Knowledge Domain: Electrical Simple
Unit: Connectors
Skill: Broken Housing

Tools and Parts Required:

1) **Solid copper core conductor wires, 22-gauge**
2) **Waterproof silicone gel**
3) **PVC tubing, 19 mm diameter or suitable diameter**
4) **Heat shrink tubing**
5) **Velcro strips**
6) **Soldering iron**
7) **0.3 m of solder wire**
8) **Electrical tape**
9) **Clear plastic tape**
10) **Cutting tool (knife or saw)**
11) **Superglue (optional)**

Introduction

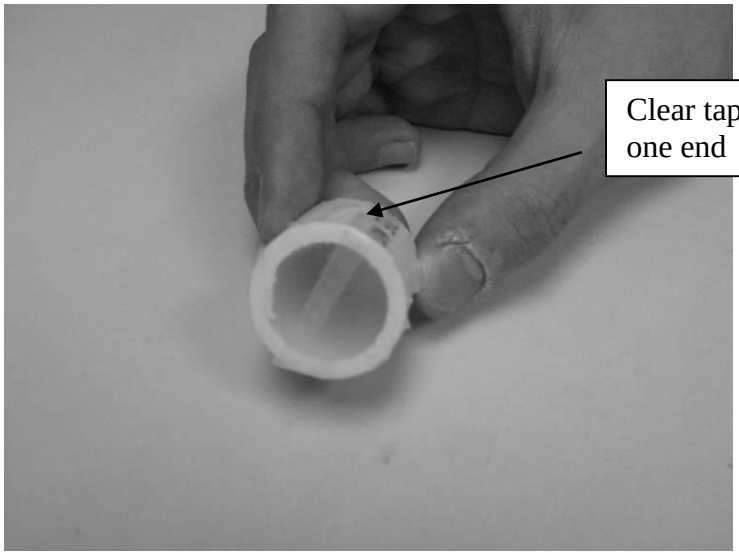
This skill instructs the user in replacing the housing and pins on a broken electrical connecting cable.

Identification and Diagnosis

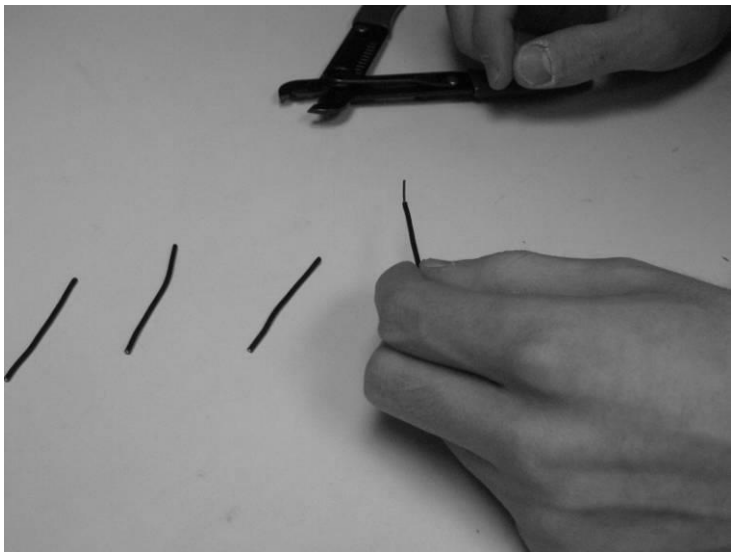
A bad connection between an electrical connector cable and a machine may indicate a problem at the connection between the cable and the machine. The cable housing protects the connection from stress and tampering. Check for cracks in the cable housing. If the cracks are less than 1-2 mm, try to repair the original housing using superglue. If the crack is larger than 2 mm you will need to replace the cable housing and the pins. These instructions will allow you to make a new cable housing using PVC pipe and new pins using copper wire (please see the BTA skill *Electrical-Connectors-Replacing Pins* for more pin ideas).

Procedure

1. Unplug the device from the electrical outlet
2. Unplug the connector cable from the device.
3. Cut off the original housing from the connector cable. Keep the original housing and note the pin configuration.
4. Strip the wires at the end of the connector cable.
5. Use a saw to cut a 20 mm segment of PVC pipe. Completely cover one end of the PVC cylinder with clear tape.

