Innovative Modification Showcase

The Gaumard Peristaltic Pump

a device used with the Arterial and Venous Patient Training Arms

Submitted by:

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Entry Description

The peristaltic pump used with Gaumard arterial and venous training arms was modified to reduce setup and cleanup time. Two different closure designs were tested to identify which one would be the most efficient.

Detailed Description

The modification to the Gaumard peristaltic pump provides the simulation technician a faster method of opening and closing the faceplate to facilitate insertion of the tubing. The new closure method eliminates the need for screws that are tedious to remove and could potentially be lost during setup and cleanup. Due to the fact that opening the faceplate is easier, setup and cleanup time is reduced and troubleshooting becomes more efficient.

A hinge was attached to the roller housing and faceplate for both design types. The supplies required to modify the pumps were (2) 1-1/2” Everbilt Narrow Utility Hinges, (1) ¾ “x 1-1/8” Everbilt Hook and Staple sets, (2) sets of ⅜” Velcro fasteners. To modify the pump, the 5 Phillips head screws in the faceplate were removed. Two 1/8” holes were then drilled into the bottom left of the front side of the faceplate. The top half of the hinge was secured to the bottom left of the front of the faceplate with 2 of the screws from the hinge set. The extra threads of the screws sticking out from the back of the faceplate were cut off using bolt cutters to allow the faceplate to lay flat against the roller housing. The bottom of the hinge was then secured using the remaining 2 set screws that came with the hinge. The attached hinge is shown in Fig. 1.

Fig. 1 Hinge
For the hook closure design, the staple portion of the set was attached to the upper right side of the roller housing by first drilling (2) 1/8” holes and attaching the staple with (2) of the set screws. The hook was attached to the front of the faceplate in the same manner. The hook arm then had to be bent at a 90° angle. The hook is then inserted into the staple to close the faceplate of the pump. Fig. 2 shows the hook closure design.

**Fig. 2 Hook Closure**

For the Velcro closure design see Fig. 3. One set of Velcro was attached to the front right side of the roller pump and the right inside of the faceplate. The other set was attached to the front left side of the roller pump and the left inside of the faceplate.

**Fig. 3 Velcro Closure**

In order to evaluate which design functioned best our simulation technician was asked to complete an evaluation after the use of the peristaltic pump and arms. An evaluation was completed for the hook design and one for the Velcro design. Question one rated the ease of opening the cover and question two rated the reliability of the cover staying closed during operation. Both questions used a Likert scale from 1 to 5 with 5 being the best or highest answer. There was also an area to write any comments.

Results of the evaluation:

<table>
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<tr>
<th>Question</th>
<th>Hook Design Score</th>
<th>Velcro Design Score</th>
</tr>
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<tbody>
<tr>
<td>Ease of opening the cover</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Reliability of cover staying</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>closed during operation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comment</td>
<td>20 min less time</td>
<td>30 min less time</td>
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<td></td>
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<tr>
<td></td>
<td>closure.</td>
<td>closure.</td>
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Looking at the numbers in the chart, the Velcro closure design was easier to use, more reliable and reduced setup and cleanup time more than the hook closure design. Based on these results the remaining two peristaltic motors will be modified with the Velcro closure design as will the other modified pump with the hook design. The warranties on this equipment have expired so modification will not be an issue or void the warranty.

**Objectives**

The primary reason this innovation was created was to decrease the setup and breakdown time of the Gaumard Peristaltic Pump used with the Venous and Arterial Patient Training Arms. In addition, the modification was designed to make opening and closing the pump faceplate easier. From the evaluation of each design, it is clear that the Velcro closure design worked more efficiently by saving 30 minutes in setup and breakdown time. The Velcro design was also easier to use and more reliable. A special thank you to Kerry Markey, Simulation Technician in the evaluation of the closure designs.