

Identifying and Reducing Preventable Flexible Endoscope Repairs





Disclaimer

This reference guide presents examples of major endoscope leak damages that can occur. Preventive methods are also recommended to extend the use of your Olympus endoscopes.

Before operating or reprocessing any endoscope, please read the endoscope and ancillary equipment Instructions for Use.

If you have any questions or comments about this document, call the Olympus Technical Assistance Center (TAC) at (800) 848-9024, Option 1.

If you are viewing this document electronically, please note that section title references and page number references contain hyperlinks. Click the reference to be brought directly to the referenced page.

The information contained within this document has been written to the best of our knowledge at the date of publication. This material should not be considered as a substitute for carefully reading all applicable labeling, including the Instructions for Use (IFU) supplied with the devices and published, peer-reviewed articles concerning the topics presented.



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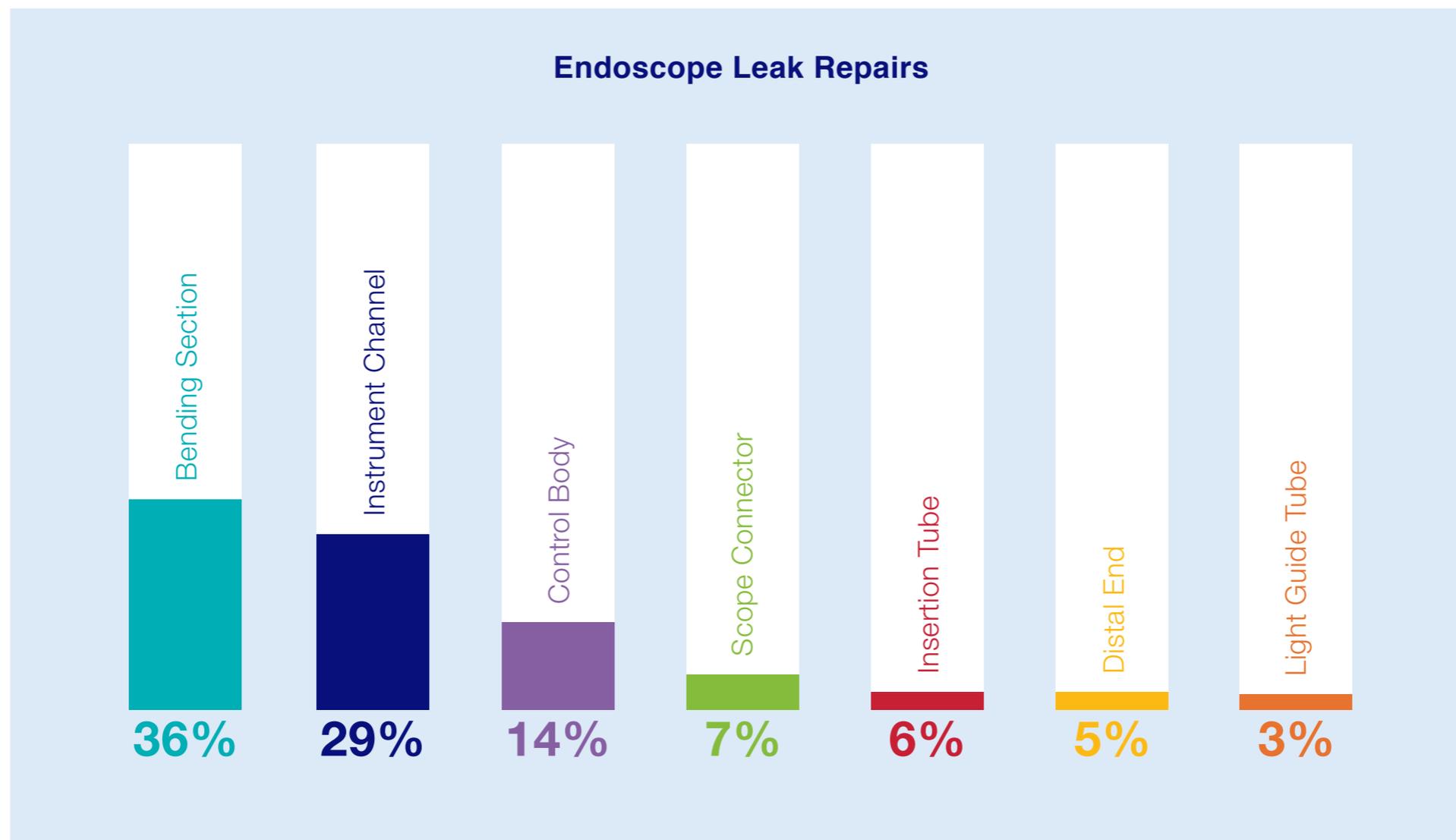
Components Susceptible to Serious Damage..... 6



Endoscope Leak Repairs

Introduction

The chart below is a damage analysis of common leaks that occurred in endoscopes in 2019. These leaks can cause fluid invasion, which can lead to more costly repairs.



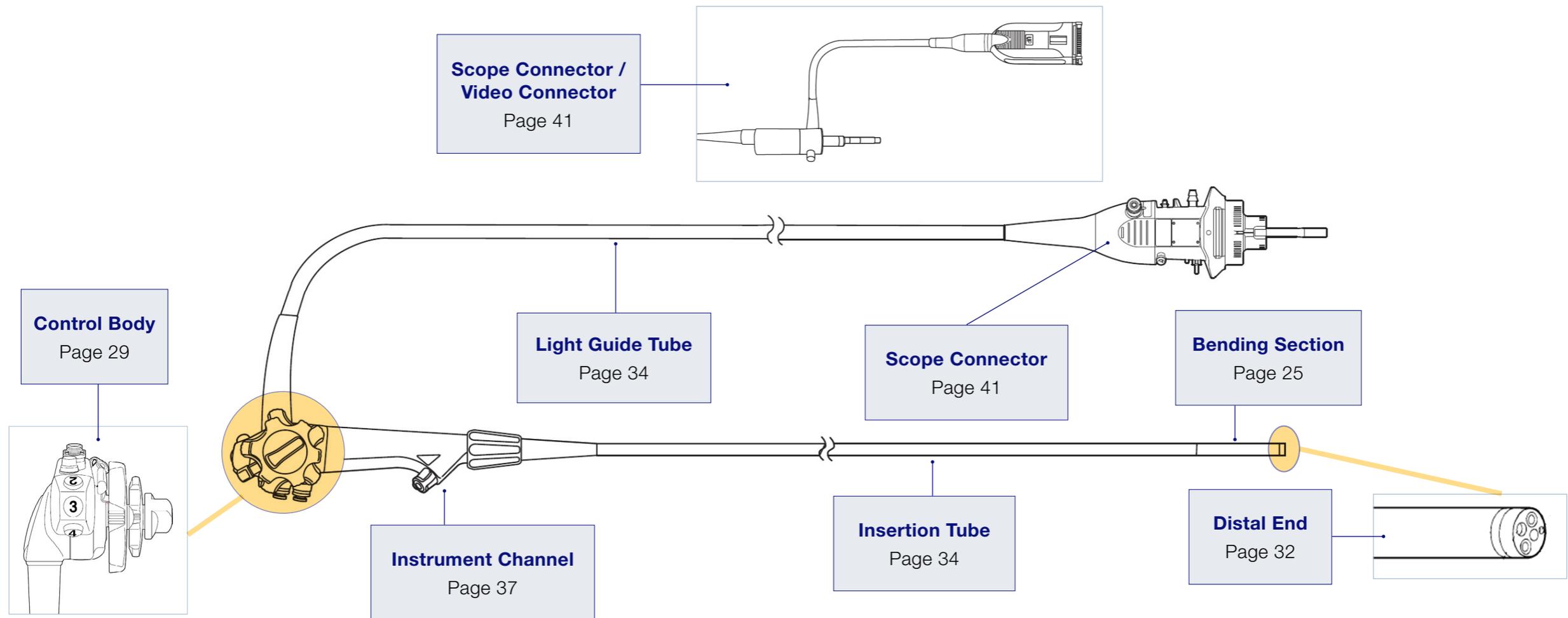


Components Susceptible to Serious Damage

Introduction

The diagram below shows endoscope sections that are susceptible to severe damage that could lead to further malfunction. This diagram will also help you navigate through this document. Under each component description is the name and page number of the topic describing the potential damage for a particular component.

Leaks are the #1 reason endoscopes are sent in for repair. The good news is that most leaks are preventable with effective care and handling techniques.





Details by Scope Type

This section includes a breakdown of leak issues for each scope type listed below, as well as recommendations for how to minimize each scope's most common leak issues.

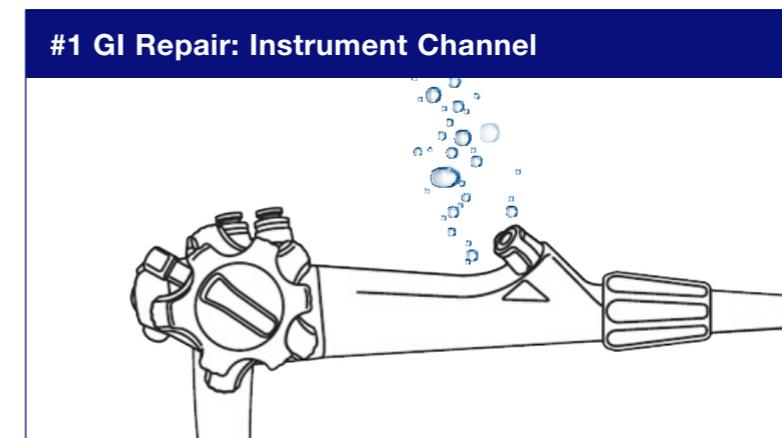
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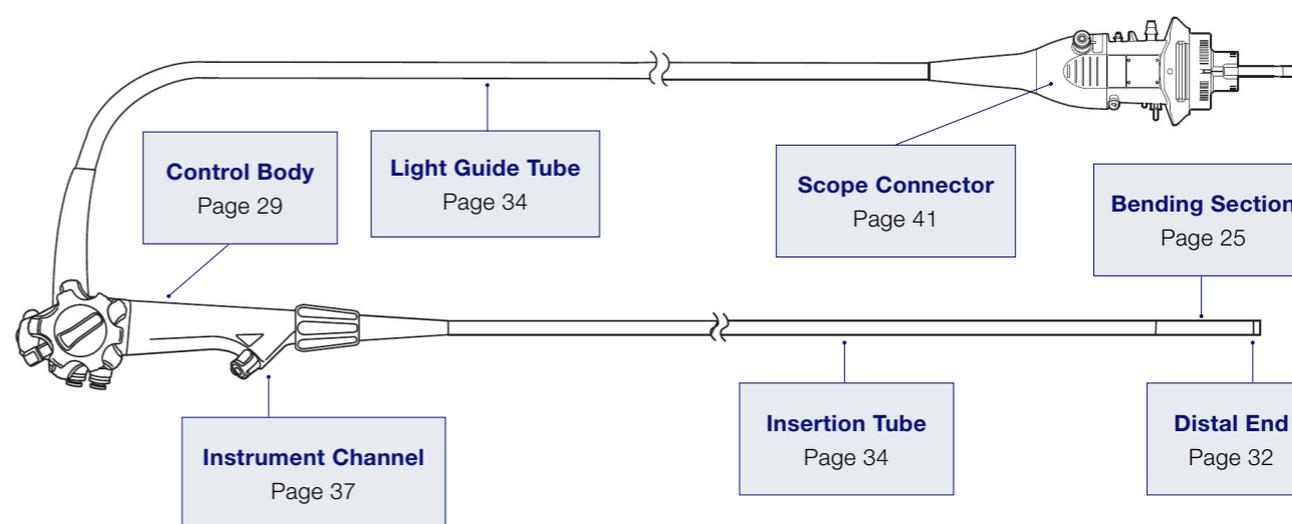
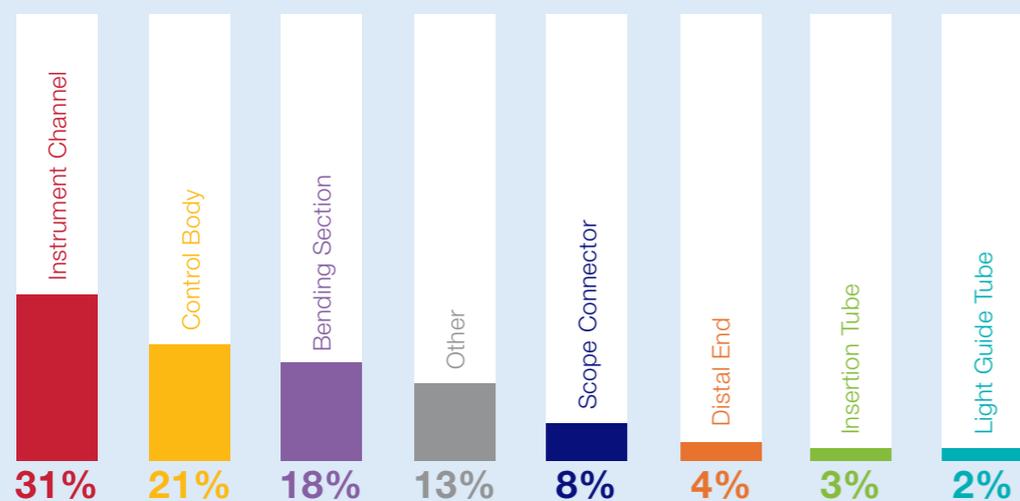
GI Videoscopes (CF/PCF/SIF/GIF)

Details by Scope Type

Gastrosopes are indicated for use within the upper digestive track (including the esophagus, stomach, and duodenum). Colonoscopes are indicated for use within the lower digestive track (including the anus, rectum, sigmoid colon, colon, and ileo-cecal valve).



GI Scopes





GI Videoscopes (CF/PCF/SIF/GIF)

Details by Scope Type



Here are the top 3 repairs and recommendations

How can you make a difference?

GI Videoscopes (CF/PCF/SIF/GIF)

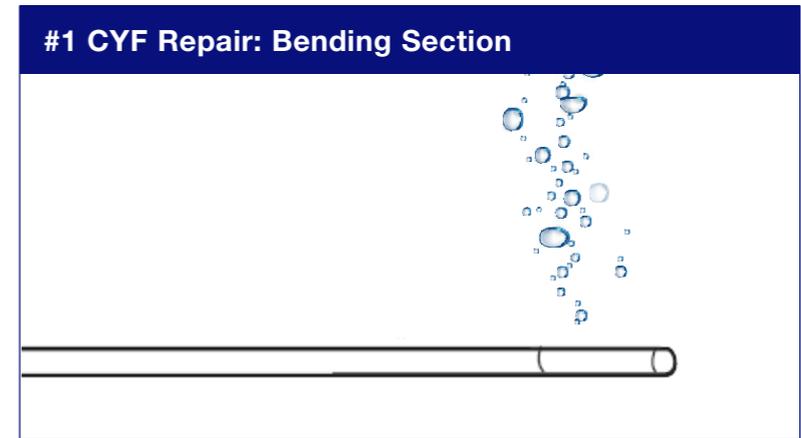
Scope Location	Cause of Damage	Recommendations
Instrument Channel	<p>Damage and leaks may occur by:</p> <ul style="list-style-type: none"> Prematurely advancing an injector needle outside the sheath while still in the channel Forcing an accessory through any channel can damage that channel and the scope Placing excessive pressure on biopsy forceps handle while in the channel can cause a “rigid” tip. May result in difficult passage of forceps through the channel, as well as biopsy channel damage. 	<ul style="list-style-type: none"> REDUCE scope loops before passing accessories through the instrument channel. Insert biopsy forceps straight into the instrument channel with the CUPS CLOSED. INSPECT all EndoTherapy devices/brushes prior to use for good form, function and channel size compatibility. DO NOT advance the injector needle past the protective plastic sheath while still inside of the scope channel. DO NOT force an accessory through the instrument channel of the scope.
Control Body	<p>Damage and leaks may occur through:</p> <ul style="list-style-type: none"> Impact Improper or unstable positioning of scope Improper storage of scope 	<ul style="list-style-type: none"> MINIMIZE scope stacking. When stacking is necessary, ensure control body and switch units do not contact any sharp accessories. DO properly position scopes and secure prior to use; control knobs up if applicable. CAREFULLY REMOVE and place scopes in storage cabinets to minimize impact with other scopes or cabinet. DO NOT position the scope with control knobs down.
Bending Section	<p>Damage and leaks may occur by:</p> <ul style="list-style-type: none"> Placing sharp items on or around the bending section of the scope 	<ul style="list-style-type: none"> Transport scopes in SEPARATE BINS. MINIMIZE scope stacking. When stacking is necessary, ensure the light guide connector is not placed directly on top of any section of the insertion tube or bending section covering. DO NOT transport, store, or reprocess scopes with accessories.



