

Alternative design matrix

	Description of Device/Idea	Benefits	Questions Involved, Possible Challenges
1	FOR SIZE-Use some kind of foam that would be squirted into the esophagus through a tube inserted in a way similar to the balloon. The foam would “harden” (or at least become more firm) in the form of the stricture.	<ul style="list-style-type: none"> -Creates a representative model of the stricture -Easy to measure size -Inexpensive-dependent upon material type 	<ul style="list-style-type: none"> -Research needs to be done on finding a foam type that may work. -Material must harden but still remain flexible -How will device pass through the “corner” at the meeting of the esophagus and mouth? -Must also involve camera to know when to squirt foam in (When is device actually in stricture?)
2	FOR SIZE-Modified balloon-use the same balloon procedure that is used to stretch stricture but make balloon out of a plastic material that will stretch out but not recoil to original size or shape. Then, when the balloon is deflated and removed, it will hold the form of the stricture to be reinflated for viewing by doctor.	<ul style="list-style-type: none"> -Easy procedure -Little modification needed for entrance of device (same technique as current balloon would be used) -Removal wouldn’t be a problem because “model” would be deflated upon removal from esophagus 	<ul style="list-style-type: none"> -Availability of a plastic material of this description -When reinflated for viewing, balloon must not be overinflated or model will be ruined
3	FOR SIZE-Couple barium swallow and X-ray to manually see size of stricture	<ul style="list-style-type: none"> -Technology already exists -Equipment would already be available to most doctors 	<ul style="list-style-type: none"> -Most patients not wanting to swallow barium -Expensive -Somewhat tedious for doctor
4	FOR SIZE-Use some type of sonar device that when placed in the center of the stricture, it would be able to return the size of the opening	<ul style="list-style-type: none"> -Very accurate -Could be automated to give readout almost immediately 	<ul style="list-style-type: none"> -Very expensive -Would require good understanding of sonar abilities -Challenge of making the device small enough and getting it into the esophagus
5	FOR COMPLIANCE-Modify the current syringe used to inflate balloon to give us a pressure readout that would indirectly represent tissue compliance	<ul style="list-style-type: none"> -Design of actual device would be fairly easy (not counting interfacing) -Would require a modification to the equipment currently used 	<ul style="list-style-type: none"> -Would require some kind of interfacing system-could be very challenging -Requires research on the varying pressures and how they relate to compliance (Which pressure values correspond to which compliance?)
6	FOR COMPLIANCE-Design device using fiberoptic pressure sensor by FISCO (possibly place the sensor inside of current balloon to monitor pressure)	<ul style="list-style-type: none"> -Very small in size -Interfacing system already available (also from FISCO) -Immediate readout of pressure, which could probably be altered to give a compliance readout 	<ul style="list-style-type: none"> -VERY expensive (for interfacing system) -Alteration of readout needed-convert pressure readings to compliance -Requires relationship between pressure and compliance