DESIGNING NEXT GENERATION

DISPOSABLE DUODENOSCOPES

Olin College of Engineering
SCOPE

Project Goal

Despite efforts to thoroughly clean a reusable duodenoscope before every procedure, complex mechanisms within the device are near-impossible to fully clean. This has prompted Boston Scientific to introduce a cost-effective, disposable duodenoscope that offers the same functionality as existing reusable duodenoscopes.

In an effort to innovate beyond the traditional duodenoscope, we were asked to develop a proof of concept design that leverages the disposable nature of the product, improving the ERCP procedure and physician usability.

What is a Duodenoscope?

A duodenoscope is a device consisting of a handle, control interface, and a tube with a small camera at the tip. Two dials on the handle enable precise, two-axis steering of the tube to easily navigate the tube into the body for ERCP.

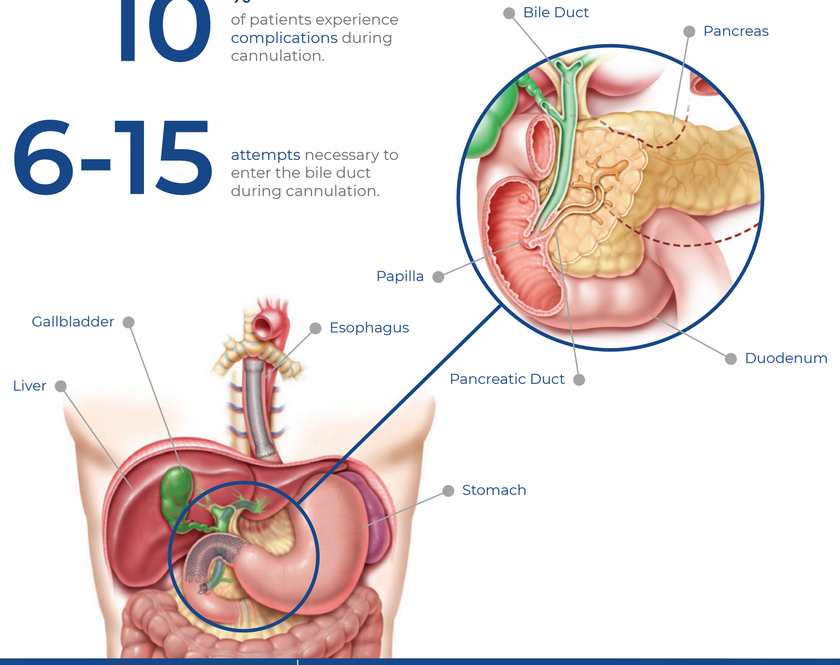
What is ERCP?

Endoscopic retrograde colangio-pancreatography (ERCP) is a non-invasive procedure to treat complications in the bile duct such as stones and strictures. The physician threads the insertion tube of the duodenoscope down the esophagus and into the duodenum, treating these complications with small tools passed through the duodenoscope.

Cannulation is the process of passing through the contracted muscle at the entrance to the bile duct. We identified cannulation as one of the most difficult parts of an ERCP procedure.

10 % of patients experience **complications** during cannulation.

6-15 **attempts** necessary to enter the bile duct during cannulation.



Our Design Process

We spoke with physicians and technicians who assist in the procedure to understand areas of opportunity and validate our ideas. We also visited Boston Scientific manufacturing plants in Indiana and Minneapolis to speak with engineers and understand how to bring our ideas to reality.

Results

We generated a proof of concept prototype for a new design that addresses challenges associated with cannulation. We also submitted IP documentation for four additional ideas generated throughout the design process.

1 CAD Design

1 Working Demo

4 IP Filings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