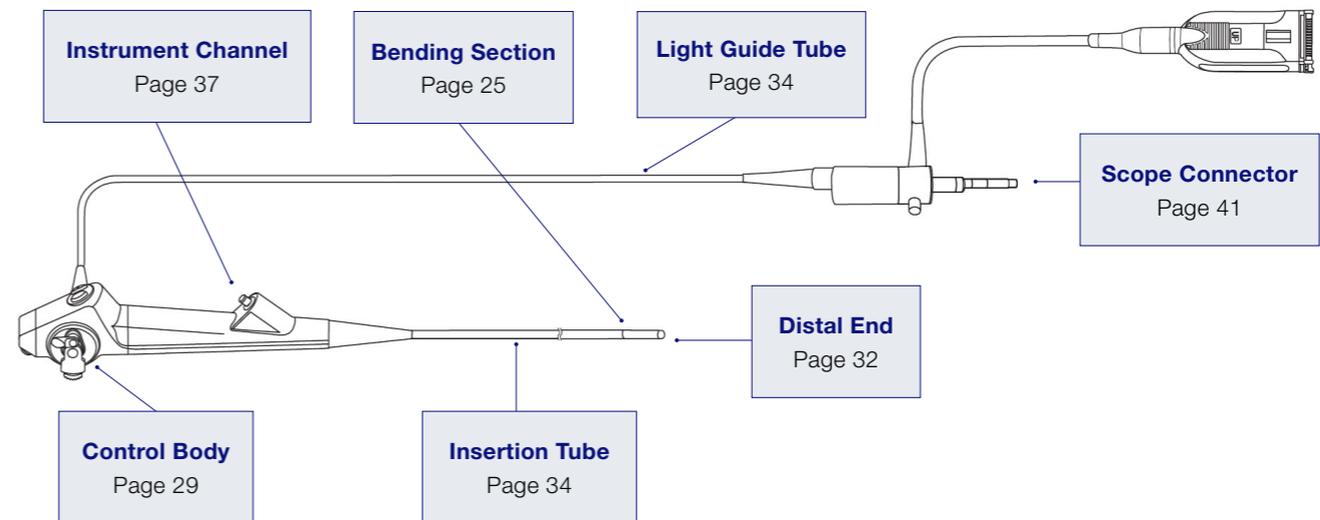
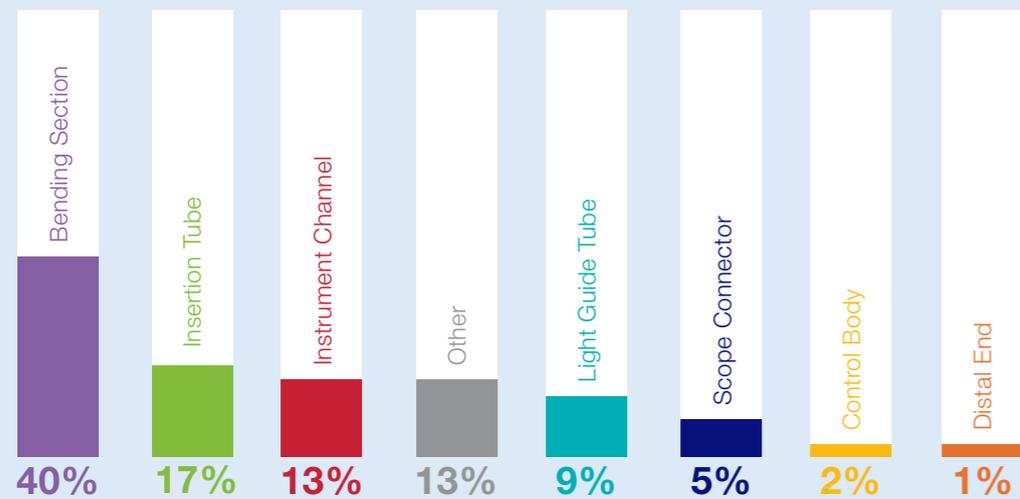
Cystoscopes – Video and Fiber (CYF)

Details by Scope Type

Cystoscopes (CYF) are used for treatment within the bladder, urethra, and kidney.



Cystoscopes – Video and Fiber (CYF)





Cystoscopes – Video and Fiber (CYF)

Details by Scope Type



Here are the top 3 repairs and recommendations

How can you make a difference?

Cystoscopes – Video and Fiber (CYF)

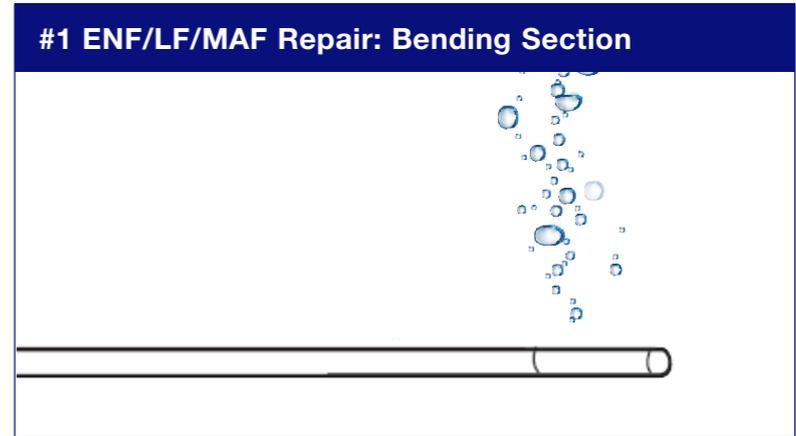
Scope Location	Cause of Damage	Recommendations
Bending Section	Damage and leaks may occur by: <ul style="list-style-type: none"> Placing sharp items on or around the bending section of the scope 	<ul style="list-style-type: none"> Transport scopes in SEPARATE BINS. MINIMIZE scope stacking. When stacking is necessary, ensure the light guide connector is not placed directly on top of any section of the insertion tube or bending section covering. DO NOT transport, store, or reprocess scopes with accessories.
Insertion Tube	Damage and leaks may occur by: <ul style="list-style-type: none"> Patients biting the scope during procedures Impact/scraping during transport, handling, and storage 	<ul style="list-style-type: none"> DO use appropriate bite blocks on upper endoscopy procedures. DO transport, store, and reprocess scopes carefully without any sharp objects/accessories. DO NOT position or store scopes next to pinch points.
Instrument Channel	Damage and leaks may occur by: <ul style="list-style-type: none"> Prematurely advancing an injector needle outside the sheath while still in the channel Forcing an accessory through any channel can damage that channel and the scope Placing excessive pressure on biopsy forceps handle while in the channel can cause a “rigid” tip. May result in difficult passage of forceps through the channel, as well as biopsy channel damage. 	<ul style="list-style-type: none"> REDUCE scope loops before passing accessories through the instrument channel. Insert biopsy forceps straight into the instrument channel with the CUPS CLOSED. INSPECT all EndoTherapy devices/brushes prior to use for good form, function and channel size compatibility. DO NOT advance the injector needle past the protective plastic sheath while still inside of the scope channel. DO NOT force an accessory through the instrument channel of the scope.



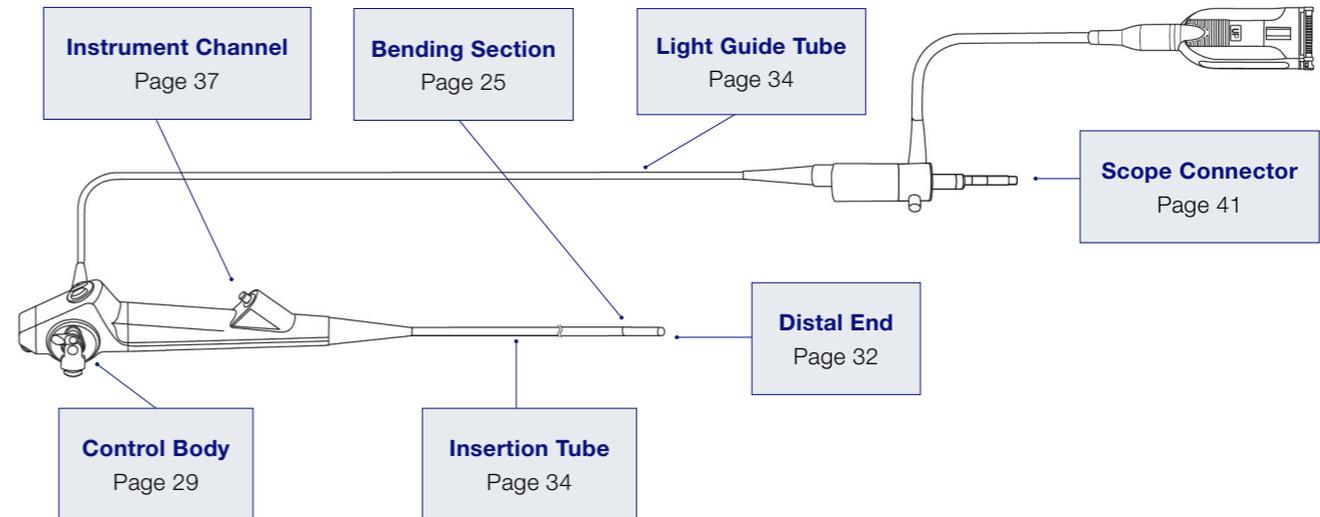
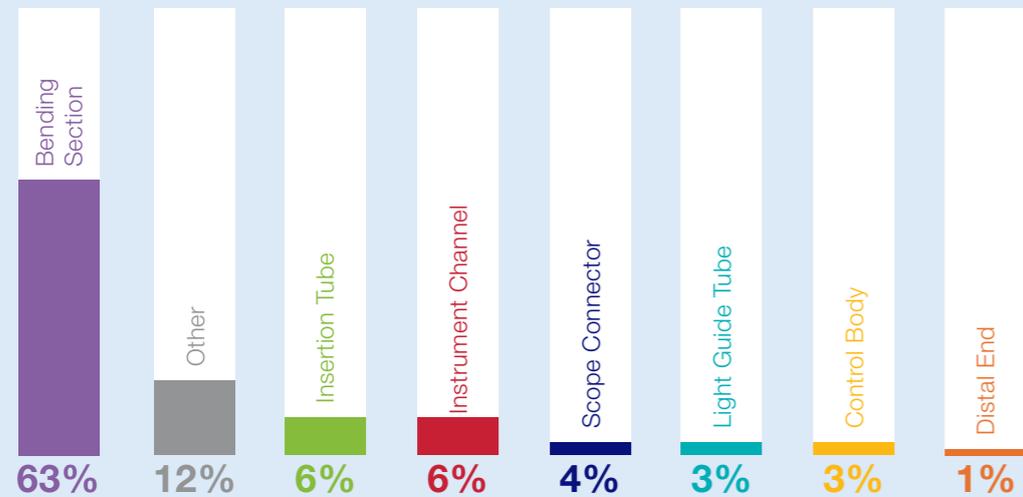
Rhinology (ENF) and Intubation Scopes (LF/MAF)

Details by Scope Type

Rhinolaryngoscopes (ENF) are used for diagnosis within the nasal lumens and airway anatomy (including nasopharyngeal and trachea). Intubation endoscopes are used for observation to access airway anatomy, endotracheal/endobronchial intubation and management.



Rhinology and Intubation Scopes





Rhinolaryngo (ENF) and Intubation Scopes (LF/MAF)

Details by Scope Type



Here are the top 3 repairs and recommendations

How can you make a difference?

Rhinolaryngo (ENF) and Intubation Scopes (LF/MAF)

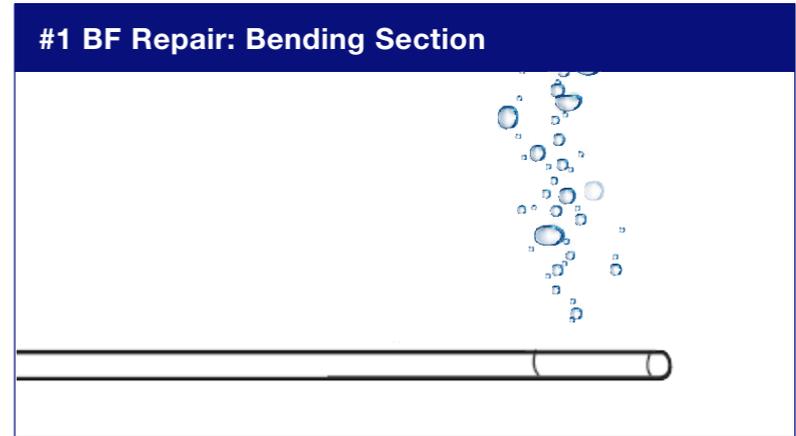
Scope Location	Cause of Damage	Recommendations
Bending Section	<p>Damage and leaks may occur by:</p> <ul style="list-style-type: none"> Placing sharp items on or around the bending section of the scope 	<ul style="list-style-type: none"> Transport scopes in SEPARATE BINS. MINIMIZE scope stacking. When stacking is necessary, ensure the light guide connector is not placed directly on top of any section of the insertion tube or bending section covering. DO NOT transport, store, or reprocess scopes with accessories.
Instrument Channel	<p>Damage and leaks may occur by:</p> <ul style="list-style-type: none"> Prematurely advancing an injector needle outside the sheath while still in the channel Forcing an accessory through any channel can damage that channel and the scope Placing excessive pressure on biopsy forceps handle while in the channel can cause a “rigid” tip. May result in difficult passage of forceps through the channel, as well as biopsy channel damage. 	<ul style="list-style-type: none"> REDUCE scope loops before passing accessories through the instrument channel. Insert biopsy forceps straight into the instrument channel with the CUPS CLOSED. INSPECT all EndoTherapy devices/brushes prior to use for good form, function and channel size compatibility. DO NOT advance the injector needle past the protective plastic sheath while still inside of the scope channel. DO NOT force an accessory through the instrument channel of the scope.
Insertion Tube	<p>Damage and leaks may occur by:</p> <ul style="list-style-type: none"> Patients biting the scope during procedures Impact/scraping during transport, handling, and storage 	<ul style="list-style-type: none"> DO use appropriate bite blocks on upper endoscopy procedures. DO transport, store, and reprocess scopes carefully without any sharp objects/accessories. DO NOT position or store scopes next to pinch points.