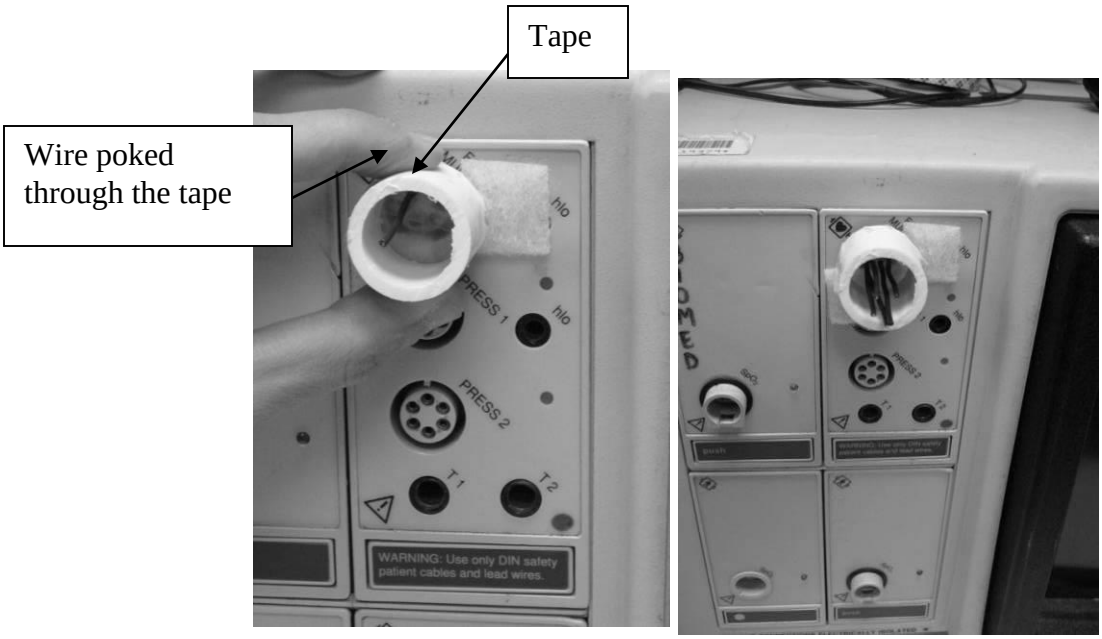


6. Make a new pin by cutting about 40 mm of solid core copper conductor wire. Strip both ends of each of your new solid core wires.

