

Surgery without scars

Innovation Day 2008

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22 October 2008



Surgery Without Scars

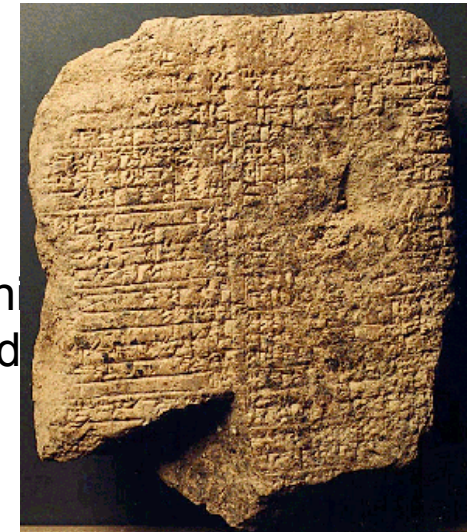
Agenda:

- 1** **What Surgery Was**
- 2** **What Surgery Is**
- 3** **What Surgery is Becoming?**
- 4** **Natural Orifice Surgery**
- 5** **What will make NOS work**

What Surgery Was

Evidence of surgical interventions

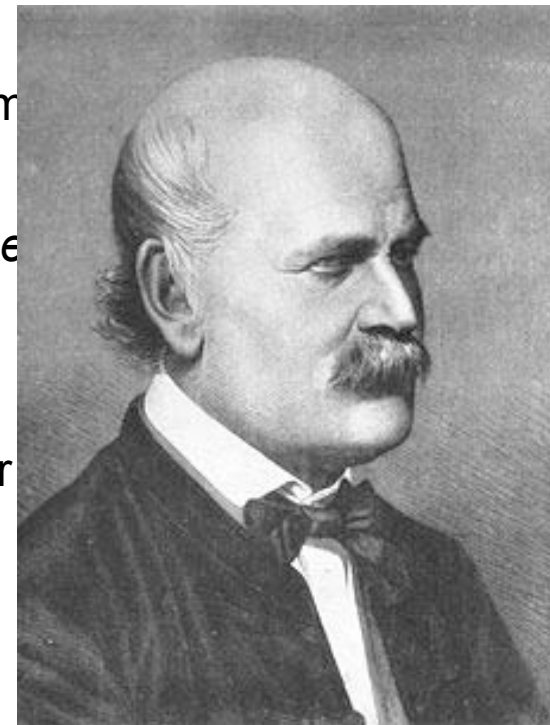
- Hammurabi's code (1760 BC)
 - If a physician make a large incision with an operating knife and open a tumor (over the eye) with an operating knife, and shall receive ten shekels in money.
- Bian Que (300 AD) conducted a two way heart transplant & may have used general anaesthesia
- Barber Surgeons



What Surgery Was

What Made Surgery a Science?

- Controlling Infection
 - Hungarian doctor Ignaz Semmelweis instituted com 1847 at Vienna General Hospital
 - Joseph Lister: Published *Antiseptic principles of the* *The Lancet* 1867:
- Controlling Pain
 - Dentist William Thomas Green Morton: MGH Ether
- Controlling Bleeding
 - Sutures in the 10th Century
 - Blood groups in the 20th Century



What Surgery Was

What Made Surgery a Science?

- Ability to see inside the body without surgery
 - X-Ray
 - Wilhelm Conrad Röntgen ~ 1895
 - CT
 - Sir Godfrey Hounsfield / Allan McLeod Cormack ~196
 - Originally “EMI Scanner”
 - MRI
 - Uses no ionizing radiation
 - Particularly useful in soft tissues
 - First human use 1977



