

Complexities of Duodenoscopes Reprocessing

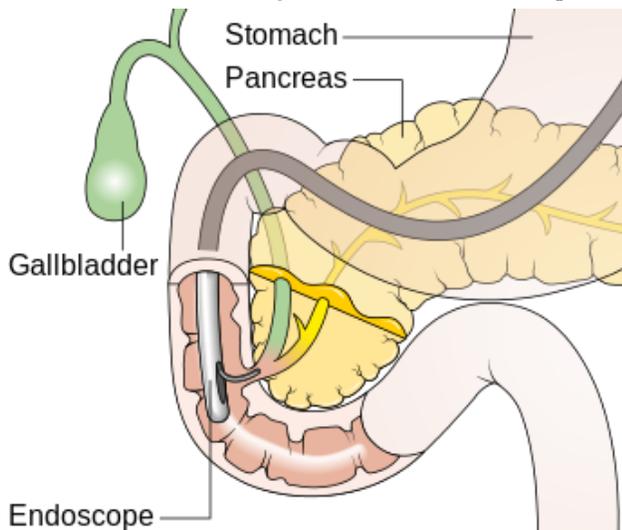
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Objectives:

- Describe the duodenoscope and its components
- Discuss what types of procedures are performed with a duodenoscope
- Discuss the three basic steps of endoscope reprocessing
- Discuss issues that can occur due to improper endoscope reprocessing

What is a Duodenoscope?

There are over a half a million procedures performed annually in which patients come in contact with a complex, surgical device labeled as a duodenoscope. Some may have heard of the term ERCP, also known as endoscopic retrograde cholangiopancreatography, also referred back to its' original name as a duodenoscope.



"Detailed diagram of an endoscopic retrograde cholangio pancreatography (ERCP) CRUK 001" by Cancer Research UK - Original email from CRUK. Licensed under CC BY-SA 4.0 via Commons - <http://tinyurl.com/jn2axd2>.

Whatever you would like to call it, these critically constructed devices are used in minimally invasive procedures which in most cases allows the patient to go home the same day. These scopes are flexible in nature, and allow entry into the stomach, throat, and mouth to name a few. This scope is also housed with a light source, and can be connected to a camera which allows surgical personnel the opportunity to visualize images onto a monitor similar to a television screen. The design of the instrument also allows for biopsy and suctioning devices to be delivered through the channels during medical procedures.

Compared to other endoscopes the duodenoscope is proclaimed to be more complex than its counterparts to effectively clean, mainly because of its' multiple channels: "In many of the outbreaks and the big breaches that end up in the news media, its often an issue where technicians didn't realize that the endoscopes had multiple channels that needed to be clean" (Bourdon, 2015, p.7). Although the intricate design of the duodenoscope makes it difficult for technicians to visually inspect for cleanliness, it does have the impeccable ability to allow surgeons to view the internal cavities and organs, such as the small intestines in a less invasive manner, contrary to open procedures in which patients typically have large incisions made in order for surgical instrumentation to be introduced to various tissues and organs. Minimally invasive procedures have numerous benefits including, but are not limited to the following in most cases: shorter hospital stays, less pain, less trauma to tissues, organs, and muscles, and less scarring. "Advantages for keyhole surgeries in general allows smaller incisions as well as lowering the risk of infection and reduce trauma" (Sihavong, 2013). Although these minimal invasive procedures produce numerous benefits to the patients, they do present much harm to the equipment being operated. Due to the nature of these procedures, the scopes are introduced into heavily soiled areas such as the mouth and intestines which are surrounded by copious amounts of bacterium that can freely travel into minute areas of the scope impossible to visibly see with the naked eye. Biofilm, which are thick masses of cells found in contaminated communities within the human body, present numerous cleaning challenges for sterile processing technicians and other medical professionals. "If biofilm is allowed to accumulate and harden within the channels, endoscopes may remain contaminated even after completion of all the reprocessing steps" (Bourdon, 2015, p. 8). Understanding the complexity of this device is critical to the reduction of cross-contamination and hospital acquired infection in patients.

What Procedures are Performed Endoscopically?

As stated previously, minimally invasive surgical operations can be performed utilizing the duodenum scope. The endoscopic retro-

grade cholangiopancreatography procedure is one of the most common procedures conducted. The small intestines consist of three major parts: duodenum, jejunum, and the ileum. The common bile duct which typically gets blocked by stones from patients with gallbladder disease enters the duodenum, which can be viewed by the ERCP scope. The bile duct functions as a transport system, carrying bile to the gallbladder. Sometimes stones which are normally produced in the gallbladder can become entrapped in the bile duct. This condition can also be referred to as Choledocholithiasis. Choledocholithiasis can cause multiple symptoms such as fever, vomiting, jaundice, and a life-threatening infection. "When a gallstone is stuck in the bile duct, the bile can become infected" (Healthline, 2015, p.2). The ERCP procedure allows the surgeon to successfully retrieve the stone from the bile duct in order to reverse stricture, damage, or blockage of the duct. The ERCP scope can also be utilized to provide a diagnostic examination for potential diseases affecting the liver, pancreas, and bile ducts.

