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NOTES



M. Hagen

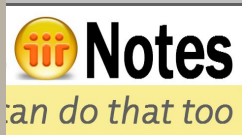
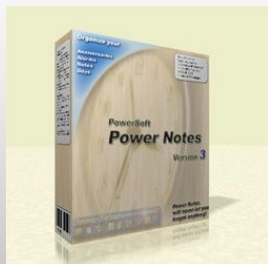
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University of California San Diego



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NOTES???





NOTES!!!

Natural Orifice Transluminal Endoscopic Surgery:

- Intentional puncture of one of the viscera (e.g., stomach, rectum, vagina, urinary bladder) to access the abdominal cavity
- With an endoscope (flexible or stiff)
- To perform an intraabdominal operation

Pearl JP, Ponsky JL: J Gastrointest Surg. 2007 Dec 5



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This image shows a surgical procedure being performed on a pig. A large, dark, curved surgical instrument is visible, positioned over the animal's body. The pig is lying on a green surgical drape. The background is a plain, light-colored wall.

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This image shows a surgical procedure being performed on a pig. A gloved hand is visible, holding a surgical instrument. The pig is lying on a green surgical drape. The background is a plain, light-colored wall.



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NOTES before NOTES I

Ott, Ventroscopia. *Zhurnal Akusherstva I Zhenskikh Boleznel.*
1901;15:1045–1049

Dimitri Oskarovich Ott performed the first endoscopic examination of the abdominal cavity through a posterior vaginal incision using a head mirror and speculum:

1901
↓
1st VENTROSCOPY

1900 1950 1990 2000 2002 2004 2006 2008


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NOTES before NOTES II

Decker A, Cherry T. Culdoscopy, a new method in diagnosis of pelvic disease. *Amer J Surg*. 1944;64:40-44

Culdoscopy



1944



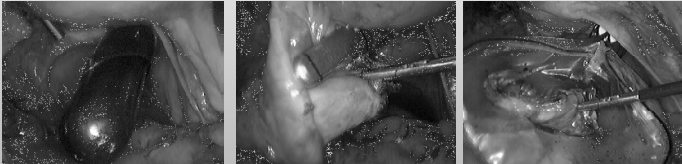
1900 1950 1990 2000 2002 2004 2006 2008
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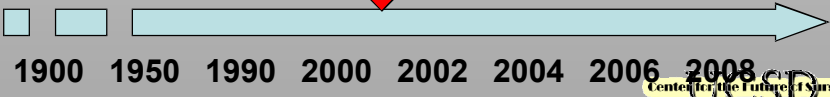
NOTES before NOTES I

Tsin DA, *J Am Assoc Gynecol Laparosc*. 2001 Aug;8(3):438-41

Operative Culdolaparoscopy (MA-NOS)



2001



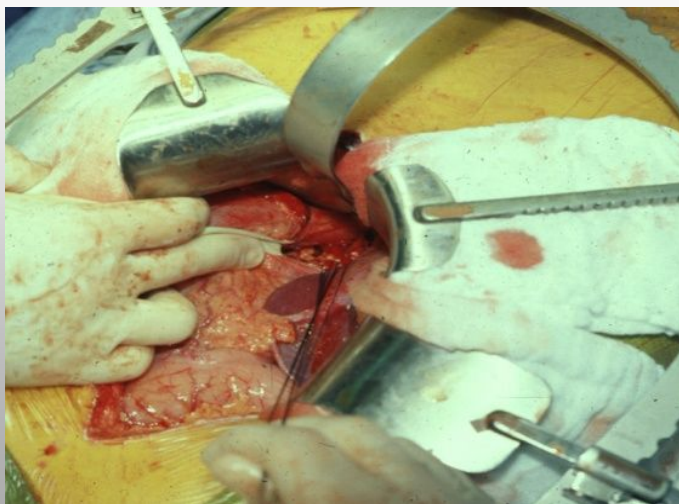
1900 1950 1990 2000 2002 2004 2006 2008
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Open surgery