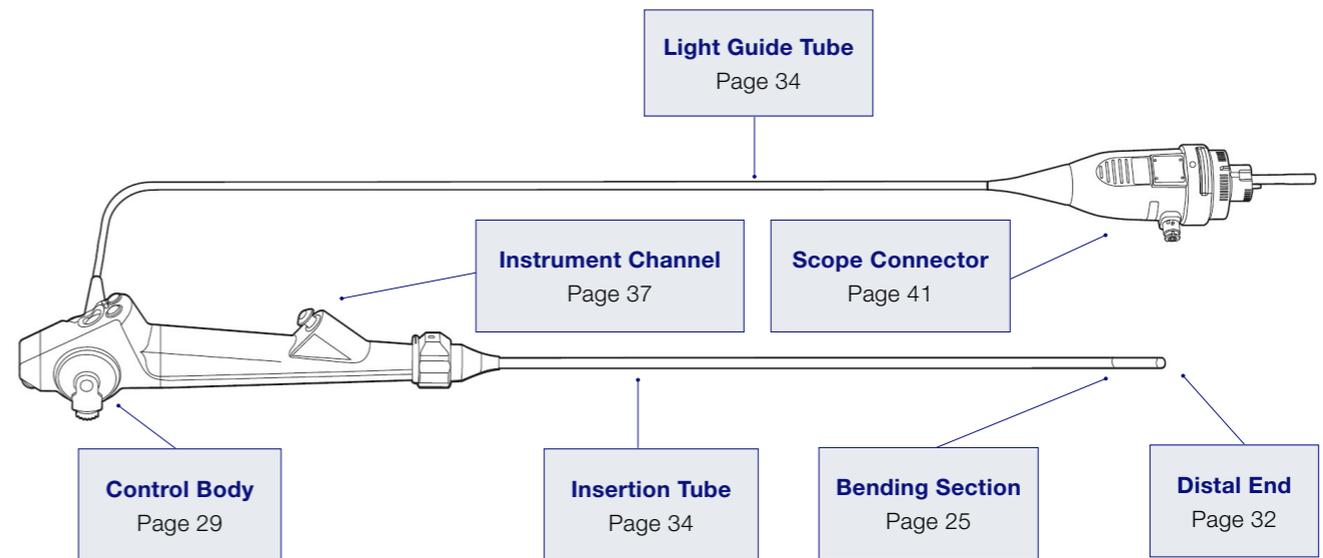
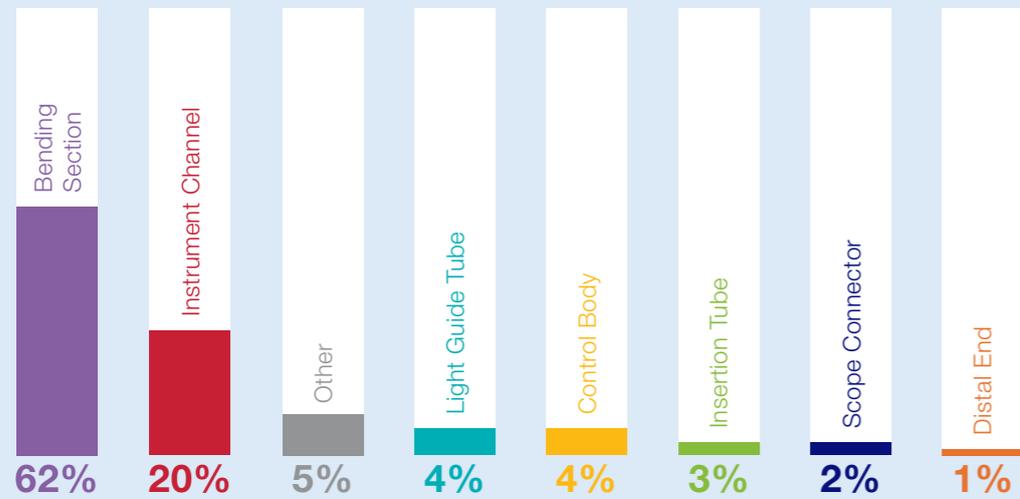
Bronchoscopes (BF)

Details by Scope Type

Bronchoscopes (BF) are used within the airways and tracheobronchial tree.



Bronchoscopes





Bronchoscopes (BF)

Details by Scope Type



Here are the top 3 repairs and recommendations

How can you make a difference?

Bronchoscopes (BF)

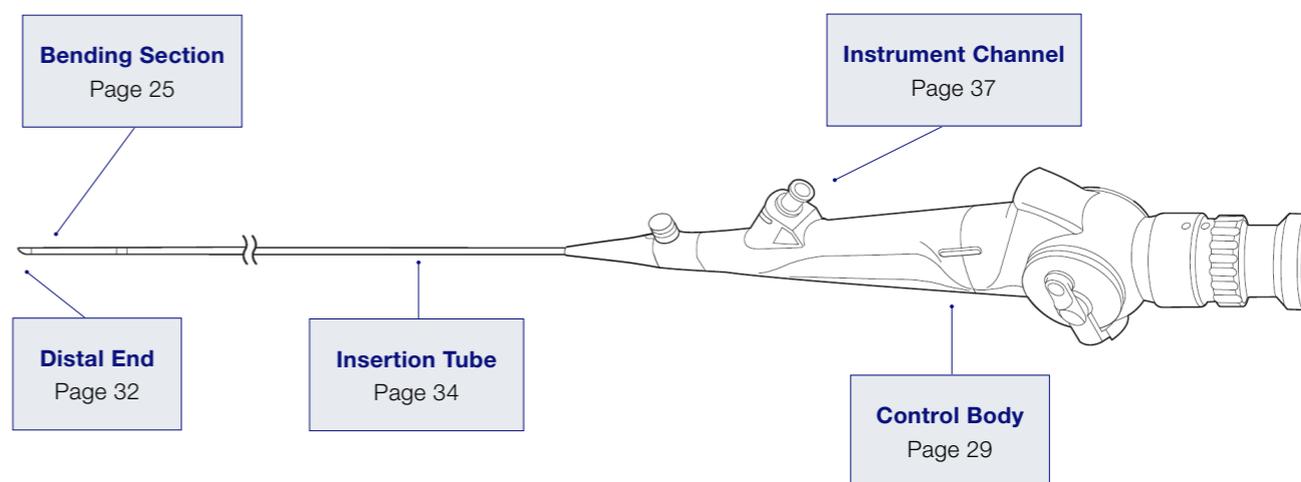
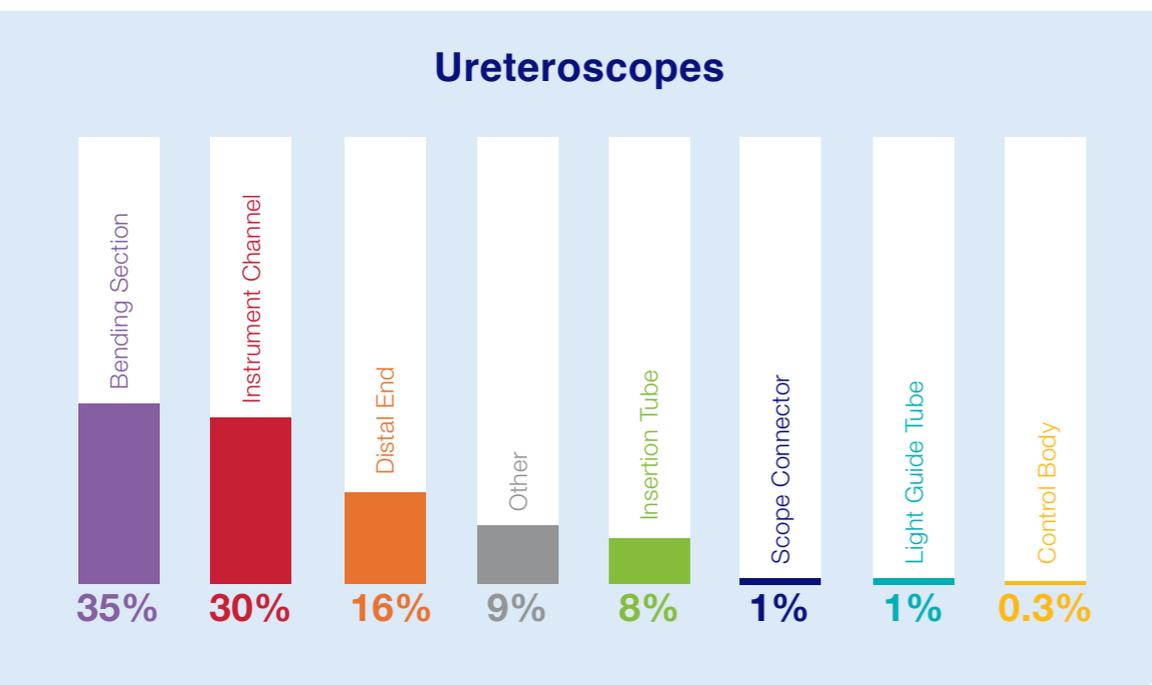
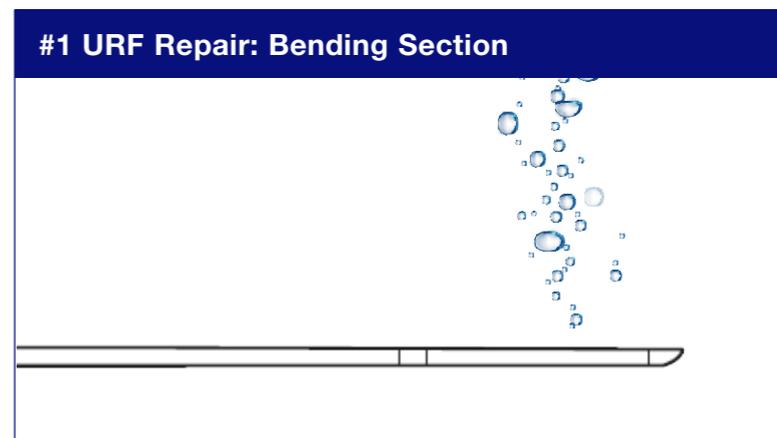
Scope Location	Cause of Damage	Recommendations
Bending Section	<p>Damage and leaks may occur by:</p> <ul style="list-style-type: none"> Placing sharp items on or around the bending section of the scope 	<ul style="list-style-type: none"> Transport scopes in SEPARATE BINS. MINIMIZE scope stacking. When stacking is necessary, ensure the light guide connector is not placed directly on top of any section of the insertion tube or bending section covering. DO NOT transport, store, or reprocess scopes with accessories.
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Control Body	<p>Damage and leaks may occur through:</p> <ul style="list-style-type: none"> Impact Improper or unstable positioning of scope Improper storage of scope 	<ul style="list-style-type: none"> MINIMIZE scope stacking. When stacking is necessary, ensure control body and switch units do not contact any sharp accessories. DO properly position scopes and secure prior to use; control knobs up if applicable. CAREFULLY REMOVE and place scopes in storage cabinets to minimize impact with other scopes or cabinet. DO NOT position the scope with control knobs down.



Ureteroscopes – Video and Fiber (URF)

Details by Scope Type

Ureteroscopes (URF) are used for diagnosis and treatment within the ureter and kidney.





Ureteroscopes – Video and Fiber (URF)

Details by Scope Type



Here are the top 3 repairs and recommendations

How can you make a difference?

Ureteroscopes – Video and Fiber (URF)

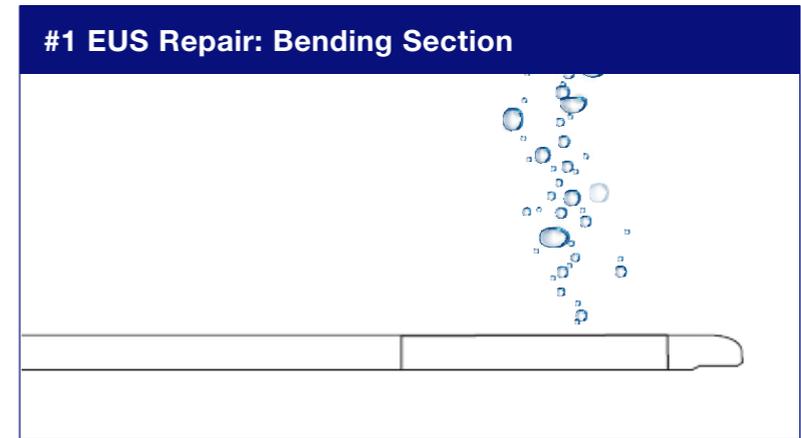
Scope Location	Cause of Damage	Recommendations
Bending Section	<p>Damage and leaks may occur by:</p> <ul style="list-style-type: none"> Placing sharp items on or around the bending section of the scope 	<ul style="list-style-type: none"> Transport scopes in SEPARATE BINS. MINIMIZE scope stacking. When stacking is necessary, ensure the light guide connector is not placed directly on top of any section of the insertion tube or bending section covering. DO NOT transport, store, or reprocess scopes with accessories.
Instrument Channel	<p>Damage and leaks may occur by:</p> <ul style="list-style-type: none"> Prematurely advancing an injector needle outside the sheath while still in the channel Forcing an accessory through any channel can damage that channel and the scope Placing excessive pressure on biopsy forceps handle while in the channel can cause a “rigid” tip. May result in difficult passage of forceps through the channel, as well as biopsy channel damage. 	<ul style="list-style-type: none"> REDUCE scope loops before passing accessories through the instrument channel. Insert biopsy forceps straight into the instrument channel with the CUPS CLOSED. INSPECT all EndoTherapy devices/brushes prior to use for good form, function and channel size compatibility. DO NOT advance the injector needle past the protective plastic sheath while still inside of the scope channel. DO NOT force an accessory through the instrument channel of the scope.
Distal End	<p>Damage and leaks may occur by:</p> <ul style="list-style-type: none"> Striking the distal end on a hard surface Dropping the scope on the floor Impact when placing or removing scope from storage cabinet 	<ul style="list-style-type: none"> DO properly position and secure the scope secure prior to use. DO protect the distal end when placing scope in, or removing scope from, a storage cabinet. DO use distal tip protectors. DO NOT drop the scope while handling.



