Boston Scientific
Locking Device Redesign

Ransom Byers, Alex Dillon, Tom Kochem
with Dan Rice and Allison Schmidt '07
advised by Professor Jessica Townsend

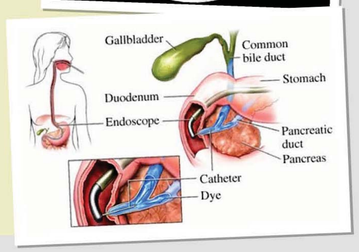
Background

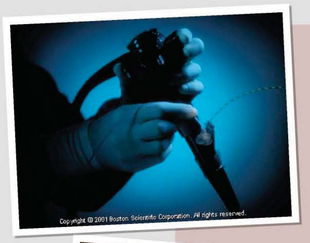
Boston Scientific

- Started in late 1960's
- Focused on less invasive procedures
- 15,000-product portfolio
- 28,000 Employees with 26 centers
- Four core business groups: cardiovascular, endoscopy, neuromodulation, and cardiac rhythm management

ERCP: Endoscopic Retrograde Cholangiopancreatography

- Hot wire cutter catheter used to open Sphincter of Odi
- Body cavity is pressurized, or insufflated, to aid the operator's vision
- Requires precise manipulation of the catheter
- Difficult locations can be re-attained easily through use of a guidewire
- Guidewire must be secured against unintentional movement





Endoscope

- Can access as far as upper gastrointestinal tract
- Provides video image from tip
- Tip is controlled by knobs operated by the surgeon
- Has "lumens" for inserting catheters
- There are many catheters to perform a variety of procedures

Problem Statement

Design an improved device which exceeds the current product's standard with regards to attachment, sealing, and locking of the guidewire.

State of the Art

Boston Scientific Microvasive

- Model approximately five years old
- Locks two guidewires
- Two-piece design has separate sealing cap and locking piece
- Strap is difficult to use
- Separate pieces mean critical wire lock distance has potential variability

Cook Group Fusion

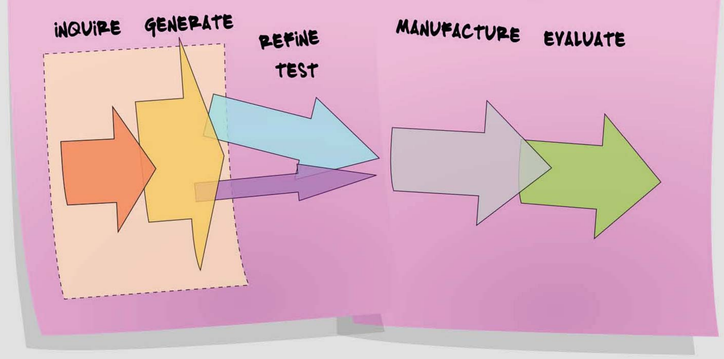
- Released less than a year ago
- Integrates the soft natural latex sealing plug inside a polycarbonate locking device exoskeleton
- Snaps onto the endoscope's catheter port with some effort
- Sealing method makes catheter insertion difficult
- Locking mechanism is easy to use

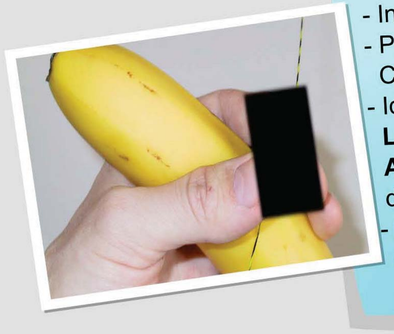
Design Process

USER-CENTERED DESIGN

- Research and Context from the Fall Semester
- Boston Scientific Briefings
- Interaction with the Devices
- IP Search
- Device Dissections
- Interview and Observation with Dr. Pleskow and his Team

A FULL DESIGN PROCESS





CONCEPT GENERATION

- Independent Initial Ideas
- Post-It Generation and Collisions→Idea Fragments
- Ideas in the realms of **Locking**, **Sealing**, and **Attachment**; 27 invention disclosures generated
- Holistic design goals guided development of Integrated Locking Device concepts