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Automatic Milking Device for Orphan Foals

The old adage says that when the going gets tough, the tough get going. So when the sister of an employee at Waller Equine Hospital, in Texas, found herself with an orphaned foal, unable to secure a nurse mare and unable to easily provide the frequent feedings the foal needed to thrive due to a busy schedule, the clinic staff got going.

The staff members put their heads together and successfully created an automatic milk-feeding device, which allowed the foal access to frequently dispensed milk rations without the milk replacer spoiling in the warm Texas climate. At the 2014 American Association of Equine Practitioners Convention, held Dec. 6-10 in Salt Lake City, Utah, Waller veterinarian Jenni Schroeder, DVM, shared the steps it takes to construct one of these devices.

Schroeder explained that foals rely on milk as their primary source of nutrition for the first two to five months of life, and they generally consume small amounts of milk several times per hour. Large, infrequent milk meals can lead to gastric ulcers, decreased gut motility, and overfilling of the stomach (which, in turn, can lead to colic and diarrhea).

Schroeder and colleagues designed the automatic milk feeder to fulfill foals' nutritional needs while freeing up time for human caregivers. She said constructing one of these devices is as easy as four parts, some tools, and less than $400.

Before you start building, however, it's important to ensure:

- The foal has received adequate antibodies normally contained in mares' colostrum (first milk).
- The foal knows how to drink from a bucket. Schroeder recommended starting by having the foal suckle a finger and then lowering your hand into a bucket of milk or replacer. It might take several tries, but the foal will catch on eventually.
- There's a safe 110-volt electric outlet near the foal's stall or pen that's protected from the elements.

The pump can be programmed to dispense milk at various intervals throughout the day.

Photo: Courtesy Dr. Jenni Schroeder

What You'll Need
When you're ready to start building, start gathering the supplies you'll need:

- **A compact refrigerator**, measuring around 3.3 cubic feet.
- **A rectangular milk storage container** that fits inside the refrigerator. A small plastic trash can works well, Schroeder said.

A peristaltic dosing pump with a timer. This is the most complex piece of equipment you'll need. Schroeder said the clinic staff has tried a variety of pumps and believes the 115 VAC Veta DR-2000 Clock Base Chemical Feed System is the best value for what it provides. She said the system pumps an average of 150 milliliters per minute and has a maximum output of 3 liters per 20-minute cycle. Schroeder said the pump can be programmed to dispense milk more frequently than once per hour, "but only stores 24 programmed cycles to memory so the internal clock would need to be reset every 12 hours for more frequent feedings." She also noted that the pump's tubing will likely need to be replaced every few years, but that all the pump's components can be easily purchased from online retailers.

- **A clear storage container** to keep the pump away from the dust found and water used in barns, and ensure the pump fits inside whatever container you choose. Schroeder said her team typically uses a 4-liter plastic food storage container for this purpose. This container is optional.

Tools, including an electric drill, a box cutter, a **3/16-inch drill bit, a ¼-inch drill bit, a marker, a hammer, and a Phillips head screwdriver.**

1 **Step-by-Step**
2 Once you've collected your supplies and have unpacked your refrigerator and pump, it's time to start construction. Do not plug the refrigerator into an electric outlet until you've completed the milk feeding device.

1. **Mount the pump**. Decide whether you want to mount your pump on the top or the side of the refrigerator. If you're using a container for the pump, use your box cutter to cut holes in the container for the power cord and the intake and output tubing. Place the container and pump in your desired mounting location, and mark where the screws will be located. Use the 3/16-inch drill bit to drill the mounting holes, and hammer the drywall anchors (included with your pump) into place. Then, mount the pump and container to your refrigerator.
2. **Drill the hole for the intake hose.** Determine where you want the suction hose to enter the refrigerator, and mark that location with your marker; Schroeder typically places her hoses through the side of the refrigerator, below the freezer unit. Then, drill your hole with your ¼-inch drill bit.
3. **Put the intake hose in place.** Measure and cut the tubing for your intake hose—it should be long enough to run from the pump's input port to the very bottom of the milk receptacle. Attach the standpipe tubing that came with your pump to the end of the intake hose that rests in the milk receptacle.
4. **Put the output hose in place.** Attach your remaining tubing to the pump's output port. Then, run this hose from the pump to the foal's bucket, and secure it in place.
5. **Put the refrigerator in place**, plug it and the pump in, program the pump, fill the receptacle with milk, and you're good to go.

Place the container and pump in your desired mounting location, and mark where the screws will be located.

Photo: Courtesy Dr. Jenni Schroeder

Schroeder noted it's important to revisit the rations your foal gets as he grows and to reprogram the pump as needed. Once a foal is weaned off milk, clean the pump with 10% bleach solution and distilled water before using it on the next foal.

"The described device has worked well in our hospital setting, and we often send them home with orphan foals for a monthly rental fee," Schroeder said, adding that some clients opt to purchase the devices from the clinic.

"The foals quickly learn the sound of the pulp when it is activated and run to the bucket to drink," she said. "The foals (we've used the device for) gained weight at an average pace, and no significant diarrhea, colic, or constipation was encountered."

Schroeder stressed that, when dealing with an orphan foal, horse owners should work with their veterinarian to manage the foal on the machine, ensure the amount and frequency fed is correct, and to ensure the foal is gaining weight appropriately and is otherwise healthy.

She also credited Christopher Boutros, DVM, Dipl. ACVS, owner of Waller Equine Hospital, and Chuck Bechtold for their roles in developing the automated milking machine.