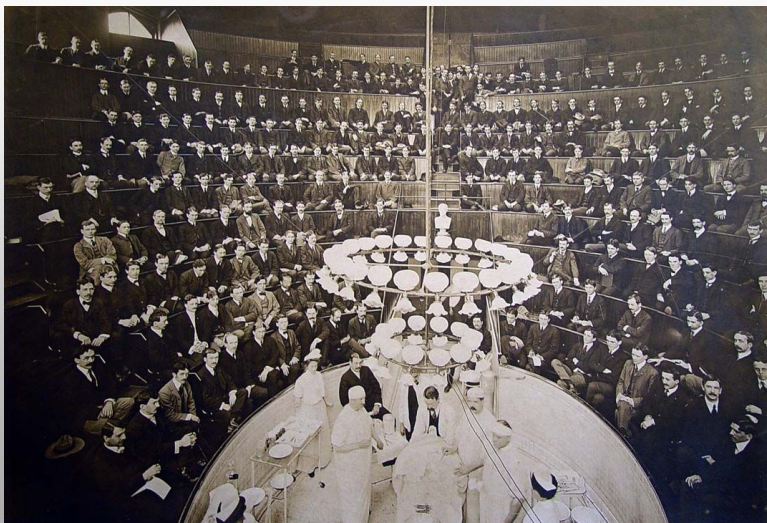
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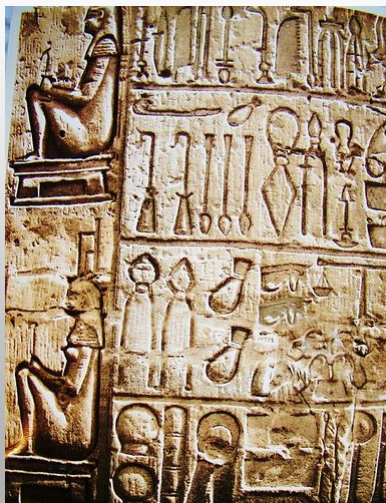
Operating Theater



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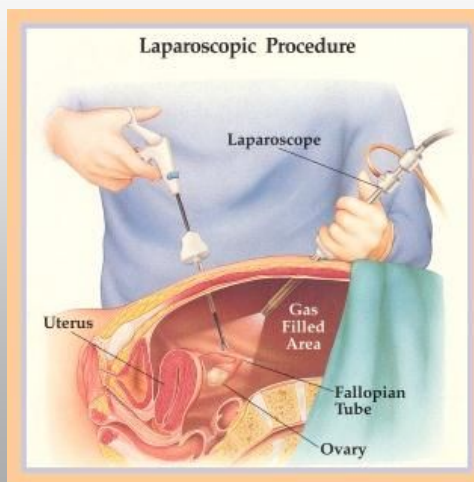
Surgical Instruments



Development of Laparoscopy



Georg Kelling
1st experimental
laparoscopy in 1910 in
dogs





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Robotic Surgery



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Single Incision Laparoscopy I



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Single Incision Laparoscopy II



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Single Incision Laparoscopy III



image from pnavel.com

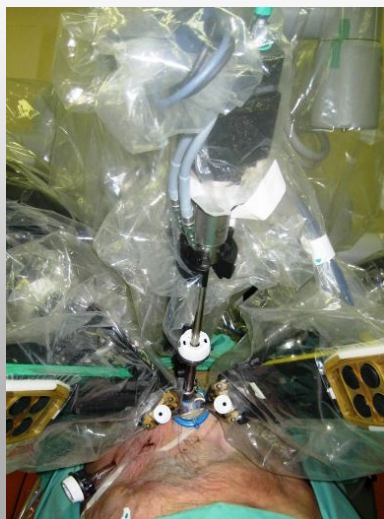
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Single Incision Robotic Laparoscopy I



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Single Incision Robotic Laparoscopy II



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Single Incision Robotic Laparoscopy III



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NOTES

2007/2008

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NEW METHODS & MATERIALS

**Flexible transgastric peritoneoscopy:
a novel approach to diagnostic and
therapeutic interventions in the
peritoneal cavity**

Acute and survival models in pigs:

- Transgastric access
- Peritoneal cavity exploration
- Liver biopsy
- Gastric closure

Kalloo AN, Gastrointest Endosc. 2004 Jul;60(1):114-7 UCSD Center for the Future of Surgery

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NOTES

2007/2008

Kalloo's first Publication 2004

Basic experiments

First patients: Rao's AE 2004

More complex and detailed lab research

Clinical NOTES In 1st world

T

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NOTES: First Patients

Reddy & Rao

« Per oral transgastric endoscopic appendectomy in human. »

45th Annual Conference of the Society of Gastrointestinal Endoscopy of India; February, 2004; Jaipur, India.