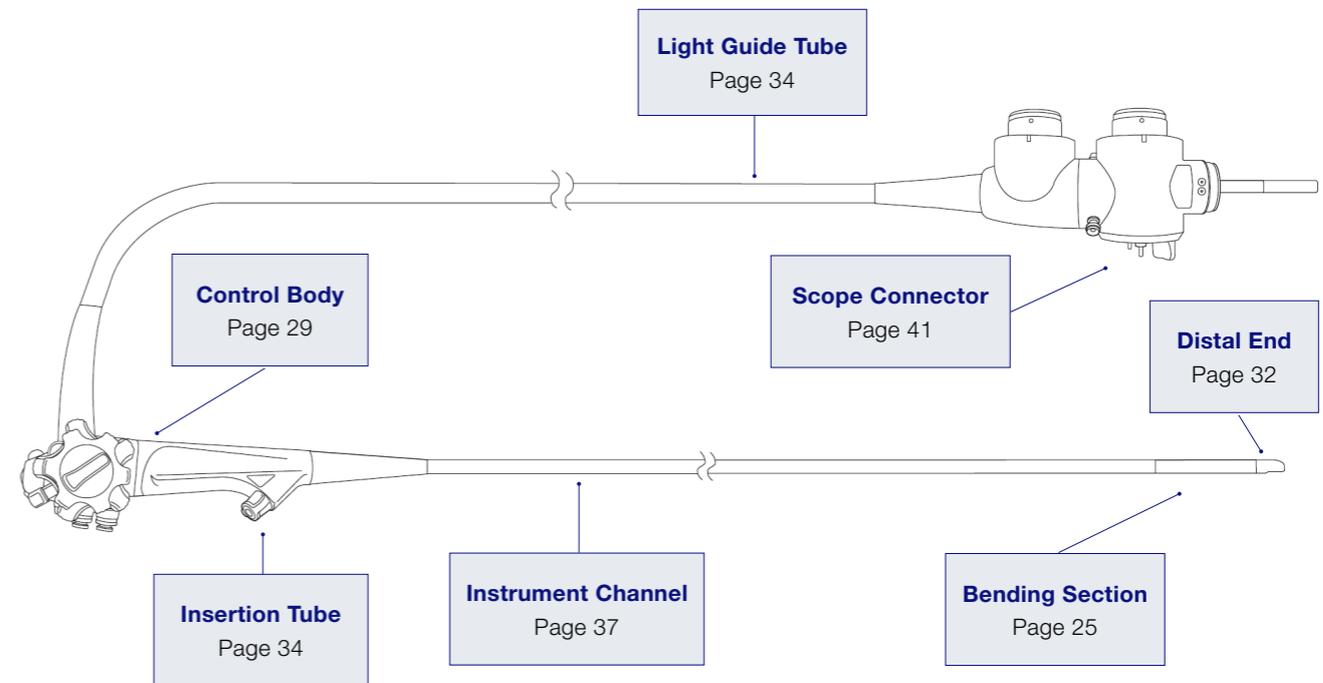
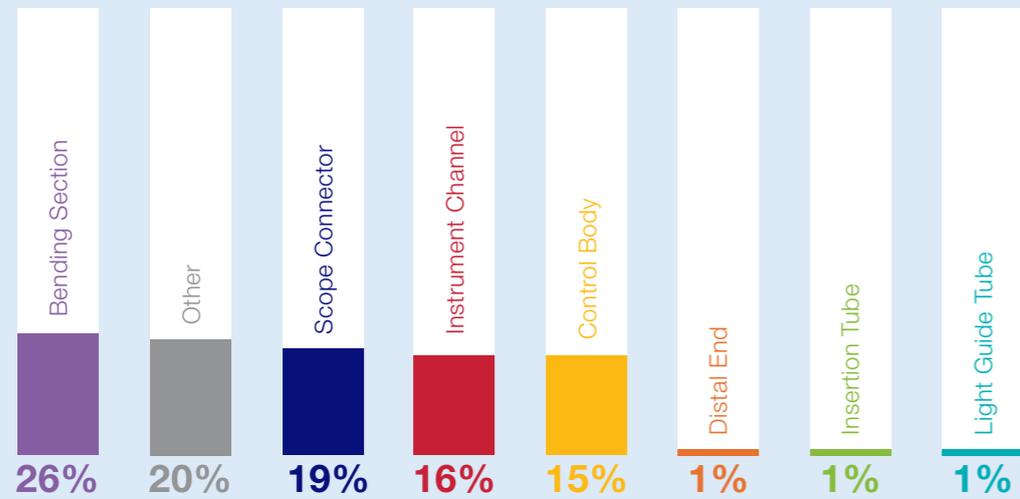
Ultrasound Gastrovideoscopes (EUS)

Details by Scope Type

Ultrasound Gastrovideoscopes (EUS) are used for real-time ultrasound imaging, ultrasound guided needle aspiration, and other endoscopic procedures within the upper gastrointestinal tract and surrounding organs.



Ultrasound Gastrovideoscopes





Ultrasound Gastrovideoscopes (EUS)

Details by Scope Type



Here are the top 3 repairs and recommendations

How can you make a difference?

Ultrasound Gastrovideoscopes (EUS)

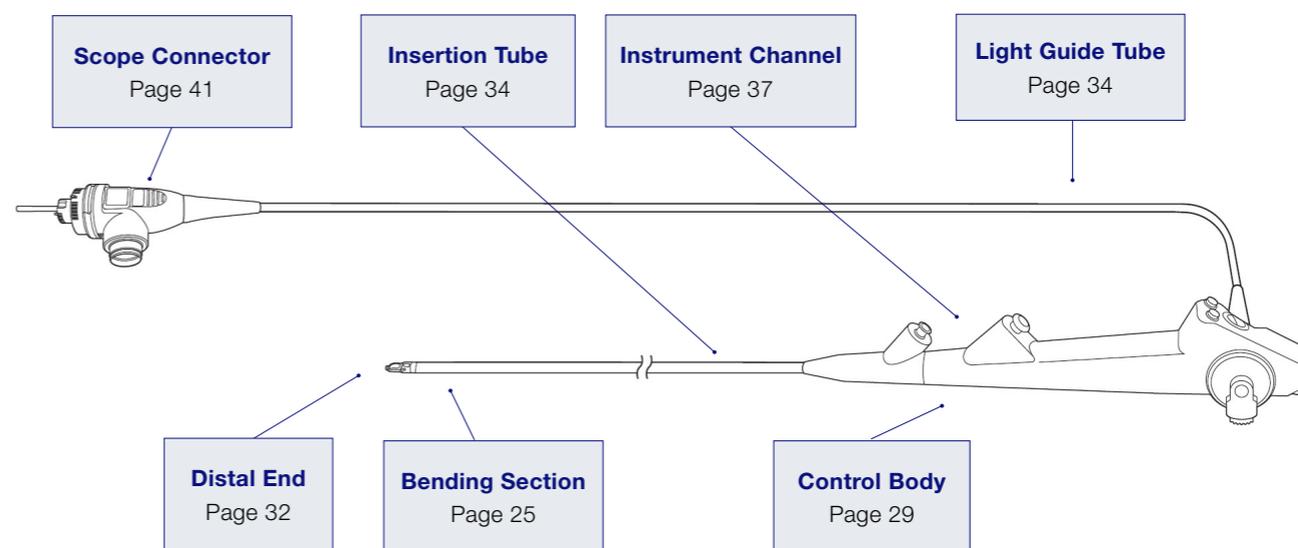
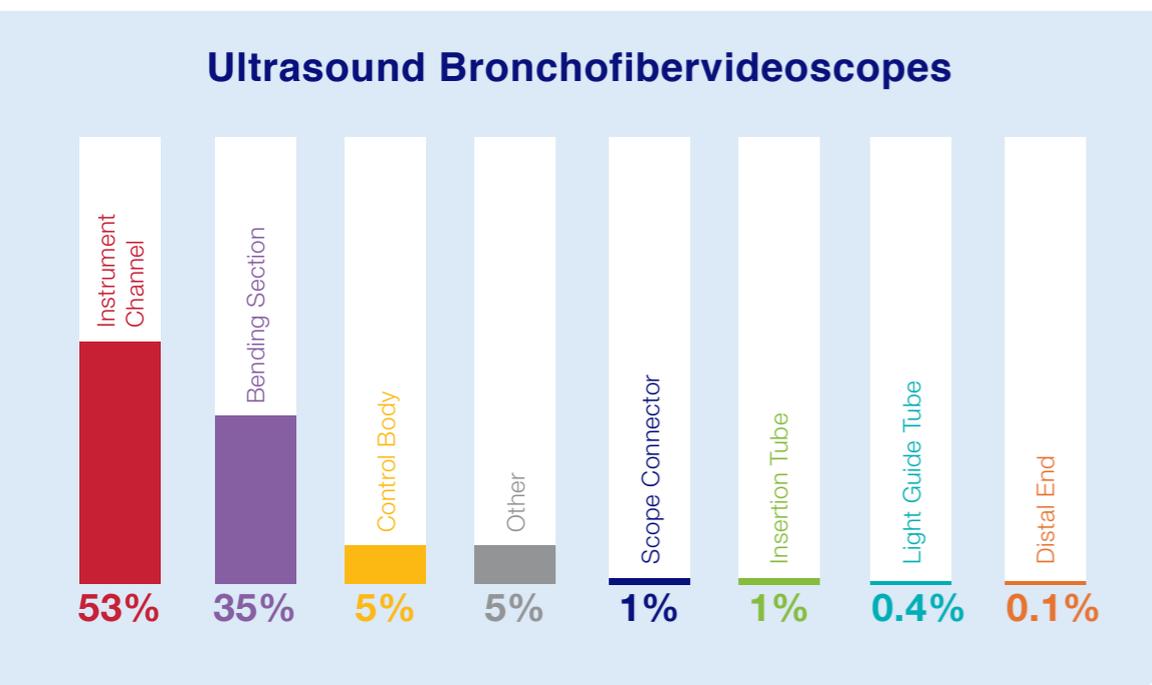
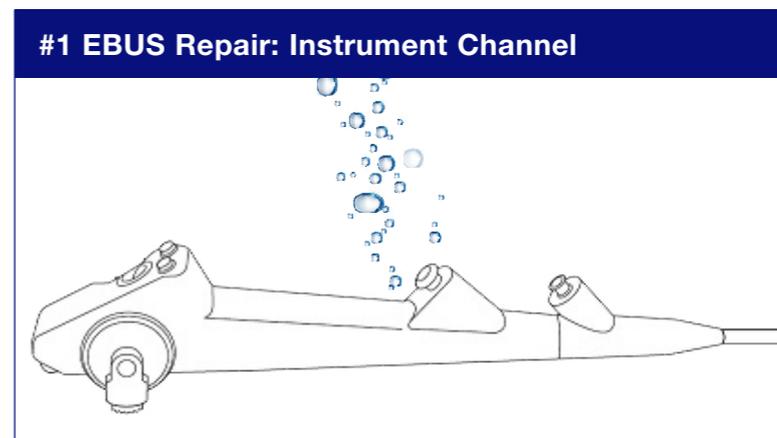
Scope Location	Cause of Damage	Recommendations
Bending Section	<p>Damage and leaks may occur by:</p> <ul style="list-style-type: none"> Placing sharp items on or around the bending section of the scope 	<ul style="list-style-type: none"> Transport scopes in SEPARATE BINS. MINIMIZE scope stacking. When stacking is necessary, ensure the light guide connector is not placed directly on top of any section of the insertion tube or bending section covering. DO NOT transport, store, or reprocess scopes with accessories.
Scope Connector	<p>Damage and leaks may occur through:</p> <ul style="list-style-type: none"> Impact during procedures Improper handling/transport 	<ul style="list-style-type: none"> PROPERLY POSITION the scope in the procedure room to minimize light guide tube stress and impact. CAREFULLY INSPECT and attach accessories such as air/water bottle connectors. DO NOT allow the scope to drop while handling. DO NOT lean or apply pressure on scope connector while plugged into the processor.
Instrument Channel	<p>Damage and leaks may occur by:</p> <ul style="list-style-type: none"> Prematurely advancing an injector needle outside the sheath while still in the channel Forcing an accessory through any channel can damage that channel and the scope Placing excessive pressure on biopsy forceps handle while in the channel can cause a “rigid” tip. May result in difficult passage of forceps through the channel, as well as biopsy channel damage. 	<ul style="list-style-type: none"> REDUCE scope loops before passing accessories through the instrument channel. Insert biopsy forceps straight into the instrument channel with the CUPS CLOSED. INSPECT all EndoTherapy devices/brushes prior to use for good form, function and channel size compatibility. DO NOT advance the injector needle past the protective plastic sheath while still inside of the scope channel. DO NOT force an accessory through the instrument channel of the scope.



Ultrasound Bronchofibervideoscopes (EBUS)

Details by Scope Type

Ultrasound Bronchofibervideoscopes (EBUS) are used for real-time ultrasound imaging, and for performing endoscopic ultrasound guided needle aspiration within the airways, tracheobronchial tree, esophagus, and surrounding organs.





Ultrasound Bronchofibervideoscopes (EBUS)

Details by Scope Type



Here are the top 3 repairs and recommendations

How can you make a difference?

Ultrasound Bronchofibervideoscopes (EBUS)

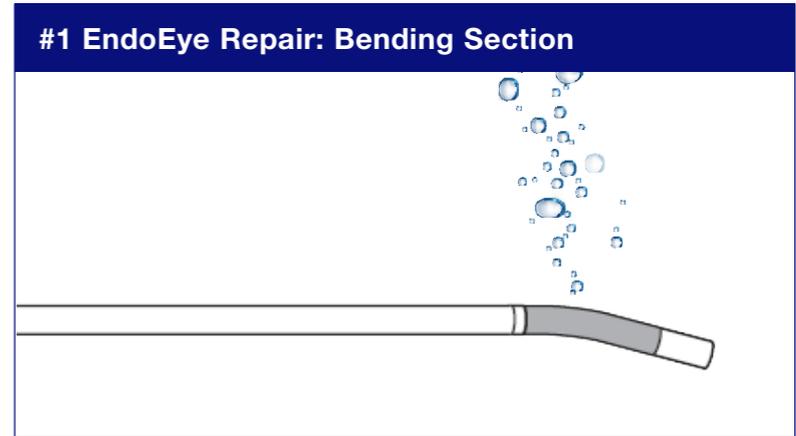
Scope Location	Cause of Damage	Recommendations
Instrument Channel	<p>Damage and leaks may occur by:</p> <ul style="list-style-type: none"> Prematurely advancing an injector needle outside the sheath while still in the channel Forcing an accessory through any channel can damage that channel and the scope Placing excessive pressure on biopsy forceps handle while in the channel can cause a “rigid” tip. May result in difficult passage of forceps through the channel, as well as biopsy channel damage. 	<ul style="list-style-type: none"> REDUCE scope loops before passing accessories through the instrument channel. Insert biopsy forceps straight into the instrument channel with the CUPS CLOSED. INSPECT all EndoTherapy devices/brushes prior to use for good form, function and channel size compatibility. DO NOT advance the injector needle past the protective plastic sheath while still inside of the scope channel. DO NOT force an accessory through the instrument channel of the scope.
Bending Section	<p>Damage and leaks may occur by:</p> <ul style="list-style-type: none"> Placing sharp items on or around the bending section of the scope 	<ul style="list-style-type: none"> Transport scopes in SEPARATE BINS. MINIMIZE scope stacking. When stacking is necessary, ensure the light guide connector is not placed directly on top of any section of the insertion tube or bending section covering. DO NOT transport, store, or reprocess scopes with accessories.
Control Body	<p>Damage and leaks may occur through:</p> <ul style="list-style-type: none"> Impact Improper or unstable positioning of scope Improper storage of scope 	<ul style="list-style-type: none"> MINIMIZE scope stacking. When stacking is necessary, ensure control body and switch units do not contact any sharp accessories. DO properly position scopes and secure prior to use; control knobs up if applicable. CAREFULLY REMOVE and place scopes in storage cabinets to minimize impact with other scopes or cabinet. DO NOT position the scope with control knobs down.



