

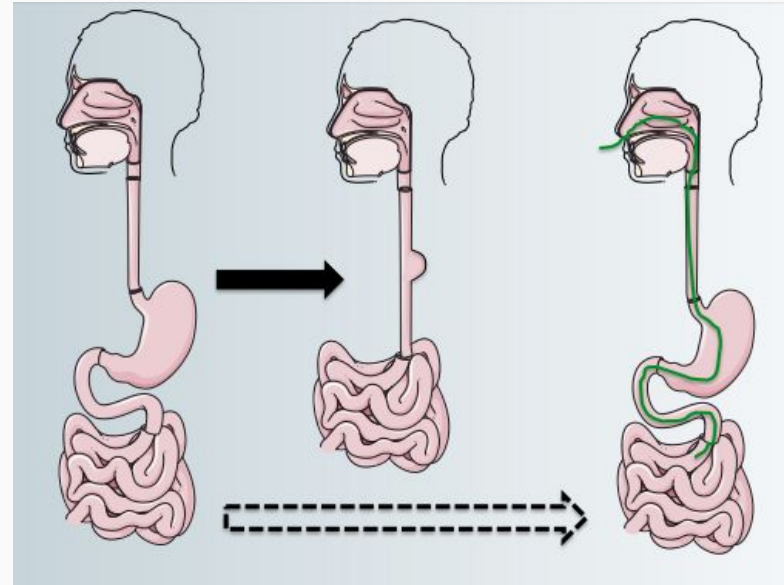
FeedRite Feeding Tube

Alexander Heilman
Graham Husband
Katherine Jones
Ying Lin



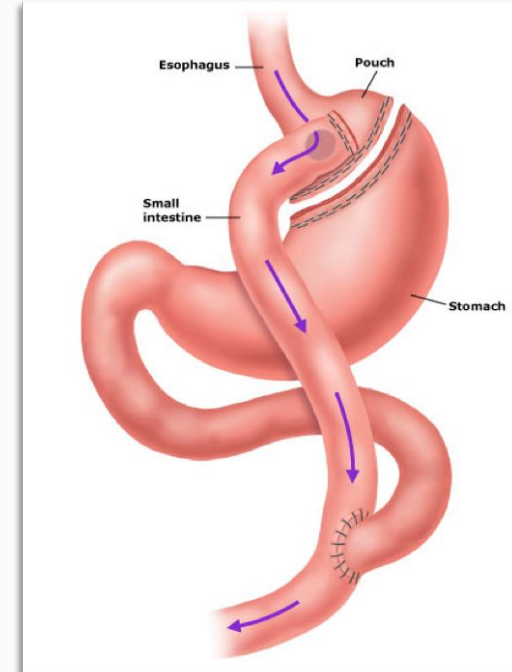
Problem

Gastric bypass is an invasive procedure that requires up to 5 days of hospitalization and has a narrow patient population (those with a BMI greater than 40 or greater than 35 with obesity-related conditions; roughly 18 million Americans) in comparison with the rate of obesity in America (78.6 million Americans; defined as BMI > 30). In addition, gastric bypass can cost ~\$25,000 (depending on state of residence), reducing the number of patients who receive the procedure to 1% of those who qualify. Current analogs to gastric bypass use naso-duodenal feeding tubes that rely on repeated fluoroscopic procedures and several hours for proper tube placement.



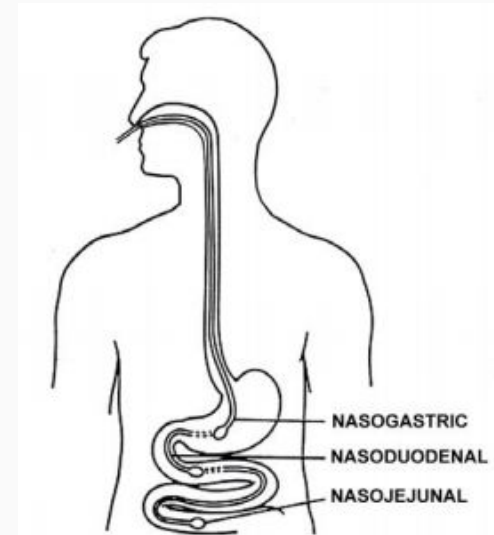
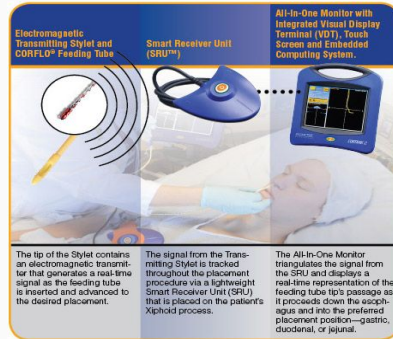
Background

