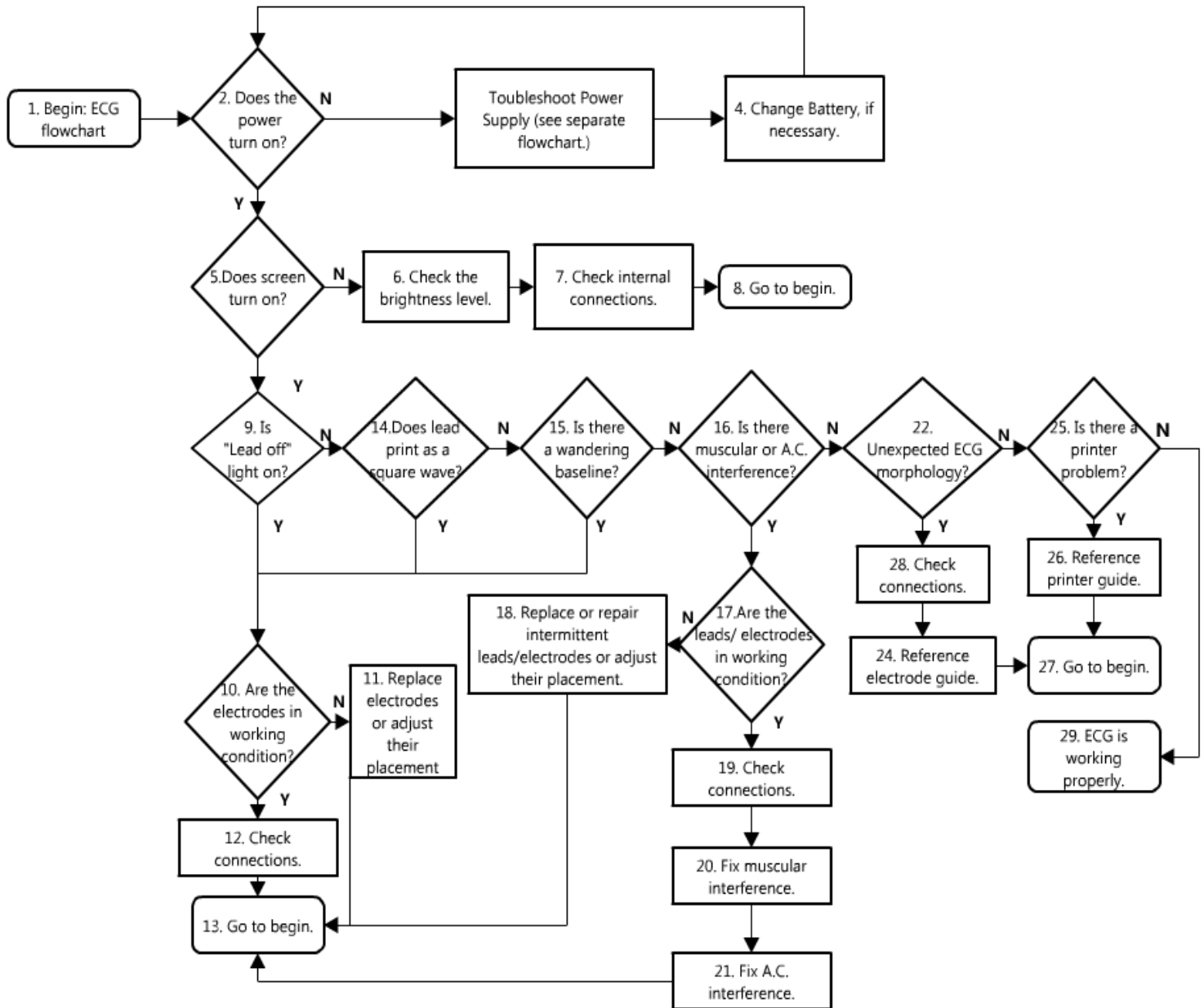



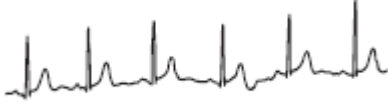
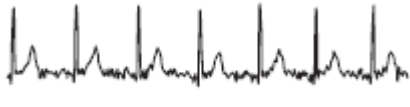
# Electrocardiogram (ECG) Repair and Troubleshooting