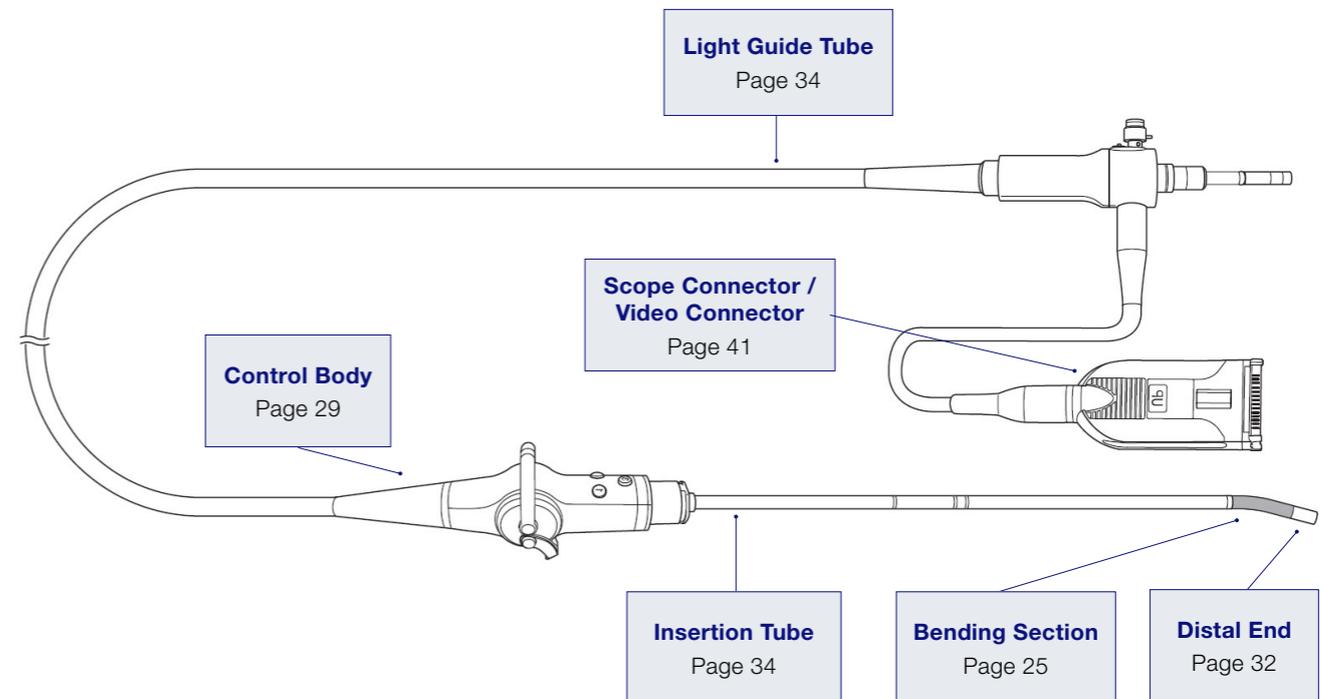
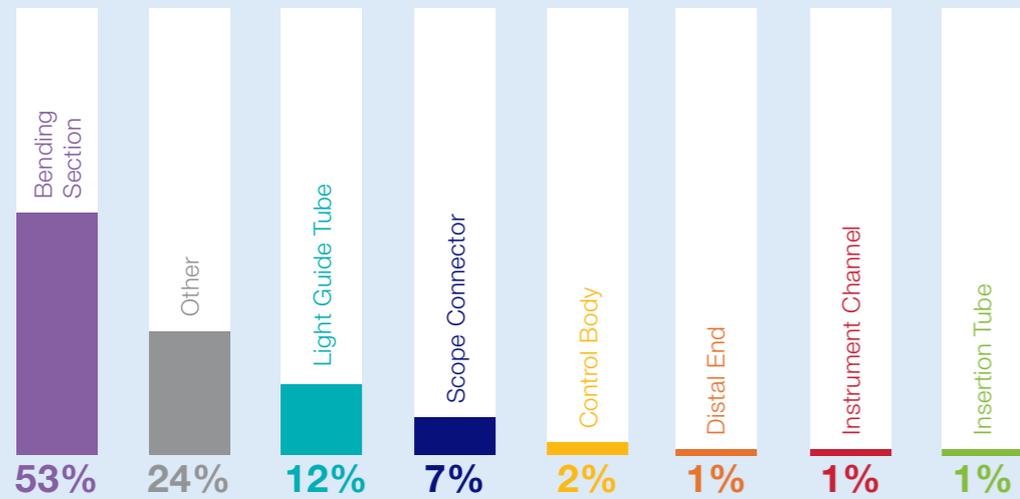
EndoEye Scopes

Details by Scope Type

EndoEye scopes are used for endoscopy and endoscopic surgery within the thoracic and abdominal cavities.



EndoEye Scopes





EndoEye Scopes

Details by Scope Type



Here are the top 3 repairs and recommendations

How can you make a difference?

EndoEye Scopes

Scope Location	Cause of Damage	Recommendations
Bending Section	Damage and leaks may occur by: <ul style="list-style-type: none"> Placing sharp items on or around the bending section of the scope 	<ul style="list-style-type: none"> Transport scopes in SEPARATE BINS. MINIMIZE scope stacking. When stacking is necessary, ensure the light guide connector is not placed directly on top of any section of the insertion tube or bending section covering. DO NOT transport, store, or reprocess scopes with accessories.
Light Guide Tube	Damage and leaks may occur through: <ul style="list-style-type: none"> Impact Scraping Undue stress on the light guide tube 	<ul style="list-style-type: none"> PROPERLY POSITION the scope in the procedure room to minimize light guide tube stress and impact. DO NOT stretch the light guide tube unnecessarily during procedures. DO NOT place, store, or transport the scope with sharp objects/ accessories that would come in contact with the light guide tube.
Scope Connector	Damage and leaks may occur through: <ul style="list-style-type: none"> Impact during procedures Improper handling/transport 	<ul style="list-style-type: none"> PROPERLY POSITION the scope in the procedure room to minimize light guide tube stress and impact. CAREFULLY INSPECT and attach accessories such as air/water bottle connectors. DO NOT allow the scope to drop while handling. DO NOT lean or apply pressure on scope connector while plugged into the processor.



Endoscope Damage and Preventive Measures

This section contains examples of preventive steps for the most common repairs in various parts of the scope. The scope figure at the beginning of each section has a highlighted area indicating which scope area will be discussed. Each type of damage is detailed showing preventive actions and causes of damage experienced when the preventive action is not taken.

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Bending Section

Endoscope Damage and Preventive Measures

Use of the endoscope with any of the conditions on the following pages may compromise scope integrity, causing possible damage to the scope (see examples at right).

The bending section is made from a thin, pliable material. A bending cover that has a hole in it, or that has been ruptured, may allow fluid to penetrate the opening during reprocessing, and therefore lead to problems with internal components. Small holes are difficult to detect during routine visual inspection. It may be challenging to determine how and when a hole was created.

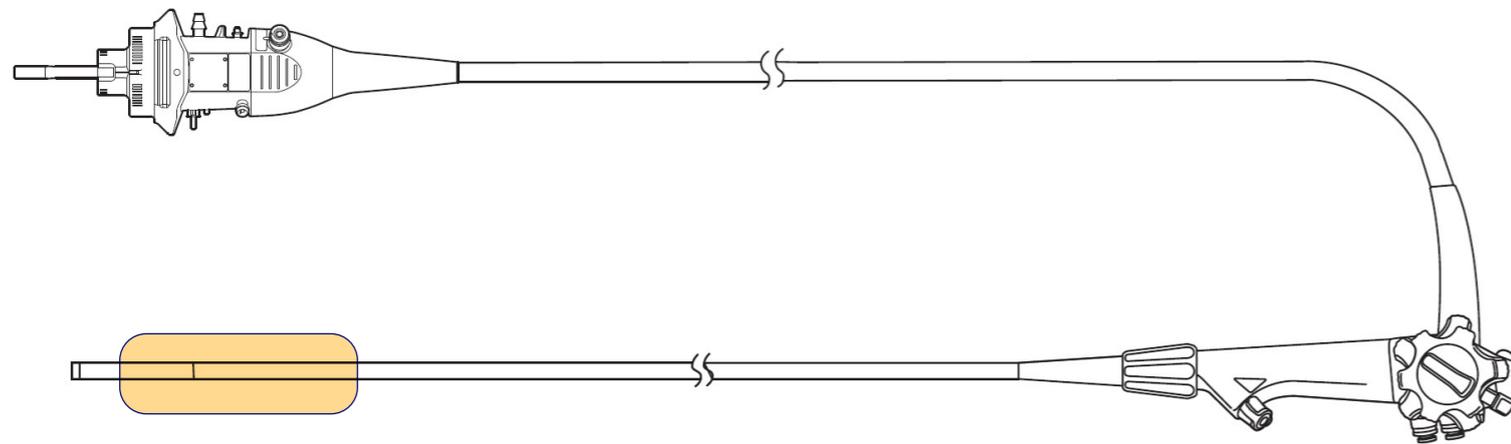
Before reprocessing an endoscope, perform a leak test as specified in the endoscope's instruction manual. For your convenience, the leak test procedure is explained at the end of this document.



Small Hole



Rupture



Do not use the endoscope, regardless of functionality, if any of the described conditions occur.

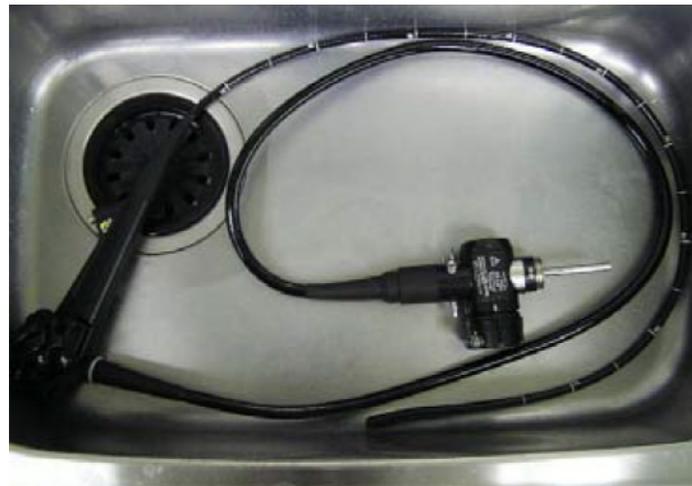


Bending Section: Holes and Cuts

Endoscope Damage and Preventive Measures

✔ Preventive Action:

Do not place endoscopes on top of one another or on top of any EndoTherapy accessories.



✘ Cause of Damage:

Stacking endoscopes on each other or with sharp accessories during transport or reprocessing may cause holes or cuts on the scope.



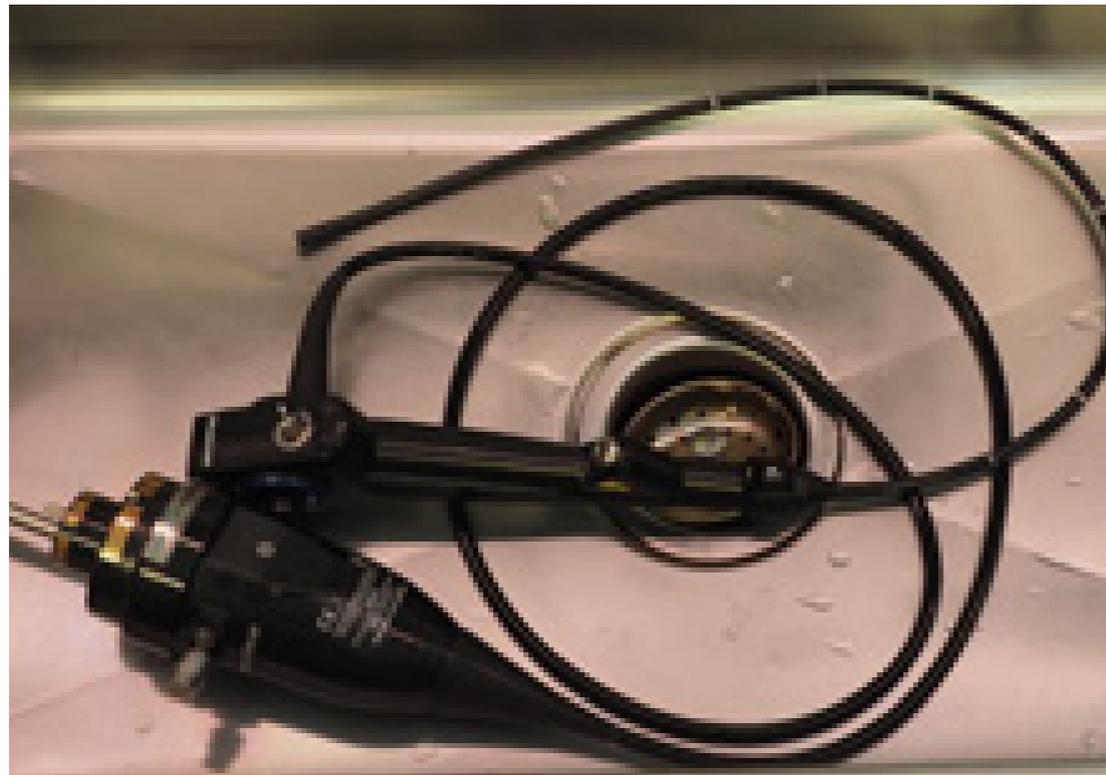
Make sure you don't transport your scope with accessories.

Bending Section: Holes and Cuts

Endoscope Damage and Preventive Measures

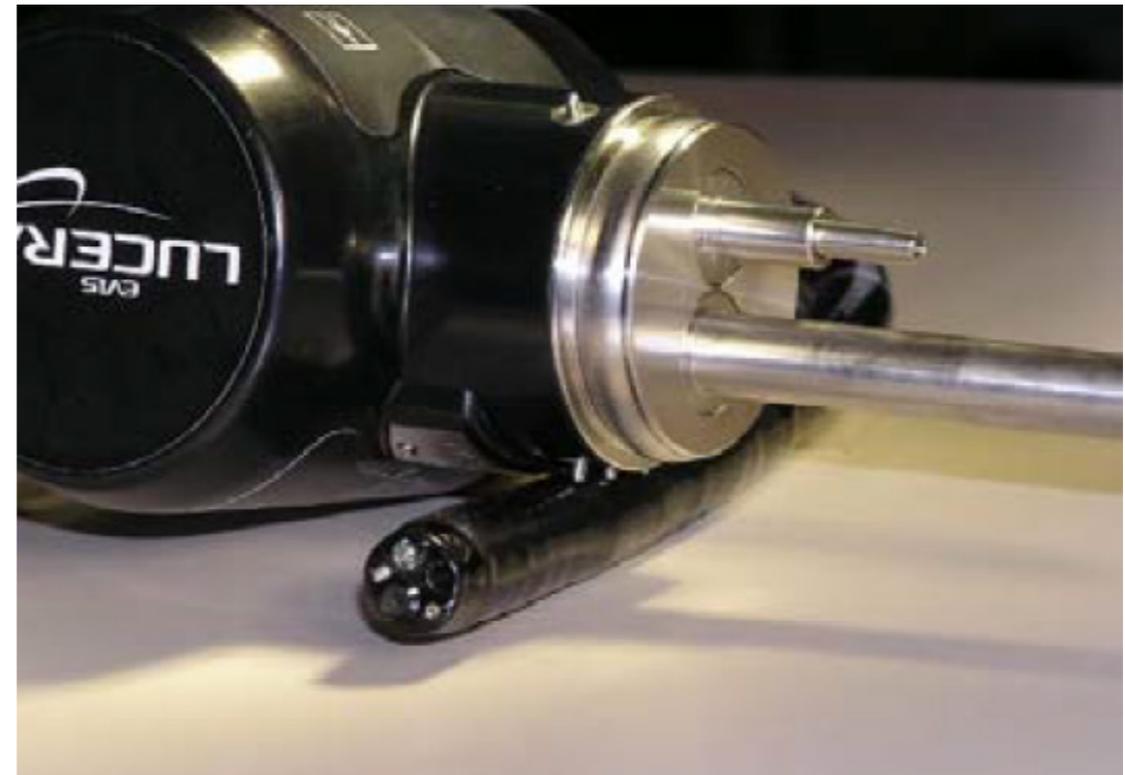
✔ Preventive Action:

Do not lay scope connector on the bending cover.



✘ Cause of Damage:

Pointed parts of the scope connector and sharp edges on the EndoTherapy accessories may damage the bending cover.



Bending Section: Holes and Cuts

Endoscope Damage and Preventive Measures

✔ Preventive Action:

Prior to a procedure:

1. Verify compatibility of the tracheal tube with the diameter of the endoscope.
2. Insert the insertion tube into the tracheal tube and verify that the insertion tube slides in and out easily.
3. Verify that the bending cover is not sagging.

Straightening out the bending cover will temporarily remedy the problem. However, it is likely that the bending cover will sag after the endoscope is inserted into the tracheal tube. Continued use will eventually create a hole in the bending cover. Whenever possible, cease using the endoscope when it is discovered that the bending cover is sagging.



✘ Cause of Damage:

Forcing an insertion tube into a tracheal tube that is not the correct diameter may cause damage.



Inserting the endoscope into a tracheal tube with a folded or sagging bending cover may eventually cause a hole.



Bending Section: Rupture

Endoscope Damage and Preventive Measures

✔ Preventive Action:

Endoscopes with Water-resistant Cap – Prior to sterilization, verify that the water-resistant cap is removed from the scope connector.



✘ Cause of Damage:

Sterilizing an endoscope with a water-resistant cap may rupture the bending section of the scope.



Bending Section: Rupture

Endoscope Damage and Preventive Measures

✔ Preventive Action:

Endoscopes without Water-resistant Cap – Prior to sterilization, verify that the ETO (venting) cap is fully engaged and venting the scope connector.