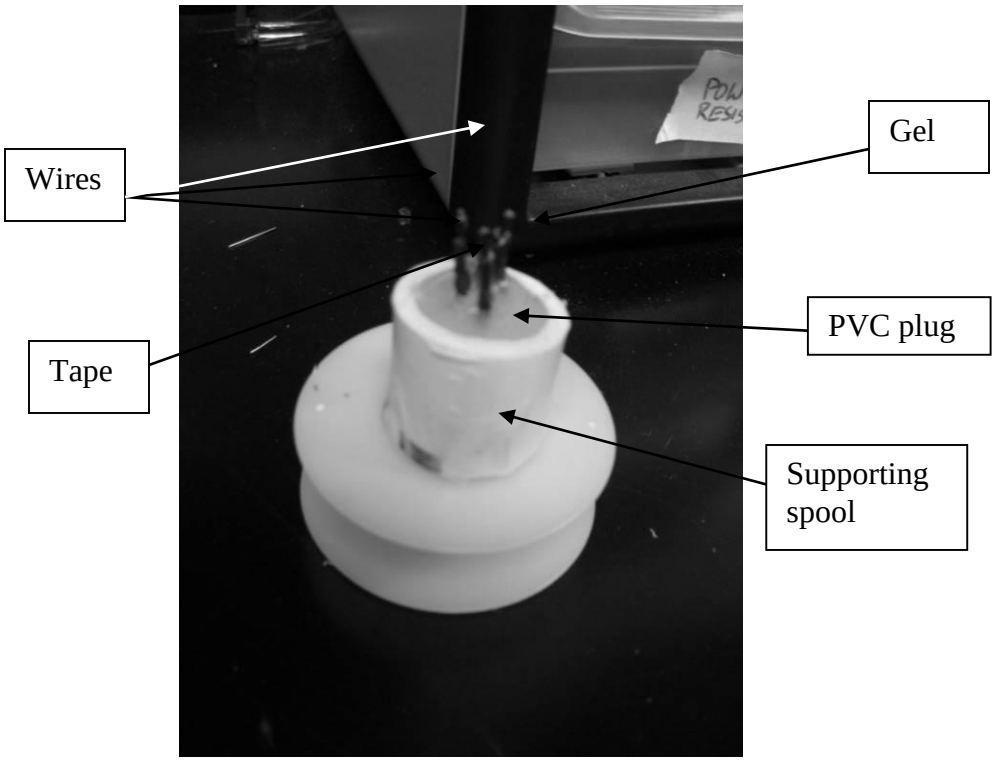


7. Hold the tube over the connection on the machine with the tape side touching the machine. Make a mark on the PVC plug to indicate the proper orientation of the plug. You can attach Velcro pads to the plug and the cable port on the device as demonstrated in the figure below. The Velcro pads will hold the PVC tube in place. The plug must be held over the connection for 24 hours.

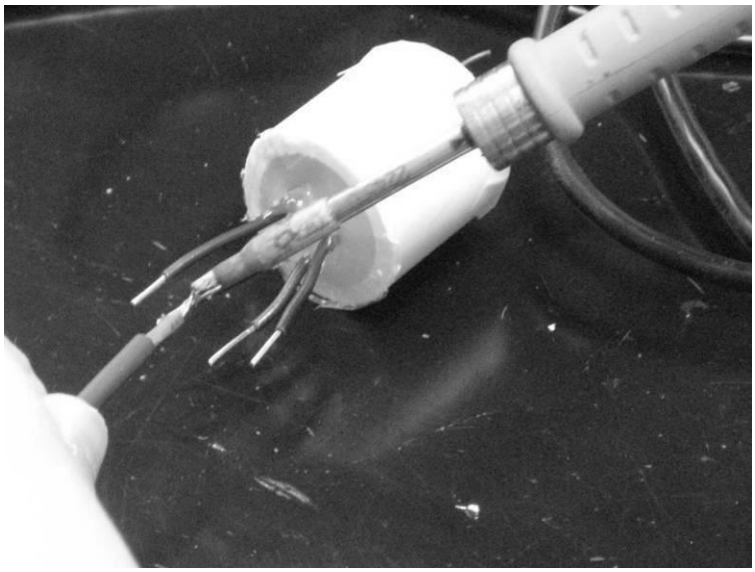
8. Poke the stripped end of the solid core wires through the tape. Match the holes of the desired connection receptor. Alternatively, use a sharp object like a pencil to make the holes, and then insert the wires.



9. Fill the PVC tubing with silicone gel squeezed from the tube. Use a spool to support the PVC tubing as it dries (see picture below). It should allow the PVC plug to sit securely without the wires touching the surface below. Let the silicone set for about an hour, then remove the tape. Allow the silicone gel to dry overnight. Do not move the tube from the machine while the connector is drying.



10.. Slide the heat shrink on the end of each wire. Solder the wires to the conductors embedded in the new connector plug in the appropriate positions as determined in step 7. Shrink the heat shrink tubing, using the BTA skill *Electrical-Connections-HeatShrinkTubing.*



11. Insert new cable housing into the device. Insure that the fit is accurate.
12. Insert the cable plug into electrical outlet. Insure that cable is conducting properly.

Exercise

Your instructor will give you the necessary materials and a connector with broken housing. Please follow the procedures to make a new housing.

Preventative Maintenance and Calibration

This cable is unique. A cable made for one machine may not work on another. Try to place the cable so that users do not step on the cable. Check the cable frequently for breaks or cracks.

Always calibrate every medical device before returning it to use.