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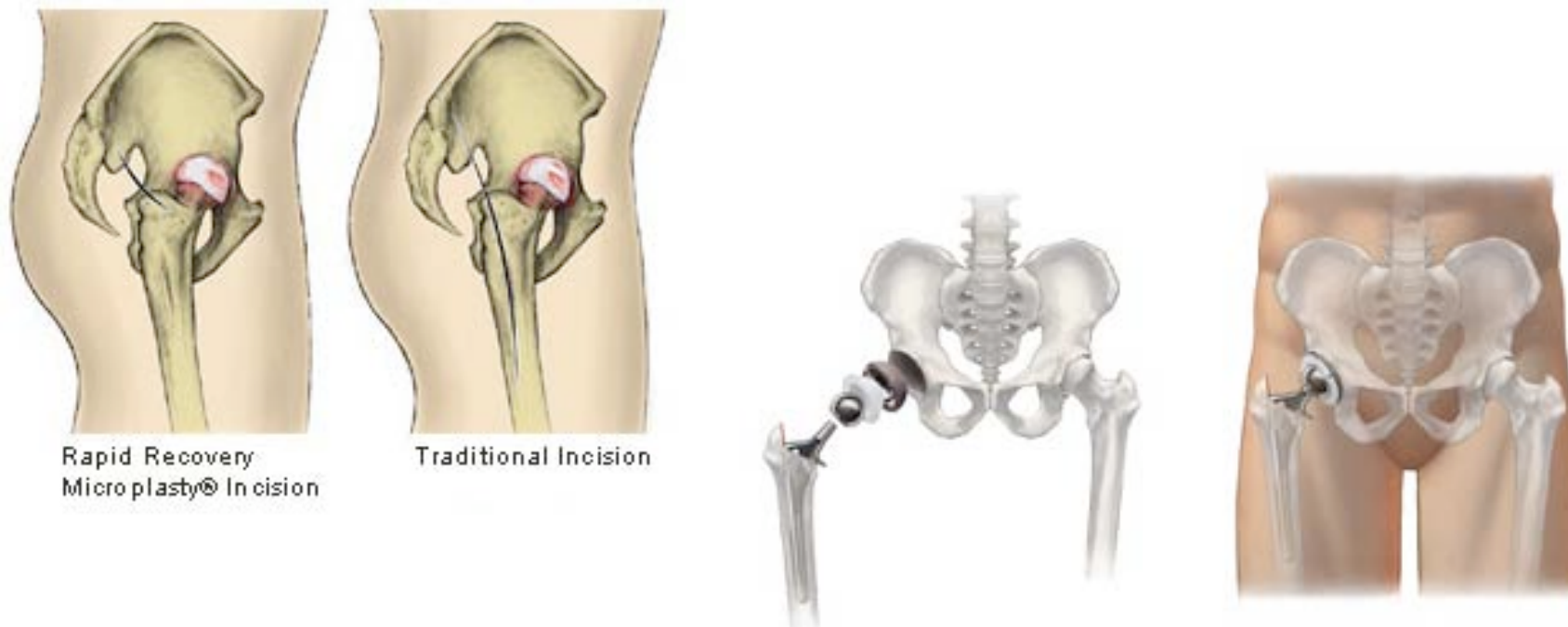
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What Surgery is

What is Surgery Today?

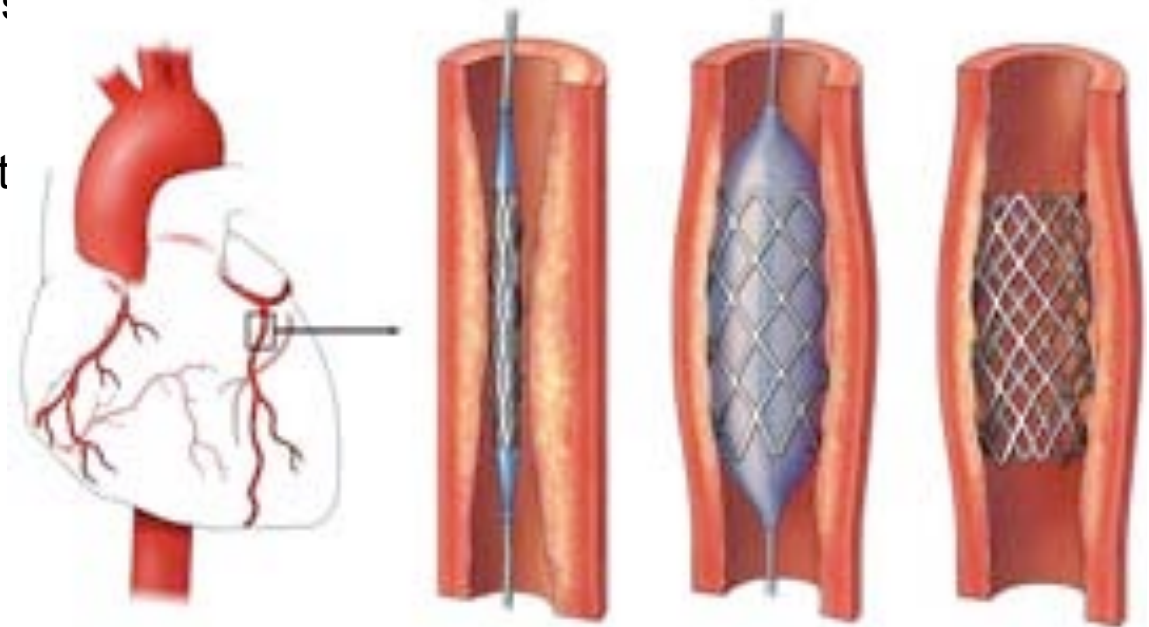
- Minimally invasive hip/knee/etc. replacement