✘ Cause of Damage:

Sterilizing an endoscope without the ETO (venting) cap may cause the bending section to rupture.



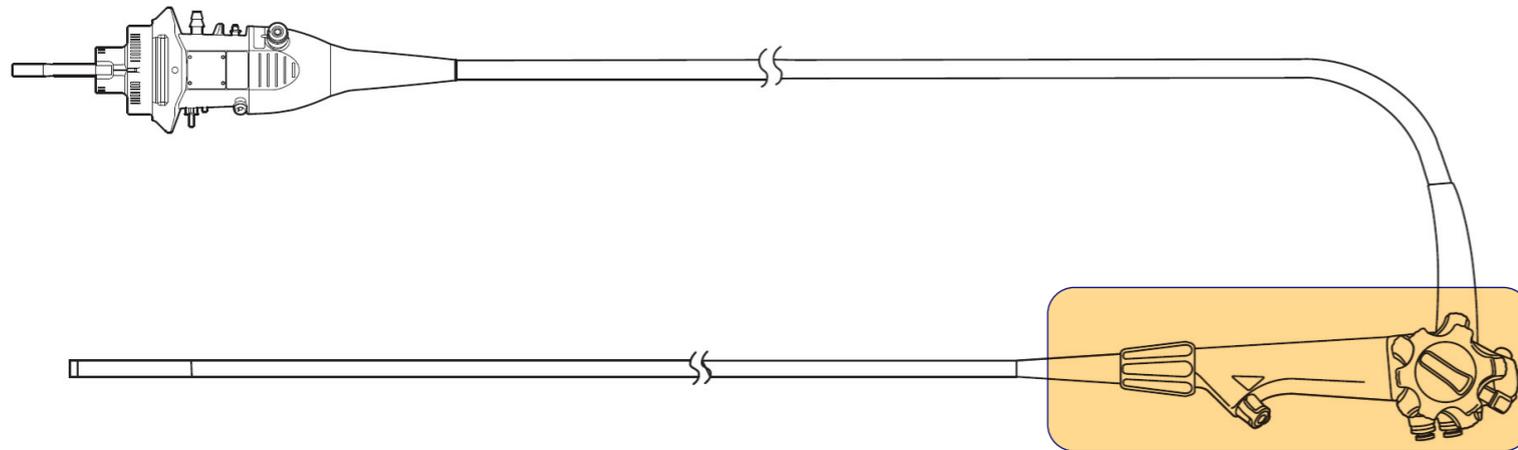


Back to Scope Components

Control Body

Endoscope Damage and Preventive Measures

The control body houses all of the components necessary to control the various functions of the endoscope.



Missing/Broken Angulation Knob



Hole in Remote Switch



Do not use the endoscope, regardless of functionality, if any of the described conditions occur.

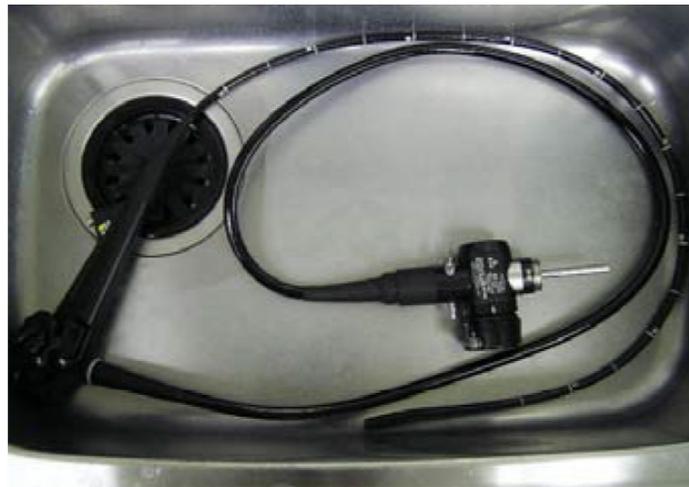


Control Body: Holes and Tears

Control Body: Holes and Tears

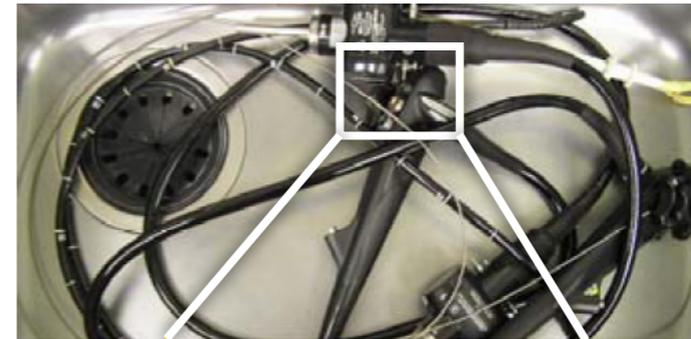
✔ Preventive Action:

When reprocessing, transporting, etc., never place endoscopes and EndoTherapy accessories on top of each other.



✘ Cause of Damage:

Placing the point part of the endoscope connector on top of the remote switch may cause holes or tears. Placing an EndoTherapy accessory on top of the remote switch may also cause holes or tears.





Control Body: Angulation Knobs

Endoscope Damage and Preventive Measures

✔ Preventive Action:

When reprocessing or transporting, never place endoscopes on control knobs.



✘ Cause of Damage:

Placing the endoscope on control knobs may affect the angulation or cause control knobs to leak, loosen, or break off.



**Always remember...
Lay scope down with
control knobs up!**



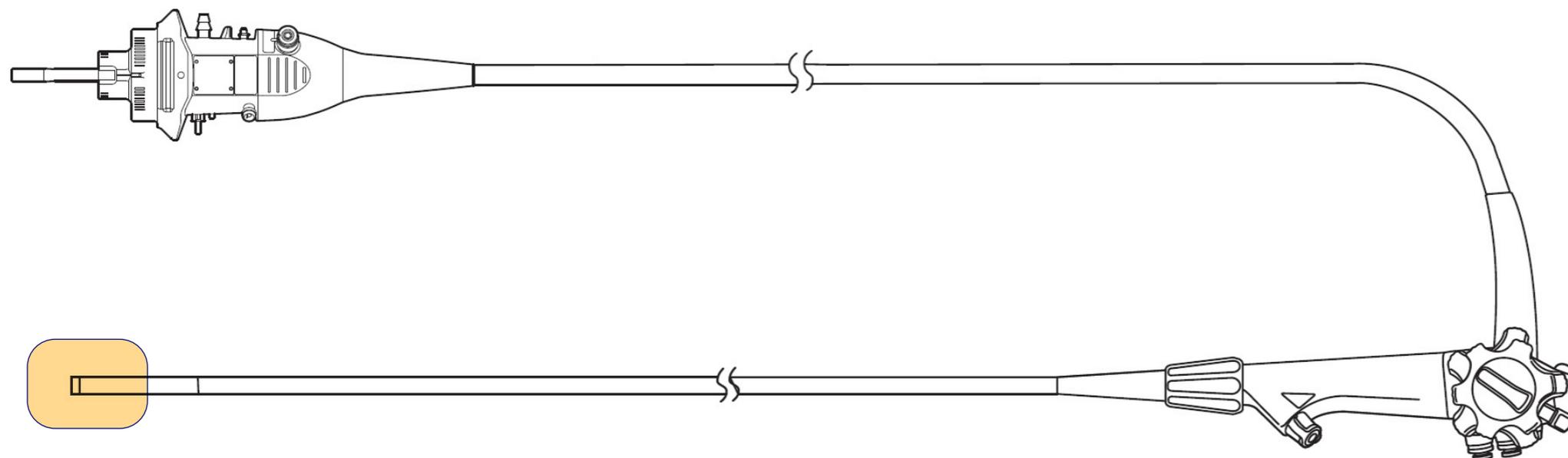
Back to Scope Components



Distal End

Endoscope Damage and Preventive Measures

Endoscopes are designed with small, precision lenses. Lenses that are damaged may affect image quality. With every routine visual inspection, look at the distal end on the endoscope and verify that none of the lenses are damaged. Physical damage to the distal tip cover area may also be observed during a leak test. The integrity of the distal tip cover is critical for proper image quality and water tightness.



Chipped or Cracked Lenses



Chipped or Cracked Lenses



Damaged Distal Tip Cover



Do not use the endoscope, regardless of functionality, if any of the described conditions occur.



Distal End: Lens Damage

Endoscope Damage and Preventive Measures

✔ Preventive Action:

Hold the distal end separately from the control unit and the scope connector. Use this method when transporting the endoscope to prevent the distal end from striking a hard surface.



Shown here: Olympus PROTECH Flexible Endoscope Tip Protector



Using distal tip protectors can help prevent lens damage.

✘ Cause of Damage:

Striking the distal end on a hard surface may cause lenses to crack or chip.



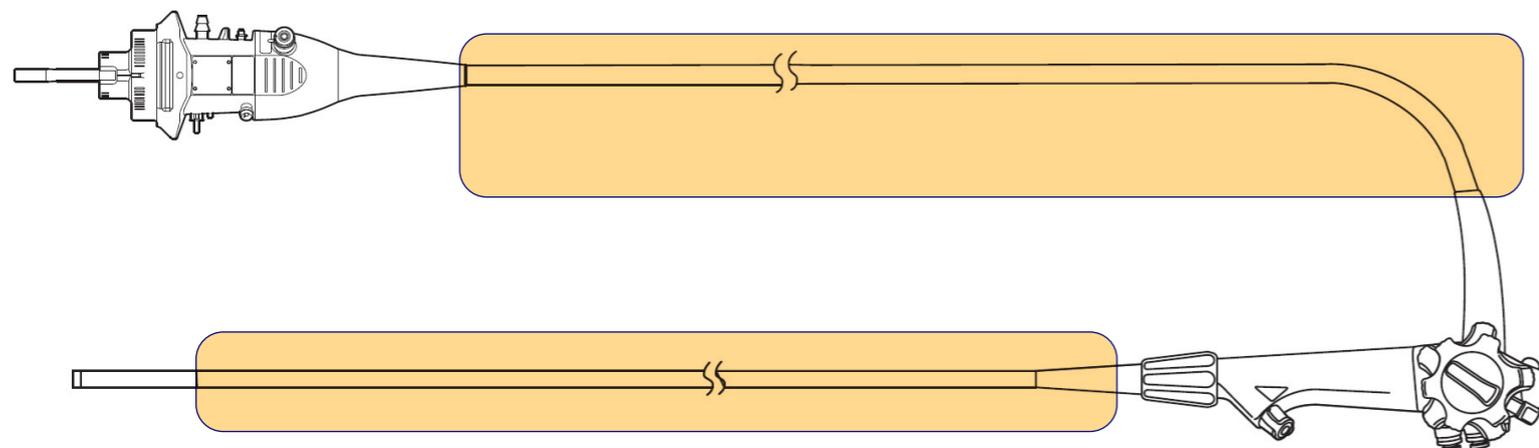
Dropping the distal end on the floor may cause cracks in the distal tip cover, along with damaged lenses.



Insertion Tube / Light Guide Tube

Endoscope Damage and Preventive Measures

Use of the endoscope with any of the conditions on the following pages may compromise scope integrity, causing possible damage to the scope (see examples below).



Compressed



Buckled



Cut



Do not use the endoscope, regardless of functionality, if any of the described conditions occur.



Insertion Tube / Light Guide Tube: Buckled

Endoscope Damage and Preventive Measures

✔ Preventive Action:

Avoid coiling the insertion tube more than necessary. Do not coil the insertion tube beyond the recommended diameter. Refer to the specific endoscope instruction manuals for exact diameter.



Do not press the endoscope against the bed or operating table.



✘ Cause of Damage:

Storing, carrying, or cleaning the endoscope with the insertion tube coiled severely may cause buckling of the insertion tube or light guide tube.



Pressing the protector boot against the bed or operating table during an endoscopy procedure may cause buckling, which can lead to decreased angulation, decreased insufflation, and/or holes on the insertion tube.





Insertion Tube / Light Guide Tube: Compressed/Cut

Endoscope Damage and Preventive Measures

✔ Preventive Action:

When handling an endoscope, be aware of the insertion tube/light guide tube location before closing a storage cabinet door or AER lid. Awareness is key.



Prior to the endoscopy procedure, fit the patient with a mouth guard to prevent the patient from biting down on the insertion tube.



✘ Cause of Damage:

Slamming or closing a door or endoscope reprocessing cover on an insertion tube may cause a dent or compression.



Inserting an endoscope into a patient's mouth without a mouth guard may cause a dent or bite mark, which can lead to holes in the endoscope.





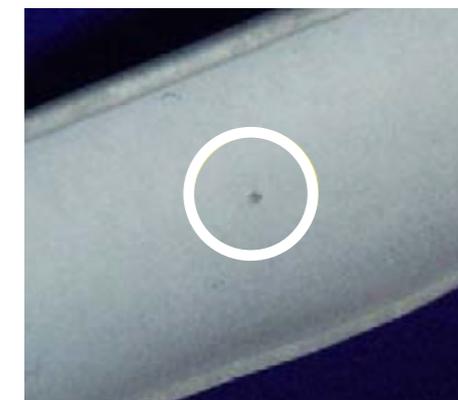
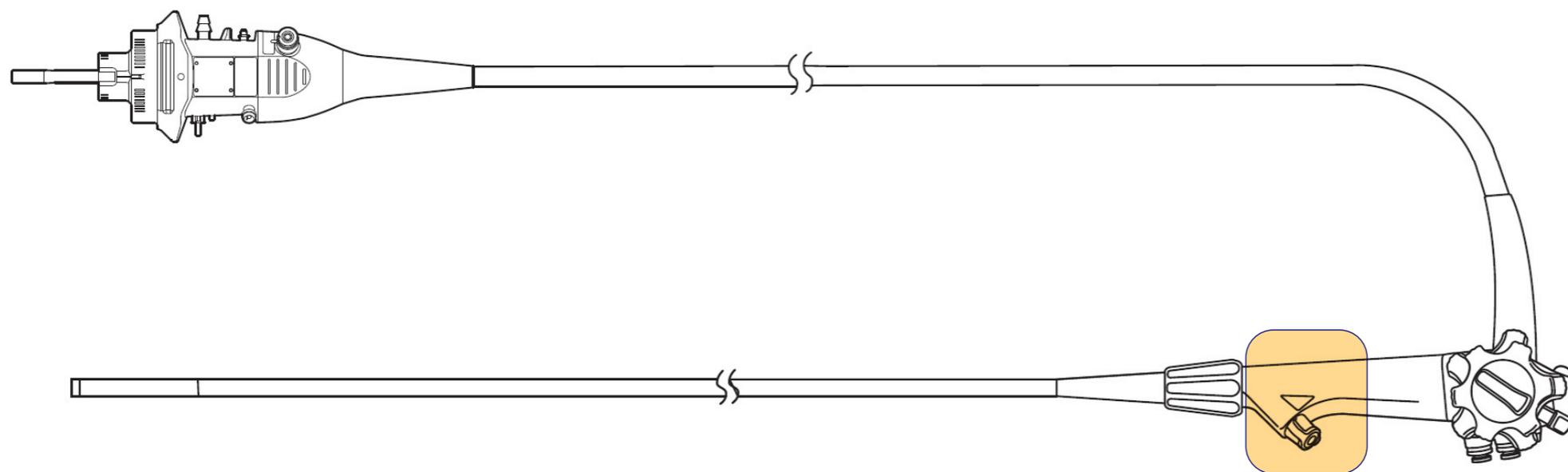
Back to Scope
Components

Instrument Channel

Endoscope Damage and Preventive Measures

A hole or slice in the instrument channel may allow fluid to penetrate through the opening during reprocessing, and therefore lead to problems with internal components. This internal damage cannot be detected during routine visual inspection. Before reprocessing an endoscope, perform a leak test as specified in the endoscope instruction manual. For your convenience, the leak test procedure is explained at the end of this document.

