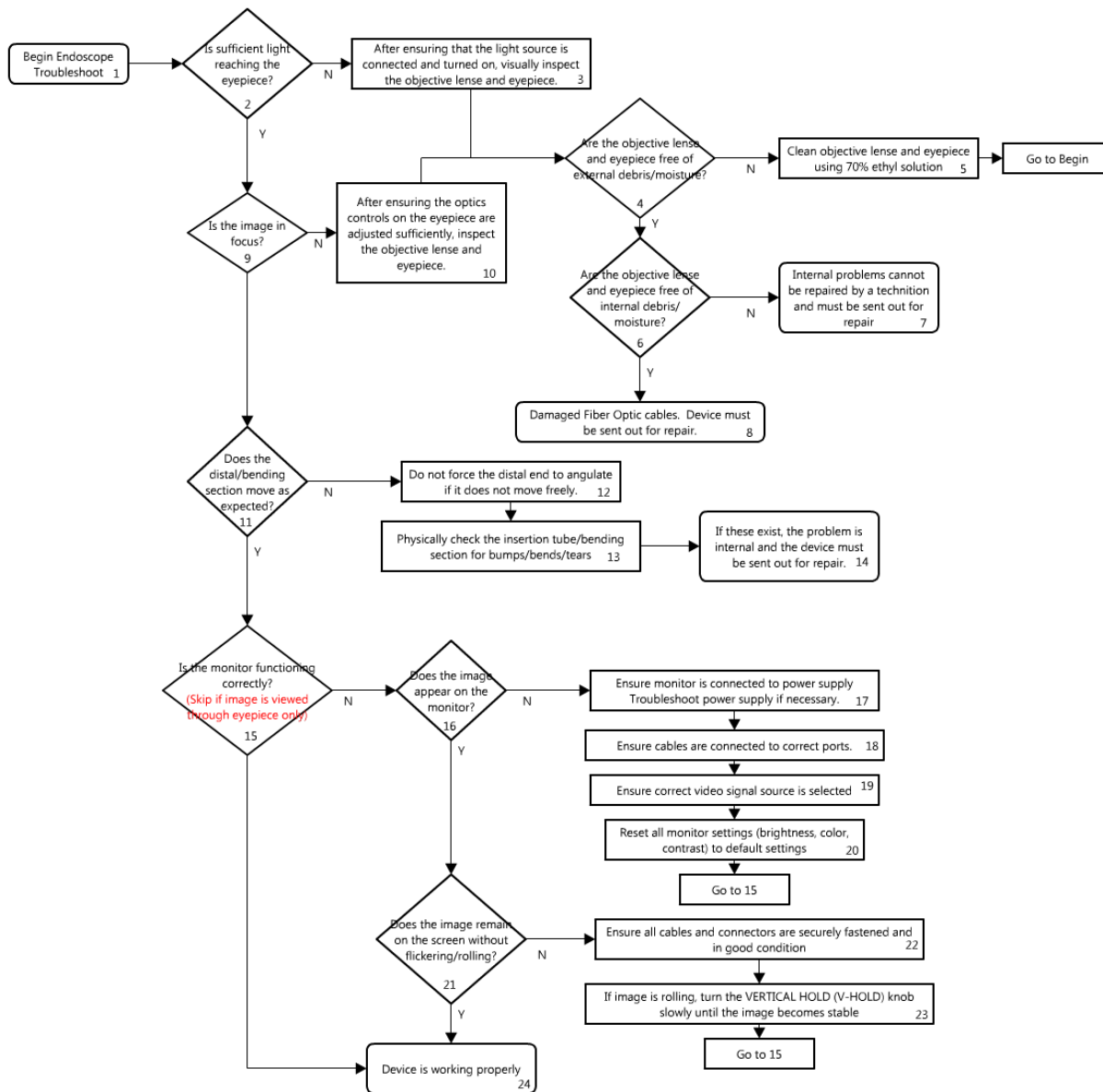


Endoscope Troubleshooting and Repair

Flowchart



Description

#	Textbox	Explanation
1	Begin endoscope troubleshoot	Start the diagnostic process for a work order on the endoscope.
2	Is sufficient light reaching the eyepieces?	After turning on and connecting the light source to the light guide cable, hold the tip of the scope up to another bright external light. Does an equally bright image appear through the eyepiece? There should be few to no black spots (broken fiber optic wires). More than 10% of the image being black is considered unacceptable.
3	After ensuring that the light source is connected and turned on, visually inspect the objective lens and eyepiece.	Double check to make sure the light source is powered on, its power source is working, and all connections from light source to endoscope are tight and fitted properly. Then inspect both the eyepiece and the objective lens on the distal tip. Both should be free of dust/dirt/buildup. Check lens for cracks or scratches. See BTA skills on Electrical Simple – Connections.
4	Are the objective lens/eyepiece free from external debris/moisture?	Is there a buildup of anything on the external surface of either the objective lens/eyepiece? This could include dust, dirt, fluid, scratches, cracks, etc.
5	Clean objective lens/eyepiece with 70% ethyl solution.	Wipe the external surface with a clean, lint-free cloth moistened with 70% ethyl or isopropyl alcohol. Never use an abrasive cleanser which might scratch the lens surface. If scratches are present, eyepiece/lens may need to be replaced. See BTA skills on Cleaning.
6	Are the objective lens/eyepiece free from internal debris/moisture?	After cleaning the outside of the lens/eyepiece, if the image still appears dark, visually inspect for internal buildup or moisture. Moisture would make the image appear foggy/unfocused.
7	Internal problems cannot be repaired by a technician and must be sent out for repair.	It is not possible to disassemble the endoscope to repair internal damage and water leaks. The equipment should be sent out for repair or replaced.
8	Damaged fiber optic cables. Device must be sent out for repair.	If dark, black spots appear in the image, some of the fiber optic cables are broken. If more than 10% of the image appears black, consider replacing the fiber optic cable. Do not attempt to disassemble and fix. Device must be sent out.
9	Is the image in focus?	Does the objective appear through the eyepiece clearly? The image should not appear “fuzzy” or unfocused. Sufficient focus is important for many procedures.
10	After ensuring the optics control on the eyepiece is adjusted sufficiently, inspect the objective lens and eyepiece.	Adjust the controls on/near the eyepiece on the endoscope control body. Turn the knob to bring the image in and out of focus until it is clear. If no optic control setting fixes the clarity, inspect the lens and eyepiece for obstruction.