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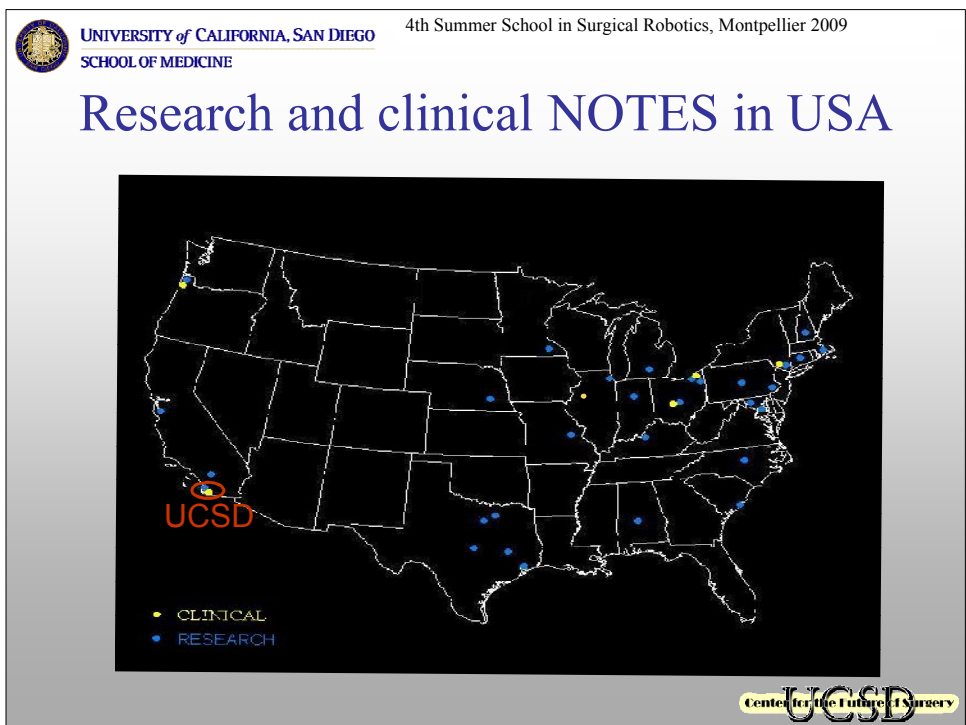
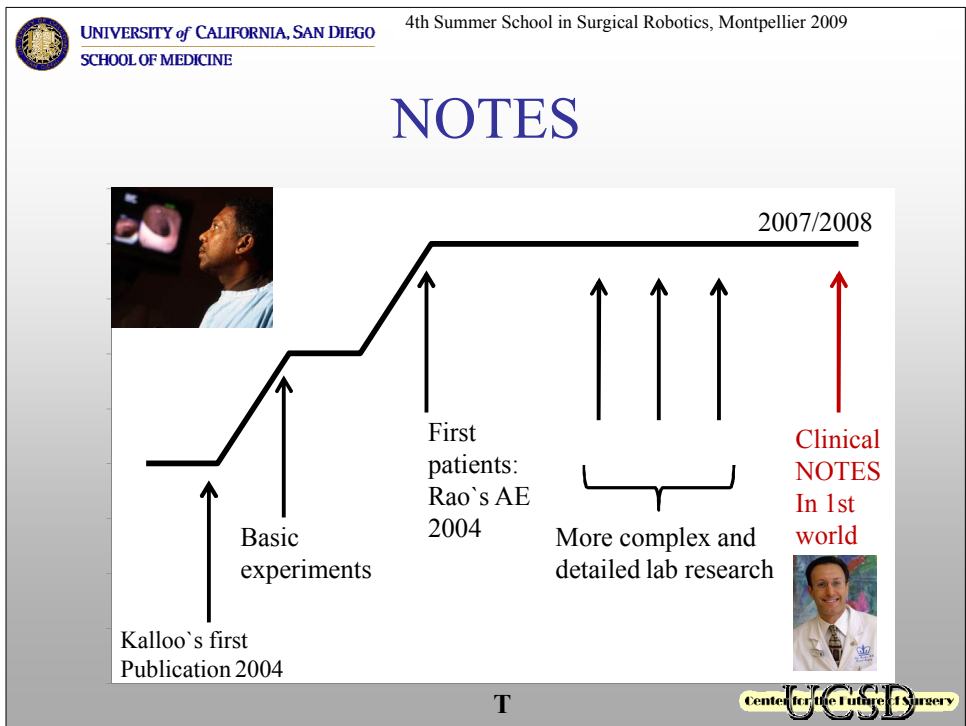
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NOTES: Further Research