What Surgery is

What is Surgery Today?

- Stenting
 - 70's/80's: PTCA (Balloon)
 - 90's: Bare Metal Stents
 - Late 90's: Drug Eluting St



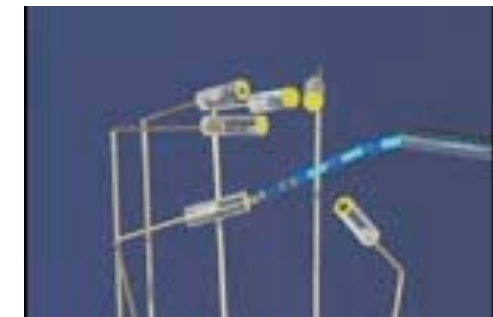
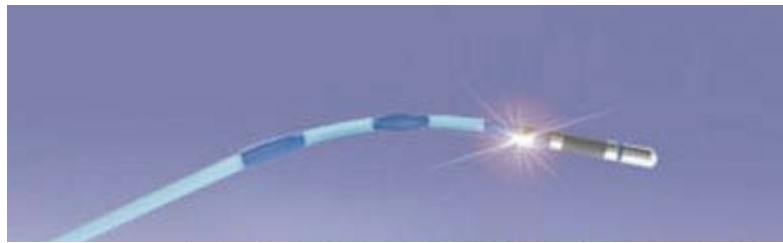
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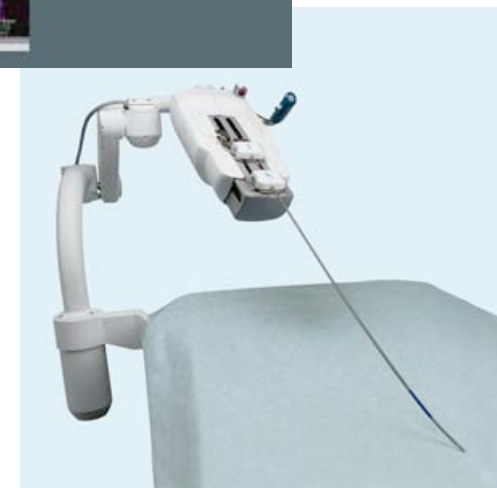
What Surgery is Becoming?

Stereotaxis



What Surgery is Becoming?

Hansen Medical



What Surgery is Becoming?

Intuitive Surgical da Vinci Surgical System



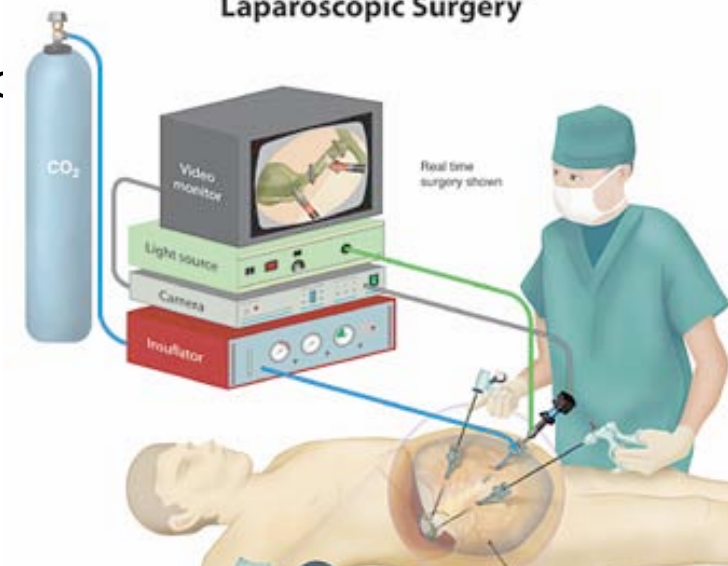
What Surgery is Becoming?