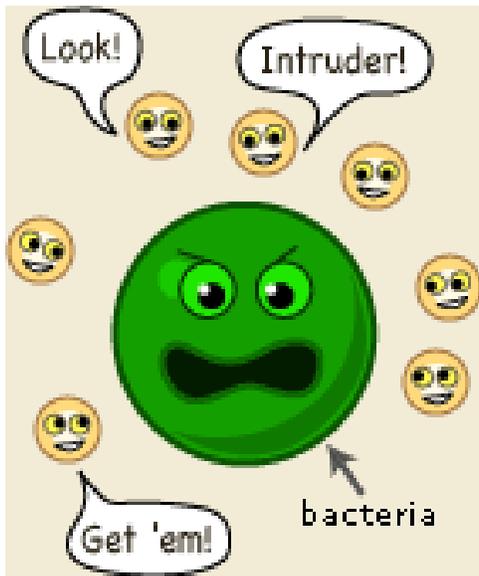


"US Navy 081117-N-7526R-568 Cmdr. Thomas Nelson and Lt. Robert Roadfuss discuss proper procedures while performing a laparoscopic cholecystectomy surgery" by U.S. Navy photo by Mass Communication Specialist 2nd Class Marc Rockwell-Pate - Licensed under Public Domain via Commons - <http://tinyurl.com/gnw9nq4>.

What are the Three Major Steps to ERCP Scope Reprocessing?

In order to reassure appropriate reprocessing of endoscopes, it is imperative that technicians understand the key steps to endoscope reprocessing. It is crucial that each step is completed without taking short cuts to ensure the safest device possible is introduced to the clinical patient. Listed below are the three critical steps:

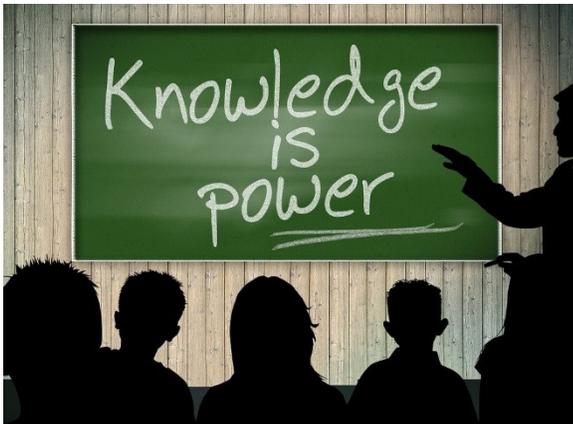
Cleaning- Cleaning has to be done before decontamination can be done on the scope. Cleaning can be defined as physically removing all soils and contaminants of a device before decontamination, high level disinfection, and sterilization can occur. The technician should be familiar with the IFU's of the ERCP scope as well as the various components of the scope to ensure adequate cleaning. Cleaning should: "minimize the soil transfer from one patient to another or between uses in a single patient; prevent accumulation of residual soil throughout the product's use life; and allow for successful, subsequent disinfection/sterilization steps" (FDA Executive Summary, 2015, p.18). Decontamination of the scope can occur after cleaning. Decontamination can be defined as a physical or chemical means of removing bloodborne pathogens and other organisms to the extent in which they can be handled safely without the transfer of infectious disease.



High-Level Disinfection- High-level disinfection can be achieved by utilizing high-level disinfectants such as glutaraldehyde or ortho-phthalaldehyde to achieve a superior level of disinfection. High-level disinfection destroys all major organisms that cause infectious diseases excluding spores.

Sterilization- Sterilization is the only method can guarantee the destruction of **ALL** microorganisms including spores. This can be achieved by the use of ethylene oxide as well as liquid chemical sterilants according to the manufacturer's instructions for the device.

Failure to follow the named steps can result in hospital acquired infections and in more extreme cases death.



Retrieved from: <https://pixabay.com/en/adult-education-leave-know-power-379219/>.

In conclusion, it is critical that each personnel reprocessing ERCP scopes are thoroughly educated on how to adequately process them. It is the technician's responsibility to be a patient advocate in order to reduce avoidable harm or demise. The technician should become thoroughly educated on the multiple channels and functions of the ERCP scope as well as the appropriate cleaning methods. Management can produce workshops or in-services for personnel in order to ensure the appropriate education before handling these devices. There is no room for guessing or uncertainty when handling these scopes. The patient should always be of primary concern.

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Post-Test 2015**

- 1. ERCP scopes are complex because of their simple channel.
TRUE FALSE
- 2. ERCP scopes are rigid in design.
TRUE FALSE
- 3. Minimally invasive surgery allows for shorter hospital stays and reduced trauma in most incidences.
TRUE FALSE
- 4. ERCP scopes are introduced in minimally soiled areas of the body.
TRUE FALSE
- 5. Biofilms do not present challenges during the cleaning process.
TRUE FALSE
- 6. The duodenum, ileum, and jejunum are three portions of the small intestines.
TRUE FALSE
- 7. Gallstones can contribute to the condition Choledocholithiasis.
TRUE FALSE
- 8. Decontamination is always the initial step of the cleaning process.
TRUE FALSE
- 9. Spores cannot be killed during high-level disinfection.
TRUE FALSE
- 10. It is not okay to assume how to effectively clean an ERCP scope when instructions are unavailable.
TRUE FALSE

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