

## The ERCP Elevator Channel

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Whenever flexible endoscope cleaning issues are discussed, ultimately the most challenging area to reprocess is the Forceps Elevator Channel on the ERCP Scope. The elevator in most duodenoscopes has a wire channel that requires using a 3cc syringe to generate sufficient pressure to force cleaning and disinfection solutions through the channel. No matter how small the volume of fluids flushed through the elevator wire channel may be, it has proved to be a tremendous improvement over past generations which did not offer channel flushing capabilities (endoscopes manufactured prior to 1983). Often the elevator refused to operate simply because debris solidified in the channel around the wire.

**It is no wonder that the elevator is susceptible to problems when you closely examine the construction of the system. We will examine four areas.**

**THE ELEVATOR RISER** is hinged at one end and attached to a wire at the other end. The top side is grooved in the center and polished to allow an instrument to glide back and forth smoothly. Pressure exerted by the motion of the wire moves the cantilevered riser up and down. The first design problem is the cavity in which the riser moves back and forth. Cleaning access to the area can only occur by brushing through the instrument channel opening. Open/extend the riser as far as possible and brush the cavity thoroughly. Then evaluate the riser completely and clean behind the riser with brushes and lint free applicators. Any debris left after cleaning may solidify and impair elevator operation.

**THE WIRE CHANNEL ASSEMBLY** traverses the length of the insertion tube and has two components. In the distal 30cm the wire passes through a plastic channel supported by a coil pipe (similar to a forceps). The coil pipe remains flexible so the tip of the scope can angulate freely. From approximately 30cm to the control body the wire continues through the metal sus-pipe. The total length of the channel being flushed is approximately 125cm long. The opening between the elevator wire and the suspipe is slightly greater than the thickness of a human hair, approximately 0.185mm. No wonder the pressure from a 3cc syringe produces a slow flow of fluid!

**THE ELEVATOR CONTROL KNOB** mechanism varies slightly from one model to another. The operator moves either a lever or a wheel. This exertion is transferred to an elevator pivot arm that is soldered to the end of the elevator wire. There should be a one to one correlation between the operator's finger movement and the elevator riser movement. If there is a delay in riser motion due to slack or free play in the wire, the instrument should be sent in for an elevator adjustment. If the riser jerks and/or moves erratically, the scope usually will require an elevator wire and sus-pipe replacement.

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**THE ELEVATOR WIRE CHANNEL CLEANING TUBE MOUNT** on the body allows fluids forced from a syringe to enter the cleaning tube and travel 3 inches to the elevator rod sealing block. This block permits the elevator rod to move in and out while allowing fluids to flow down through the channel without invading the interior of the scope. This sealing block has two o-ring seals that compress the elevator rod but do not restrict its movement which is why reprocessor manufacturers are having a difficult time designing a method to flush the elevator wire channel. Too little pressure doesn't produce enough flow to adequately reprocess; too much pressure allows fluid to bypass the o-rings and enter the scope's interior. The o-rings wear with instrument use thus allowing the pressure seal around the elevator rod to decrease.

Pentax uses a different design on their 30 and 40 series flexible duodenoscopes. The elevator wire is sealed at the tip with an o-ring which prevents debris from refluxing up the elevator wire channel. The integrity of this o-ring should be monitored closely by your endoscope service company. Pentax has further improved duodenoscope cleaning capabilities by designing a removable distal cap available with the 40 series models.

Even if reprocessing the elevator wire channel is time consuming and not yet automated, continue to take the time to manually reprocess the channel after each procedure. This channel should be reprocessed following the same steps used for any other channel in the endoscope: flush with cleaning solution, rinse with clear water and purge with air; disinfect, rinse and purge with air; flush with alcohol and again purge with air. Make sure the instrument is stored hanging vertically in a well-ventilated area with all channels dry and all valves removed from their ports.