Paradigm Shift

- 1980 Kurt Semm, MD removed a woman's appendix with
- President of German Surgical Society requested Dr. Semm
- Journal of Obstetrics & Gynecology declined to publish Dr. Semm's "radical" paper
- *Patients demanded the procedure*
- In U.S. in 1999, 100% of gallbladders were removed
are done laparoscopically



Laparoscopic Surgery



Surgery Without Scars

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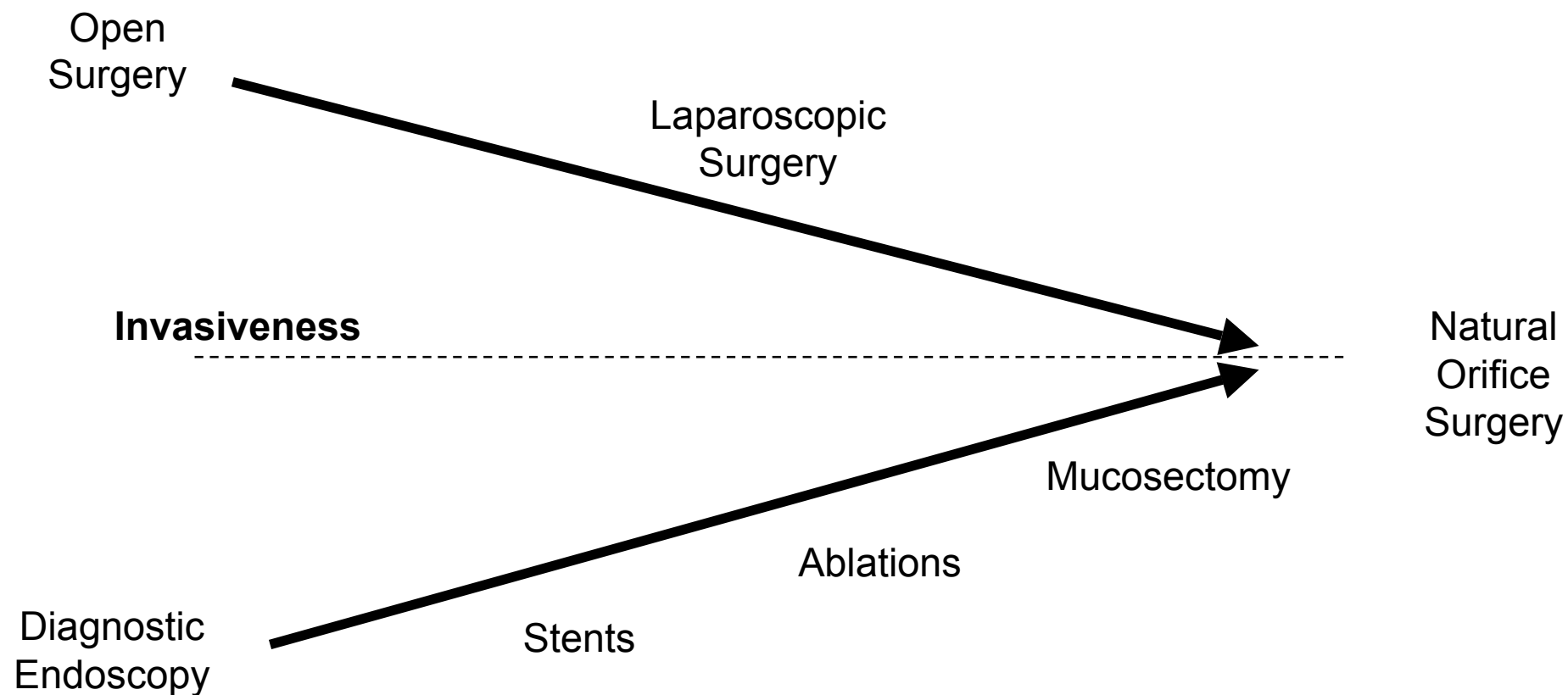
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Surgery without Scars

- Japanese surgeons noted that when stomach wall was perforated during tumor resection, etc. massive expected complications did not occur
- Natural Orifice Surgery
 - N.O.T.E.S.® (Natural Orifice Transluminal Endoscopic Surgery)
- Performing surgery via mouth, vagina, urethra, rectum

Natural Orifice Surgery

Who will perform NOS Surgeries?