## Flowchart



## Description

#	Text Box	Comments
1	Begin: ECG flowchart	Start diagnostic process for a work order on an ECG
2	Does ECG power on?	Lights, displays, and sounds are indications that device is powered on. Also, check the power cords for continuity. See BTA skills on Connections.
3	Troubleshoot power supply (separate flowchart)	ECG's have an AC to DC power supply. See Flowchart on Power Supply, and BTA skills on Power Supply.
4	Change battery if necessary.	If there is a battery, test its ability to receive and hold a charge. See BTA skills on Batteries.
5	Does screen turn on?	No obvious brightness or color change on display screen?
6	Check brightness level.	If possible, raise brightness level of screen.
7	Check internal connections.	Check for obvious wiring issues such as damaged or disconnected wires. See BTA skills for Connections and Electrical Simple.
8	Go to begin.	Return to box 1, Begin: ECG
9	Is "Lead off" light on?	"Lead off" light will likely be near display window. It indicates that there is a bad connection somewhere between the patient electrodes and the machine. (1) See BTA skills for Electrical Simple.
10	Are the electrodes in working condition?	Check for damage or corrosion to the electrode or electrode insulation.
11	Replace electrodes or adjust their placement.	See electrode guide below for replacement of electrodes as well as electrode placement and a conducting gel recipe. If possible, attach a patient simulator to the patient cables. If proper signal with simulator, electrodes are non-functional.
12	Check connections.	If possible, attach patient simulator to patient cables, if no signal replace cables. Ensure proper connections between ECG and electrodes and ensure patient is not moving. Make sure electrode has proper contact with patient's skin. (1) See BTA skills for Electrical Simple.
13	Go to Begin.	Return to box 1, Begin: ECG
14	Does lead print as square wave?	Does one or more lead display as a square wave? 
15	Is there a wandering baseline?	Does display show an unsteady baseline signal?

		 <p>(1)</p> <p>Note: In an analog ECG machine, a wandering baseline may be caused by the INSTO adjust or if the stylus pegs violently</p>
16	Is there muscular interference or AC interference?	<p>Does display show muscular or AC interference (picture): Even peaked, regular voltage superimposed on waveforms?</p>  <p>(1)</p>
17	Are leads/electrodes in working condition?	<p>Check for damage or corrosion to the electrode or electrode insulation. If possible, attach a patient simulator to the patient cables. If proper signal with simulator, electrodes are non-functional.</p>
18	Replace or repair intermittent leads/electrodes or adjust their placement.	<p>See electrode guide below for replacement of electrodes as well as electrode placement and a conducting gel recipe.</p>
19	Check connections.	<p>If possible, attach patient simulator to patient cables, if no signal replace cables. Ensure proper connections between ECG and electrodes and ensure patient is not moving. Make sure electrode has proper contact with patient's skin. (1) See BTA skills for Electrical Simple.</p>
20	Fix muscular interference.	<p>Make sure patient is comfortable and not tense, if possible turn on muscular filter. See user's manual for instructions on muscular filter. (1)</p>
21	Fix AC interference.	<p>Verify that patient is not touching any metal. Verify power cable is not touching patient cable. If possible, turn on AC filter according to instructions in user's manual. Also, try running on battery power, if possible. (1) See BTA skills on Power Supply and Electrical Simple.</p>
22	Unexpected ECG morphology?	<p>Does display show an unexpected ECG morphology?</p>
23	Reference electrode guide.	<p>Check electrode guide below, particularly on lead placement to ensure proper location.</p>
24	Check connections.	<p>If possible, attach patient simulator to patient cables, if no signal replace cables. Ensure proper connections between ECG and electrodes and ensure patient is not moving. Make sure electrode has proper contact with patient's skin. (1) See BTA skills for Electrical Simple.</p>

25	Is there a printer problem?	Does printer not print or print output that does not match display
26	Refer to printer guide	Use Printer flowchart to determine possible problems with printer output. ? If it is an analog ECG machine, the stylus heat and pressure can cause poor trace display. Refer to the service manual or online documentation.
27	Go to Begin	Return to box 1, Begin: ECG
28	Check connections	If possible, attach patient simulator to patient cables, if no signal replace cables. Ensure proper connections between ECG and electrodes and ensure patient is not moving. Make sure electrode has proper contact with patient's skin. (1) See BTA skills for Electrical Simple.
29	ECG is working properly.	Return the machine to service via the appropriate clinical personnel.