11	Does the distal/bending section move as expected?	Test the response of the control knobs on the endoscope control body. The UP/DN knob should move the distal tip up and down, and the R/L knob should turn the tip from side to side. Check to make sure the knobs turn with ease and are not loose or cracked. See BTA skills on Mechanical – Attachment.
12	Do not force the distal end to angulate if it does not move freely.	If the tip does not angulate, DO NOT TRY TO FORCE IT. Angulation problems are usually a result of water damage or physical strain on the internal wires.
13	Physically inspect the insertion tube/bending section for bumps/bends/tears.	Run hand down the length of insertion tube from its connection to the control body down to the distal tip and objective lens. Physically feel and visually look for any holes, tears, wrinkles, buckles, bends, etc.
14	If these exist, the problem is internal and the device must be sent out for repair.	If any external damage exists on the insertion tube, it should be replaced. Do not attempt to repair the insertion tube with epoxy/sealant, as this could damage the device further or put the patient at serious risk.
15	Is the monitor functioning correctly? (Skip this step if image is viewed through eyepiece only).	If the endoscope is connected to a monitor for viewing: Check display on monitor. The image should appear as it does through the eyepiece.
16	Does the image appear on the monitor?	Does the monitor display an image?
17	Ensure the monitor is connected to the power supply. Troubleshoot power supply if necessary.	Make sure the monitor is powered on, connected to a power source. See flowchart for Power Supply and BTA skills on Power Supply.
18	Ensure cables are connected to correct ports.	Check that the “video out” cable from the endoscope is connected to the “video in” port on the monitor. Make sure the connection is tight, and that the wire is undamaged. See BTA skills on Electrical Simple.
19	Ensure correct video signal source is selected.	Check monitor settings for the input source. If “NO SIGNAL” appears on the monitor, cycle through input sources until an image appears.
20	Reset all monitor settings (brightness, color, contrast) to default settings.	Default all monitor display settings.
21	Does the image remain on the screen without flickering/rolling?	Once an image appears, does it remain on the screen? The display should not bounce, flicker, or roll across the monitor.
22	Ensure all cables and connectors are securely connected, and in	Tighten all connections on endoscope and monitor. Make sure there are no tears in the wires. See BTA skills on Electrical Simple.

	good condition.	
23	If image is rolling, turn the VERTICAL HOLD (V-HOLD) knob slowly until the image becomes stable.	If there are lines rolling across the monitor or the display is unsteady, locate the Vertical Hold knob/button on the back of the monitor. Adjust this setting slowly until the image no longer jumps.
24	Device is working properly.	The endoscope is in good working condition.