- ❑ Problems: Obesity, Type II Diabetes
- ❑ Solution: Gastric Bypass Surgery
 - ❑ Lose weight, may reverse diabetes
 - ❑ Expensive
 - ❑ Invasive and risky



Background

- Alternative Solution: Naso-duodenal Feeding Tube
 - Confirmation of placement - X-ray
 - Existing device - Cortrak EAS
 - Our design - less expensive, confident placement



Potential Market

- ❑ Obesity and Type II Diabetes - 9 % of American adults
- ❑ Gastric Bypass Procedures - 180,000 per year
- ❑ Marketing:
 - ❑ Medical professionals at hospitals
 - ❑ Individual patients at home

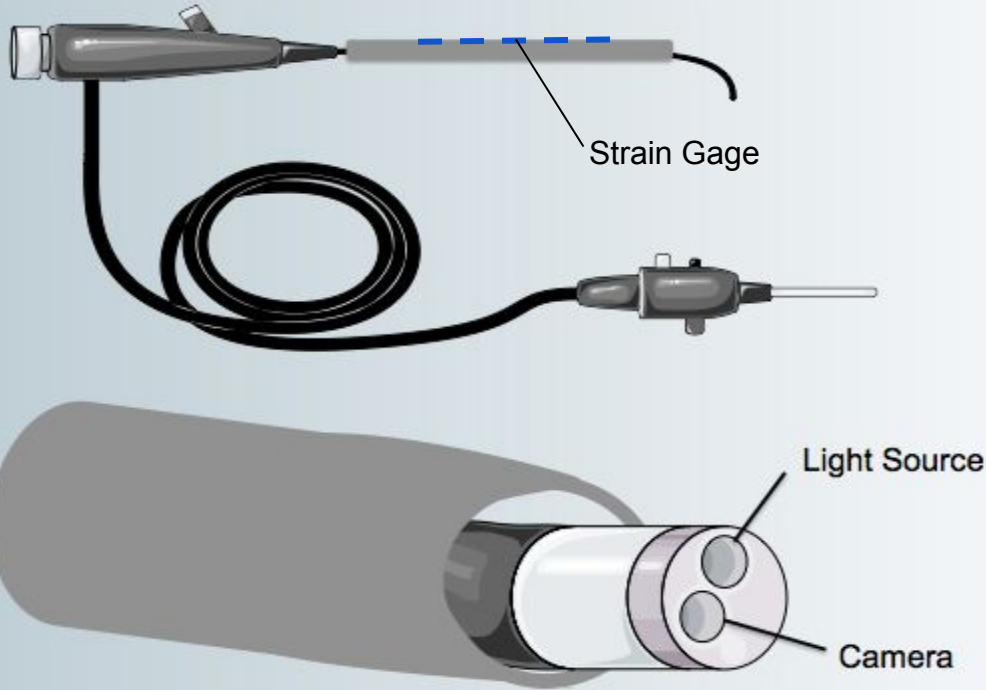
Needs Assessment

- ❑ Device must be radiation-free
- ❑ Device must integrate a second method that ensures proper tube positioning
- ❑ Feeding tube must require 1 outpatient appointment for placement
- ❑ Tubing must be biocompatible
- ❑ Must be portable such that it can be used throughout a hospital
- ❑ Primary placement tool must be detachable from tube after placement
- ❑ Device must verify differences between duodenum and jejunum
- ❑ Device must provide real-time updates of tube position

Original Design Components

- ❑ Confirming Position
 - ❑ pH sensors
 - ❑ Gastrointestinal motility sensors
- ❑ Imaging
 - ❑ Ultrasound
 - ❑ Camera
- ❑ Aim
 - ❑ Minimize cost and equipment
 - ❑ Maximum return for money invested

Design Components



- ❑ Mimic endoscope surrounded by feeding tube
- ❑ Camera
 - ❑ Visualize current position
 - ❑ Measure gastrointestinal motility
- ❑ Strain Gages
 - ❑ Track path
- ❑ Removable insert

Future Design Considerations

- ❑ Measure motility using electromyography
- ❑ Handle and camera/light controls
- ❑ Attachment and detachment of tube for smooth insertion and removal
- ❑ Specific materials

Conclusions

- ❑ Effective alternative to gastric bypass surgery
- ❑ Very open market
 - ❑ Only one competitor
 - ❑ Significant differences between the two devices
- ❑ Many options for placement assessment
 - ❑ Imaging
 - ❑ Physiological Sensors
 - ❑ Electromyography

Next Steps

- ❑ Advisor Meetings
 - ❑ Dr. Naji Abumrad - Thursday, November 19
 - ❑ Dr. Pietro Valdastri, Dr. William Grissom, Dr. Cynthia Paschal
- ❑ Narrowing down features
- ❑ Locating facility to test device
- ❑ Initial prototyping