Adapted from Swanstrom et. al

NOS Working Groups

- Natural Orifice Surgery Consortium for Assessment & Research
 - NOSCAR: <http://www.noscar.org/>
 - American Society for Gastrointestinal Endoscopy: ASGE
 - Society of American Gastrointestinal & Endoscopic Surgeons: SAGES
- European Association for Transluminal Surgery
 - EATS: <http://www.eats.fr/>
- New European Surgical Academy
 - NESAC: <http://www.nesacademy.org/index.html>

Surgery Without Scars

Benefits of NOS

- Decreased pharmacy costs
- Reduce short & long term post-op complications
 - Adhesions, bowel obstructions, etc.
- Shift inpatient care to outpatient settings
 - Cost of O.R. time exorbitant

NOS State of the Art

Mid “10’s” of procedures now performed:

- Transgastric Appendectomy
- Transvaginal Cholecystectomy
- Transgastric Cholecystectomy

Surgery Without Scars

Hurdles to be Overcome

~~Access to peritoneal cavity~~

~~Infection~~

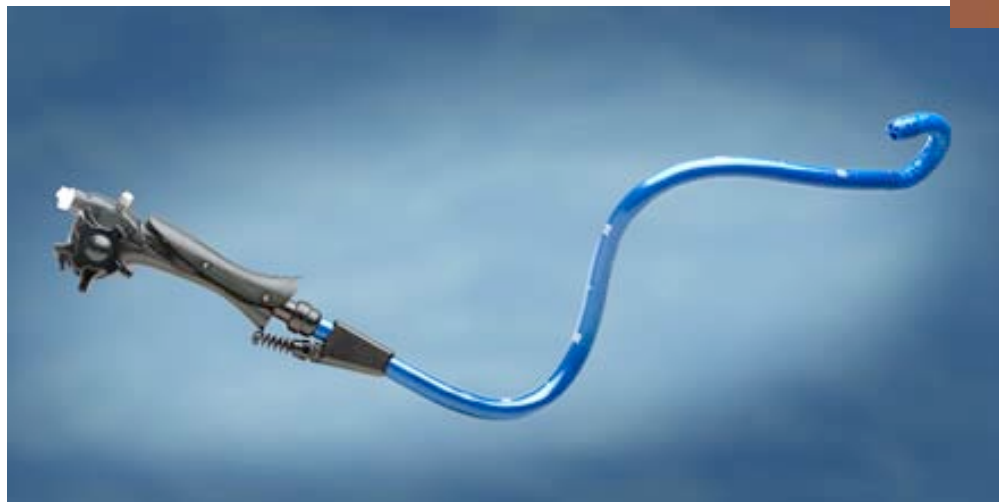
Spatial Orientation / Manipulation

Suturing & Closure

- At SAGES '07, fewer than 18% of self-proclaimed advanced endoscopic surgeons could tie a knot endoscopically in-vivo in less than 10 minutes

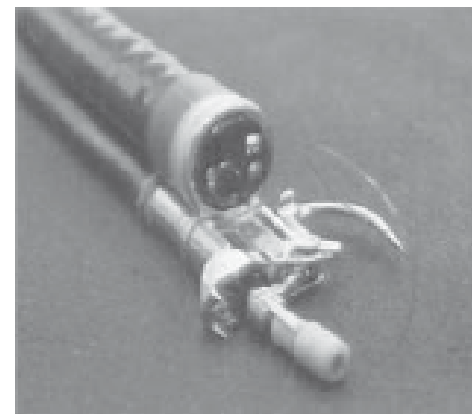
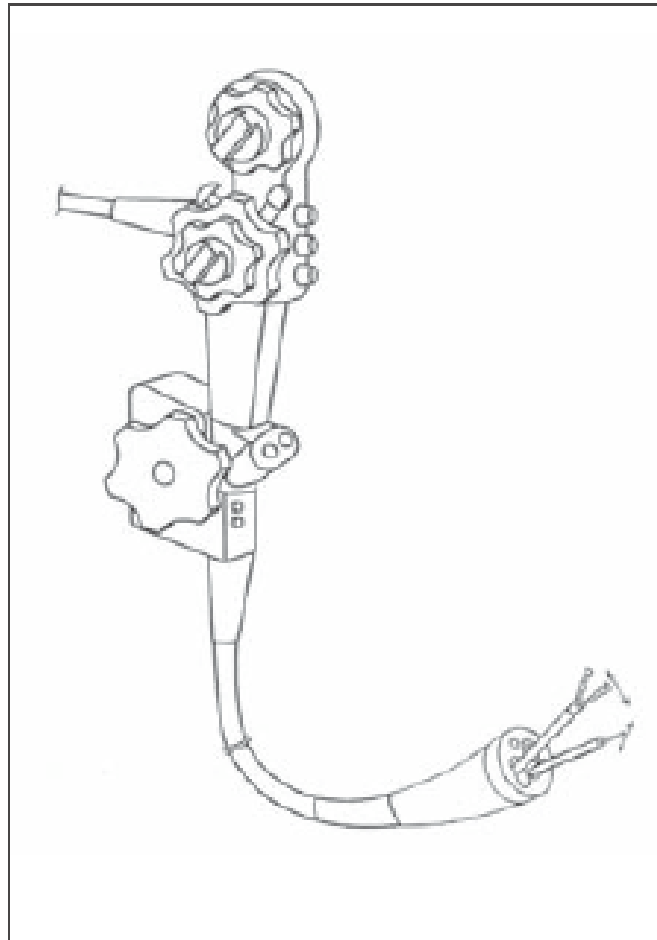
What will make NOS work