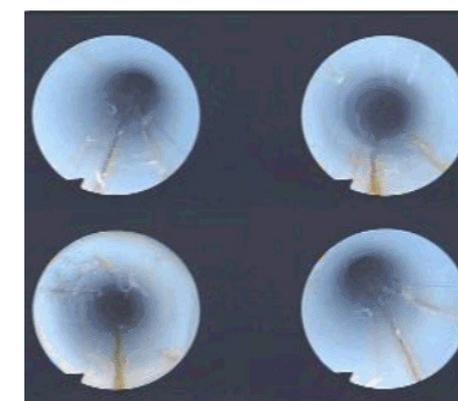
When performing a leak test, look at the biopsy channel port on the control body and the instrument channel opening at the distal end. If a stream of air bubbles is emitting from either the forceps valve connector or the instrument channel outlet at the distal end, there is a hole in the instrument channel. Do not use the endoscope.



Hole



Slice



Scratches



Do not use the endoscope, regardless of functionality, if any of the described conditions occur.

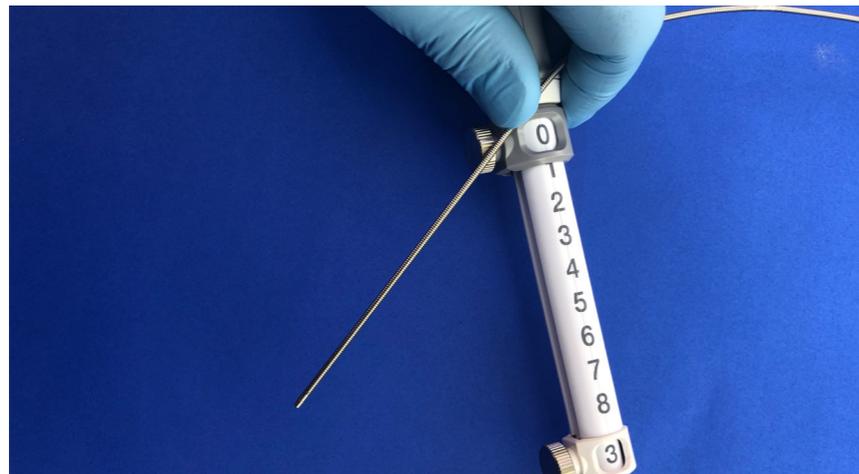
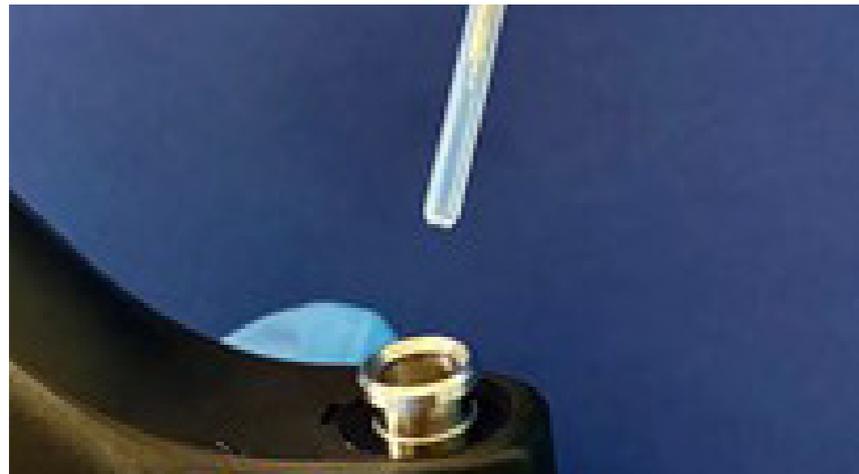


Instrument Channel: Puncture

Endoscope Damage and Preventive Measures

✔ Preventive Action:

Do not deploy the needle while the tip of the instrument is inside the instrument channel. Instead, deploy the needle when the tip of the instrument is in the endoscope field of view.



✘ Cause of Damage:

Inserting and withdrawing a deployed accessory through the instrument channel may cause scrapes and/or holes in the instrument channel.





Instrument Channel: Puncture

Endoscope Damage and Preventive Measures

✔ Preventive Action:

Straighten the bending section prior to advancing an accessory. Carefully advance all accessories with short strokes to help detect resistance in the channel.



✘ Cause of Damage:

An angulated endoscope can cause a needle or forcep to puncture through the instrument channel. Inserting an accessory too quickly or too forcefully can also cause holes or scrapes in the channel.

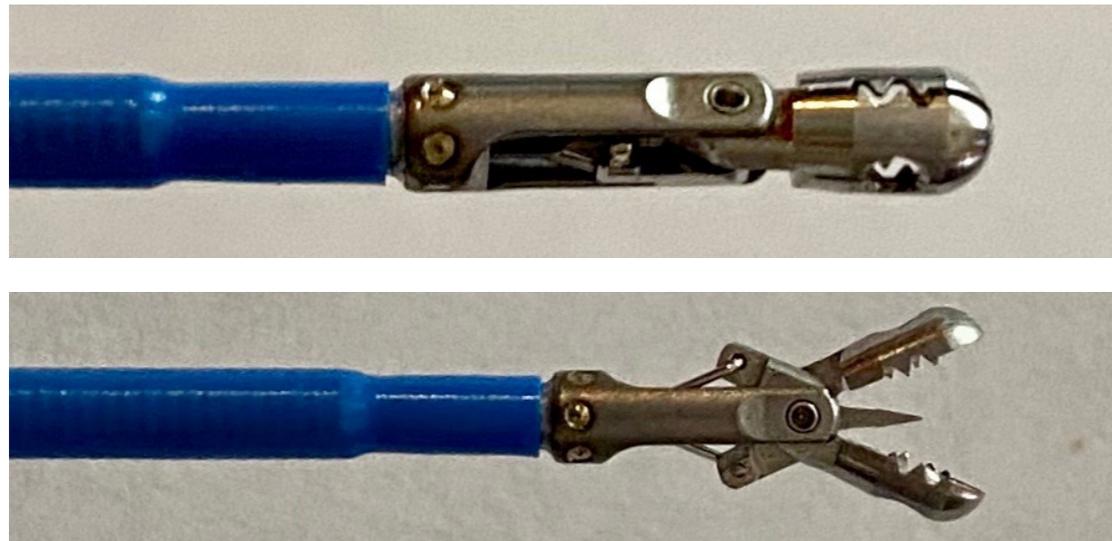


Instrument Channel: Slice

Endoscope Damage and Preventive Measures

✔ Preventive Action:

Thoroughly inspect the biopsy forceps and ensure that there are no abnormalities, as shown in the examples below.



✘ Cause of Damage:

Using damaged biopsy forceps in an endoscope may cause scratches and/or holes in the instrument channel.



Bent Needle (Forceps with Needle)



Back to Scope Components

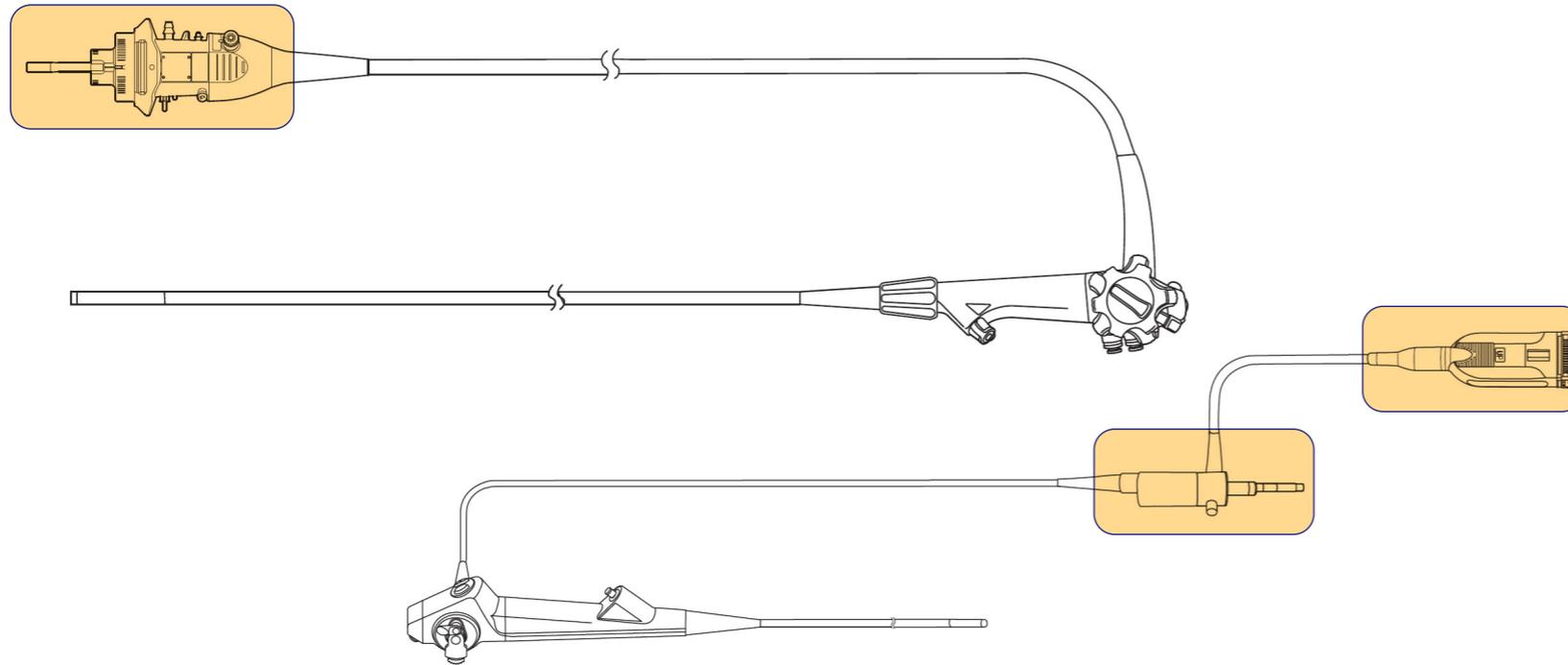
Scope Connector / Video Connector

Endoscope Damage and Preventive Measures

Leaks or cracks on the scope connector or video connector may lead to fluid invasion. Damage to the scope may also occur if the water-resistant cap is either not attached or damaged.

ETO (venting) Cap: For Fiberscopes and 190 series Videoscopes, do not attach an ETO (venting) cap during reprocessing, as this will cause fluid invasion.

Water-resistant Cap: For 180 series and older Videoscopes, ensure the water-resistant cap is attached during reprocessing to avoid fluid invasion.



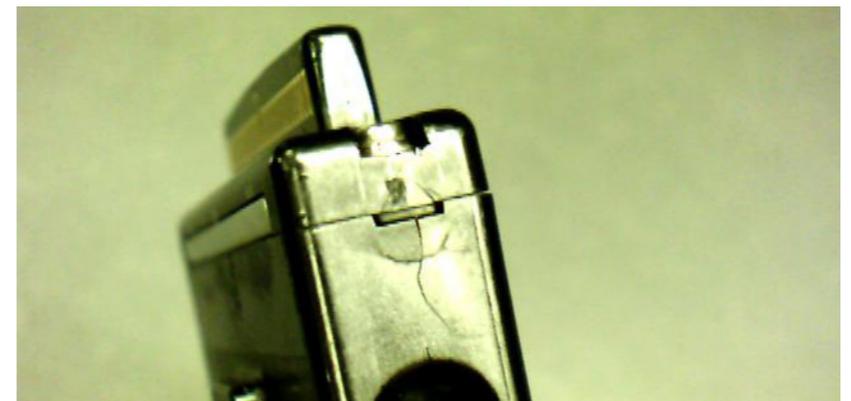
Do not use the endoscope, regardless of functionality, if any of the described conditions occur.



Corrosion Result of Fluid Invasion



Damage Result of Impact



Damage Result of Impact



Fiberscope / Videoscope Scope Connector: Fluid Invasion

Endoscope Damage and Preventive Measures

✔ Preventive Action:

Attach the water-resistant cap to the scope connector before reprocessing the endoscope (the chain may be used as a reminder to attach the cap).



✘ Cause of Damage:

Failing to attach the water-resistant cap prior to reprocessing the endoscope will cause fluid invasion.



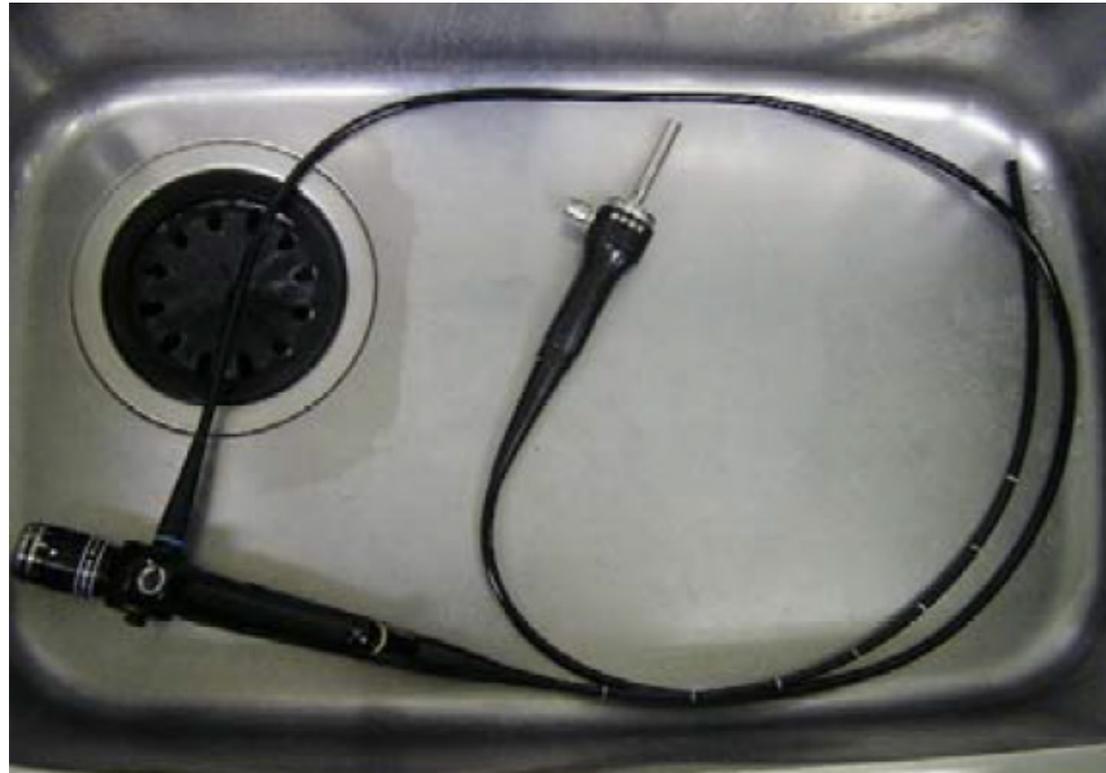


Fiberscope / Videoscope Scope Connector: Fluid Invasion

Endoscope Damage and Preventive Measures

✔ Preventive Action:

Do not attach the ETO (venting) cap to the scope connector when reprocessing the endoscope.



✘ Cause of Damage:

Reprocessing an endoscope with an ETO (venting) cap attached to the scope connector will cause fluid invasion.



Fiberscope / Videoscope Scope Connector: Fluid Invasion

Endoscope Damage and Preventive Measures

✔ Preventive Action:

Inspect the water-resistant cap. Avoid using any water-resistant cap that is abnormal (e.g., a loose venting connector, torn seal, etc.). Note that the water-resistant cap is a nonserviceable product. The water-resistant cap cannot be repaired due to its design structure.



✘ Cause of Damage:

A malfunctioning water-resistant cap (e.g., damaged seal) may cause fluid to enter the electrical connector.



