up to 10ml

in intermittent mode. The pump does not have an air sensor, but one can be added on to the side of the pump. Pressure and occlusion sensors are built in.

The CADD pump runs on one 9V battery. A rechargeable battery pack can also be used, though this is large and bulky. The pump can be plugged directly into a wall outlet with an optional power cord. The battery life is about 12 hours at a moderate rate.

For children who like to change settings and press buttons, there are three levels of locking access, including unlocked, partially locked, and fully locked.

The administration sets for this pump are quite difficult to attach and use, requiring a cassette to be locked into the bottom of the pump. A coin or key is required to lock the cassette into place and unlock it when the infusion is completed. Several different sets are available, with and without filters. Other advanced features include a Delay Start and immediate taper down.

While this pump functions just fine, many families find its lack of features and clunky administration sets problematic. This pump is best for individuals who do not need many advanced features and want a simple pump. It is an excellent option for someone new to IV infusion who does not require advanced features or is more comfortable with a lower level of technology.