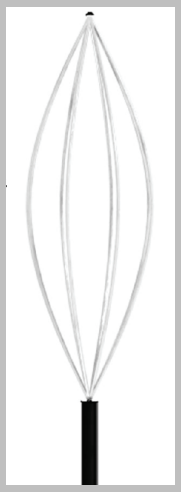
BIOE 451/452: Bioengineering Design

An opportunity for students to tackle and solve a design problem in bioengineering

April 2008

Gallbladder Removal Device

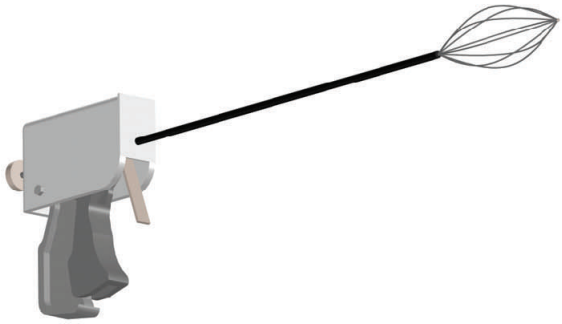


TEAM LITH-X

Alex Bryant,
Ashley Smith,
Stephen Wallace
TeamLithX [at] gmail.com

Bioengineering Design Challenge

More than 700,000 gallbladder removals are performed each year to cure gallstone disease and prevent further complications at a total cost of over five billion dollars. While laparoscopic techniques have decreased patient recovery time and cost compared to traditional open surgery, a large increase in the number of procedures has offset these savings, such that gallstone-related diseases are the most prevalent and costly of all digestive ailments today. Normally, the gallbladder is pulled through a 10mm incision, which often must be extended in the case of larger gallstones, causing undue pain and leading to longer recoveries. A device is needed to safely and effectively allow the removal of these stoned-filled gallbladders through an incision of 5mm.



Appropriate Solution

Through the use of a high strength wire basket, similar to those used for common bile duct stone removal, Team Lith-X's laparoscopic gallbladder removal device will effectively remove both gallbladder and stones through a 5mm incision. This crushing instrument serves to reduce patient pain and recovery time, while preserving the quick removal procedure necessary for practical use when physicians are faced with problematic gallstones larger than 10mm. As their capstone design project, BIOE451/452: Bioengineering Senior Design, Alex Bryant, Ashley Smith, and Stephen Wallace would like to thank all of the mentors who contributed to the design process, as well as Carlos Amaro, Joseph Gesehues, and Janet Wheeler from Rice University.

Current Status

Currently, a final prototype has been constructed with proper specifications to slice the gallbladder and crush any enclosed stones. Testing will be done with animal tissue and model gallstones to assess the mechanical integrity and efficacy of our device. The device in its current form has been presented at the Rice-TMC Design Forum.

BIOENGINEERING DESIGN AT RICE

Rice University
Dept. of Bioengineering
6100 S, Main St. - MS142
Houston, TX 77005

Phone: 713-348-4156
Fax: 713-348-5877

Mentors:
Dr. Brian Dunkin (Methodist)
Dr. Erik Wilson (UT-Houston)
Dr. Maria Oden (Rice)
Dr. Stephanie Kreml (Rice/Baylor)
Stephanie Nemir (Rice/Baylor)

This initiative is made possible by the Brown School of Engineering and the Department of Bioengineering at Rice University.