Fiberscope / Videoscope Scope Connector: Fluid Invasion

Endoscope Damage and Preventive Measures

✔ Preventive Action:

Do not attach or detach the water-resistant cap or leak tester under water. Depending on the extent of the fluid invasion, the damage created can cause several malfunctions to the endoscope.



✘ Cause of Damage:

Connecting or disconnecting the leak tester connector cap, insufflation tube on the reprocessing equipment, or the water-resistant cap under water will cause fluid to invade the scope.



Fiberscope / Videoscope Scope Connector: Fluid Invasion

Endoscope Damage and Preventive Measures

✔ Preventive Action:

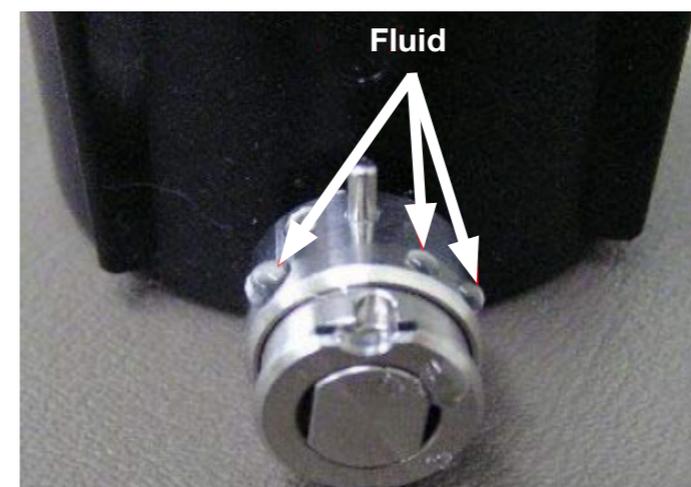
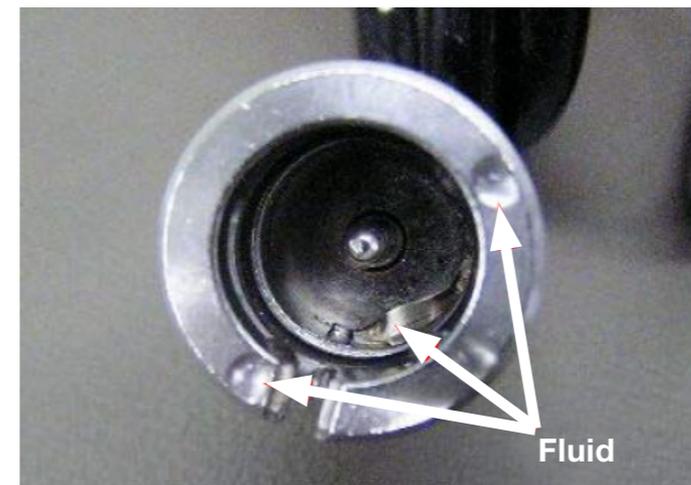
Confirm that both the connector cap of the leak tester and the venting connector are dry.



✘ Cause of Damage:

The following may cause damage:

- Attaching a wet water-resistant cap
- Residual fluid in the leak tester connector cap and/or fluid on the venting connector



 **Remember to dry your connector cap and venting connector with a clean lint-free cloth before connecting the leak tester!**



Scope Connector: Impact

Endoscope Damage and Preventive Measures

✔ Preventive Action:

Avoid leaning and applying pressure on scope connector while plugged into the processor.

Do not allow the scope to drop while handling. Ensure the connector is straight when plugging/unplugging the connector.



✘ Cause of Damage:

Cracks may occur on the scope connector by:

- Plugging in the scope connector at an angle
- Leaning on the scope connector
- Impact to the scope/video connector





Leak Testing

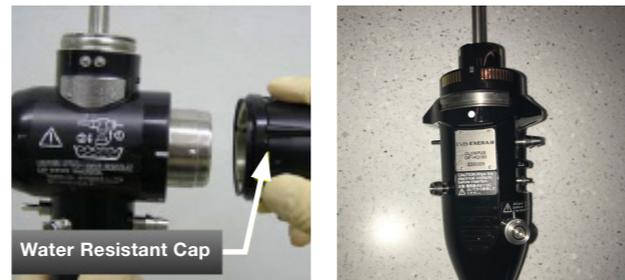
Leak Test Procedure	51
How to Reprocess a Leaking Endoscope	53
Mandatory Manual Cleaning for Leaking Endoscopes.....	54
Mandatory High-level Disinfection or Sterilization for Leaking Endoscopes.....	55

Leak Test Procedure

Leak Testing

Leak testing an endoscope is essential for early detection of damage or wear. Ignoring the leak test may delay the discovery of problems until they have reached a more advanced state. Usually, fluid will migrate inside the endoscope causing severe damage. At this point, the cost of repair can be expensive. Costly repairs can easily be avoided by performing a leak test before reprocessing an endoscope.

1. Attach the water-resistant cap to the scope connector where applicable (refer to your scope's reprocessing manual).



2. Fill a container deep enough to submerge the entire scope with clean water.

3. Insert the connector from the leak tester into the socket on the maintenance unit or into a light source.



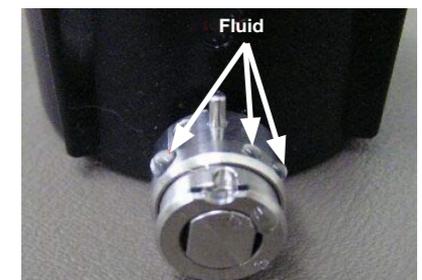
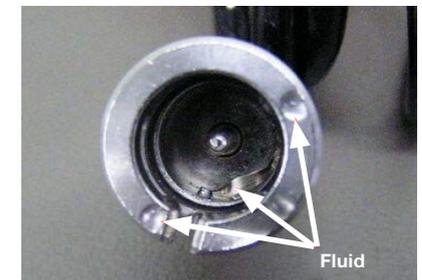
4. Turn ON the maintenance unit or the light source.

5. If a light source is being used, set the airflow regulator switch to its maximum level.

6. Gently press the pin located inside the leak tester cap to verify that the air is flowing through the leak tester.



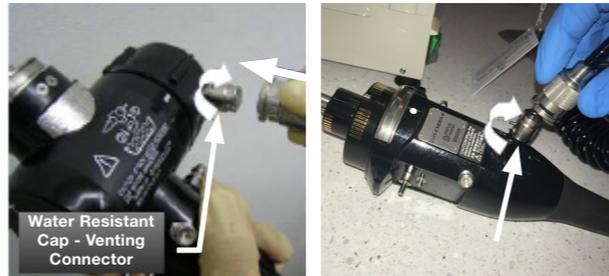
7. Verify that no water is inside the leak tester cap or on the venting connector. Verify that the scope connector is dry. Residual water can invade the scope and cause a malfunction.



Leak Test Procedure

Leak Testing

8. Attach the leak tester connector cap to the water-resistant cap venting connector.



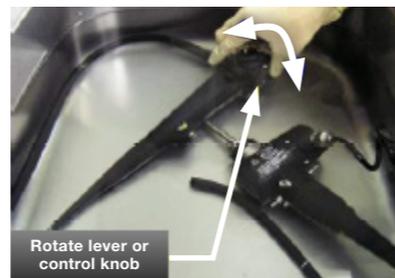
For scopes that do not use a water-resistant cap, the venting connector is located on the scope connector.

9. Gently squeeze the bending cover.

10. Verify that the bending cover is expanded with air. The bending cover expands when air is fed into the scope through the venting connector.

11. Immerse the scope in water.

12. Observe the scope for 30 seconds while turning the control knobs to angulate the bending section. Angulating the bending section in different directions during this test allows the detection of small holes in the bending cover and the forceps channel.



13. Verify that no continuous bubbles are streaming from the scope.

14. Remove the scope from the basin with the leak tester attached.

15. Turn OFF the maintenance unit or the light source.

16. Disconnect the leak tester from the maintenance unit or the light source.



17. Verify that the scope is fully depressurized. The bending cover should have deflated to its normal size.

18. Disconnect the leak tester connector cap from the venting connector by first fully rotating the connector cap, and then removing it from either the scope connector or the water-resistant cap.



Note: Steps 16–18 must be performed in order; otherwise, the scope will remain pressurized and the bending cover will still be expanded. If the scope remains pressurized, the bending cover is highly susceptible to damage during reprocessing.



How to Reprocess a Leaking Endoscope

Leak Testing

The following information provides guidance on how to reprocess damaged flexible endoscopes to render them safe to handle. Damaged endoscopes that do not have a leak should be reprocessed according to instructions provided in the Olympus reprocessing manual. However, if the endoscope has developed a leak, routine reprocessing may lead to further damage. Therefore, Olympus has developed special guidelines for flexible endoscopes that have failed leak testing.

The key to preventing further damage to a leaking endoscope is to provide positive pressure to the endoscope during all phases of the reprocessing cycle by connecting the endoscope to the maintenance unit (Olympus model MU-1) or light source. This will ensure that the endoscope is pressurized throughout the entire reprocessing cycle and will help to prevent fluid from entering the endoscope.

A leak in the endoscope will be indicated by a continuous series of bubbles emerging from a location on the endoscope. Before removing the endoscope from the water, identify and make note of the location of the leak. With the maintenance unit or light source still turned on and the leak tester still connected, remove the endoscope from the water. If the maintenance unit or light source is turned off while the endoscope is immersed, water may invade the internal spaces and further damage the endoscope.



Mandatory Manual Cleaning for Leaking Endoscopes

Leak Testing

1. For a leak detected in the covering of the insertion tube, bending section, or universal cord, turn the maintenance unit OFF. Detach the leak tester from the maintenance unit or the light source. Wait 30 seconds or until the covering of the bending section contracts to its pre-expansion size. Detach the leak tester from the endoscope. Thoroughly dry the identified location of the leak on the outer area of the scope using alcohol and a clean lint-free cloth. Carefully apply a piece of electrical tape over the location of the leak prior to immersing the endoscope in detergent solution. Wrapping the tape too tightly may result in damage to the endoscope. For leaks detected in other locations (e.g., internal channel), proceed with the instructions provided below.

Note: Please be advised that Olympus recommends use of a colored tape, such as red, yellow, or blue to allow for easier visual identification of a scope in need of repair after leak testing and cleaning. It is further recommended that customers develop a path/segregation technique for endoscopes requiring repair to minimize the possibility of reuse prior to being returned to Olympus for repair.



2. Fill a basin with detergent solution at the temperature and concentration recommended by the detergent manufacturer. Use a basin that is at least 40 cm by 40 cm (16" by 16") in size and deep enough to allow the endoscope to be completely immersed.
3. Insert the leak tester connector into the output socket of the maintenance unit or the light source and turn the maintenance unit or the light source ON. Set the light source's airflow regulator switch to "HIGH" or "3."
4. Connect the leak tester's connector cap to the venting connector of the water-resistant cap. For 190-series endoscopes, the leak test connects directly to the venting connector.
5. Fully immerse the endoscope in the detergent solution.
6. Perform manual cleaning according to the instructions provided in the reprocessing manual. Minimize unnecessary flexion of the insertion tube and universal cord during cleaning.



Mandatory High-level Disinfection or Sterilization for Leaking Endoscopes

Leak Testing

Sterilization:

Following manual cleaning, the preferred method of rendering a leaking endoscope safe to handle is ethylene oxide sterilization. Ethylene oxide sterilization should be performed according to the instructions provided in the endoscope's reprocessing manual. If electrical tape was applied to a leak detected in the endoscope's external surface, remove the tape and wipe with 70% ethyl or isopropyl alcohol prior to ethylene oxide sterilization.

If ethylene oxide sterilization is not possible, perform high-level disinfection or STERRAD sterilization according to the instructions provided below.

Sterilization in a STERRAD sterilization system is also an acceptable alternative practice provided the endoscope is listed as materially compatible with the STERRAD sterilization system. Those endoscope models which are compatible with STERRAD sterilization may be sterilized using the normally recommended STERRAD model, cycle, and conditions (e.g., check booster requirements) as long as the following requirements are met: 1) The endoscope has been properly cleaned and dried, and 2) Fluid has not invaded the endoscope. Retained fluid will cause the STERRAD cycle to abort and may contribute to additional repairs.

Manual High-level Disinfection:

1. Fill a basin with disinfectant solution at the temperature and concentration recommended by the disinfectant manufacturer. Use a basin that is at least 40 cm by 40 cm (16" by 16") in size and deep enough to allow the endoscope to be completely immersed.
2. Insert the leak tester connector into the output socket of the maintenance unit or the light source and turn the maintenance unit or the light source ON. Set the light source's airflow regulator switch to "HIGH" or "3."
3. Connect the leak tester's connector cap to the venting connector of the water-resistant cap or endoscope directly.
4. Immerse the endoscope in the disinfectant solution.
5. Perform the high-level disinfection procedure described in the endoscope's reprocessing manual. Minimize unnecessary flexing of the insertion tube and universal cord during reprocessing.

Automated High-level Disinfection

Automated Endoscope Reprocessors (AERs) circulate high-pressure fluid through the internal channels of the endoscope, which may result in fluid invasion and further damage to a leaking endoscope. As a result, performing the manual high-level disinfection procedure is recommended on leaking endoscopes. However, some AERs are designed to maintain positive pressure to the internal cavities of the endoscope in order to prevent fluid invasion during the reprocessing cycle. Check with your AER manufacturer to determine whether your AER is intended to reprocess leaking endoscopes and whether positive pressure can be maintained during the disinfection cycle without aborting the cycle.



Test Your Knowledge

Comprehension Check 57



Comprehension Check

Test Your Knowledge

After reviewing the content of this reference guide, use the following questions to confirm understanding of the material.

1. What are some ways distal end lens damage can be prevented?

- a. Utilizing distal end protectors
- b. Protecting the distal end at all times
- c. Not applying pressure or weight on top of the distal end of the scope
- d. All of the above

2. On which section of endoscopes are leaks most commonly found?

- a. Instrument Channel
- b. Bending Section
- c. Scope Connector
- d. Control Body

3. After you plug the leak tester into the maintenance unit (MU-1), what are the next two steps that are required?

- a. Connect the leak tester cap to the venting connector, then turn on the MU-1
- b. Place the scope into a basin of water, then connect the leak tester
- c. Turn the MU-1 ON, then press the pin inside the leak tester to verify that air is flowing
- d. Make sure the leak tester and venting connector are dry, then connect the leak tester to the venting connector

4. Which statement is true for avoiding instrument channel leaks?

- a. Avoid striking the distal end of the scope on hard surfaces
- b. Thoroughly inspect the biopsy forceps and ensure there are no abnormalities prior to use, and use according to the instructions for use
- c. Do not transport the scopes with sharp accessories to the reprocessing room
- d. Prevent stacking scopes at all times

5. Inserting an accessory too quickly or too forcefully can cause holes or scrapes in which section of a scope?

- a. Instrument Channel
- b. Light Guide Tube
- c. Bending Section
- d. Control Body



Comprehension Check

Test Your Knowledge

6. Stacking scopes can cause what type of damage?

- a. Holes in the bending section
- b. Holes in the switches
- c. Damage to the control knobs
- d. All of the above

7. Which section of EUS endoscopes has the highest leak rate?

- a. Bending Section
- b. Control Body
- c. Instrument Channel
- d. Light Guide Tube

8. What is the leak percentage rate for the instrument channel on GI videoscopes?

- a. 18%
- b. 13%
- c. 21%
- d. 31%

9. Transporting sharp accessories with the scope may cause damage/leaks to the bending section, control body switches, and insertion tube?

- a. True
- b. False

10. What should you look for when inspecting biopsy forceps?

- a. Distal cup does not close
- b. Misaligned distal cup
- c. Bent needle
- d. All of the above

For more information, contact your Olympus Endoscopy Support Specialist, or call 800-848-9024.

www.medical.olympusamerica.com

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