USGI
TransPort & Cobra



What will make NOS work

Olympus

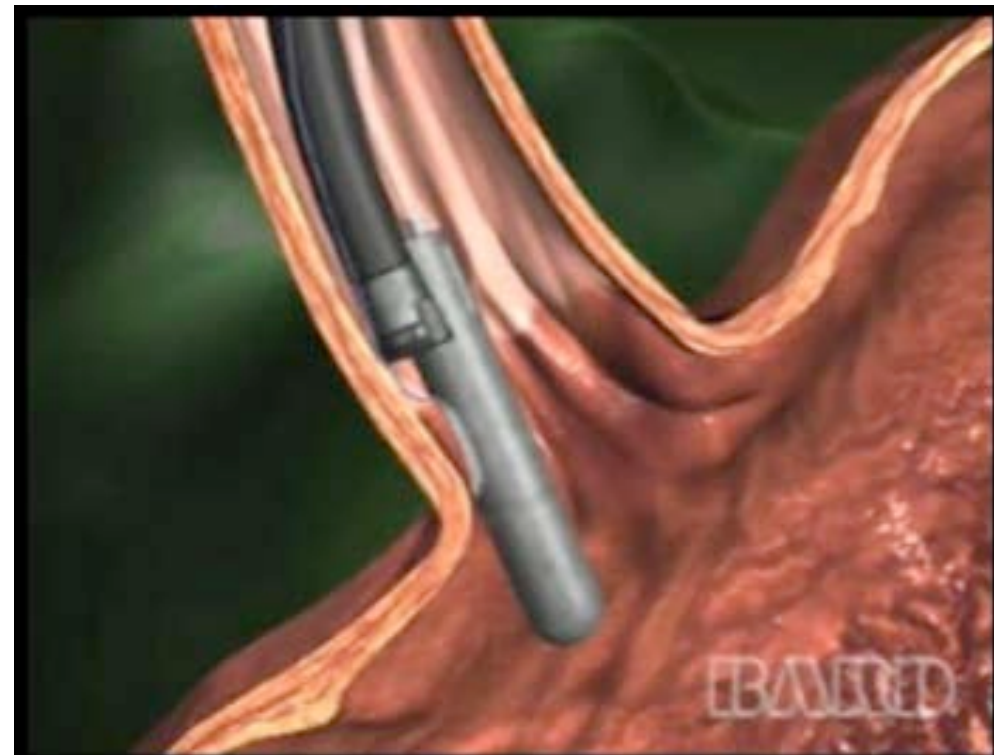


What will make NOS work

**EndoGastric Solutions
StomaphyX & EsophyX**

**CR Bard
EndoCinch**

- Moving GERD treatment from Laparoscopic to Endoscopic



Conclusions

- Minimally invasive (non-invasive?) is the future
- Penetration of minimally invasive surgery will be driven by simple tools
- Moving surgery from the OR to outpatient setting is becoming routine
- Engineer / Scientist / Surgeon collaboration is essential
- The right technology for the job

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 Unique instrumentation for NOTES from devices to computer-driven endoscopes ()
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