- Tubal Ligation
- Cholecystectomy
- Gastrojejunostomie
- Oophorectomie
- Tubectomy
- Splenectomy
- Nephrectomie
- Pankreatic Resection

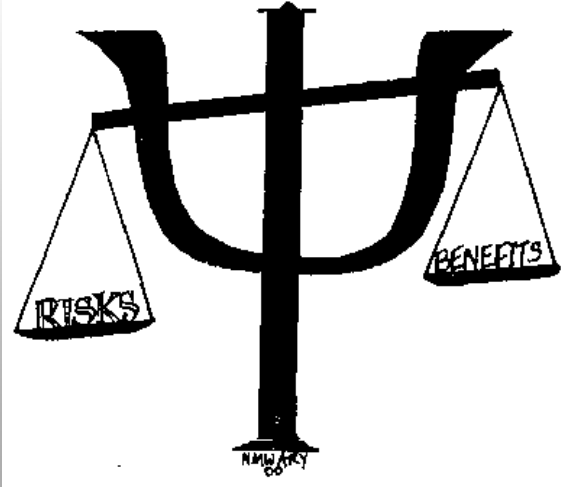
Sex: Age: Name:
D. O. Birth: 11/07/2005
08:22:14
SCV-----70

Comment:



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Why NOTES???




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Rationale for NOTES

- No abdominal wall incisions
- No wound infections and hernias
- Less pain
- Less adhesions



- NO scars → perfect cosmetic outcomes

www.noscar.org

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Importance of cosmetics

**Safer, More Affordable
Cosmetic Surgery**
...because you deserve it!

Specializing in body contouring and facial rejuvenation, Dr. Kaplan uses the latest advancements in cosmetic surgery entirely with local anesthesia.


Financing Available
407.401.7812

Kaplan Cosmetic Surgery Centers
www.kaplancosmeticsurgery.com





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Geneva Cosmesis Study

Onsight poll at "day of open wards" + ongoing interviews

Questionnaire:

- Importance of cosmetic issues in abdominal surgery
- Satisfaction with previous scars
- Favoritism of scarless surgery
- Favoritism of scarless surgery if risks are increased
- Accepted percentage of risk rise
- Importance of further research and investments

Questions answered on VAS from 0 to more than 100% or 1 to 10

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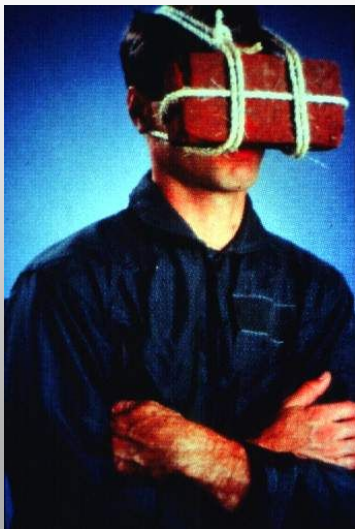
Conclusion Geneva cosmesis study

- People strongly favor the idea of scarless abdominal surgery
- No differences between genders have been found
- Certain risks are accepted in order to achieve scarless surgery
- Further research and investments seems important

→ People have a desire for NOTES!!!



Rationale for NOTES II



The NOTES-concept :

Human ingenuity and technological advance can continue to reduce the trauma and discomfort of effective surgery



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NOTES Today at UCSD



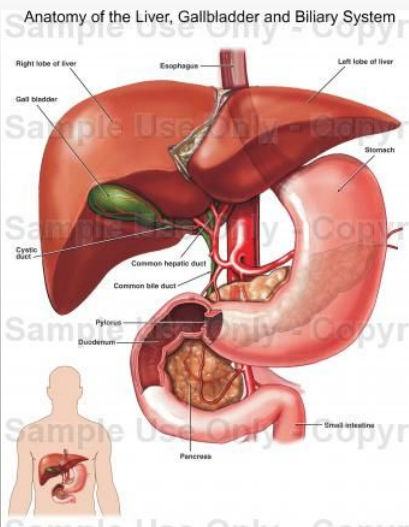
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Cholecystectomy



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Transvaginal Cholecystectomy I



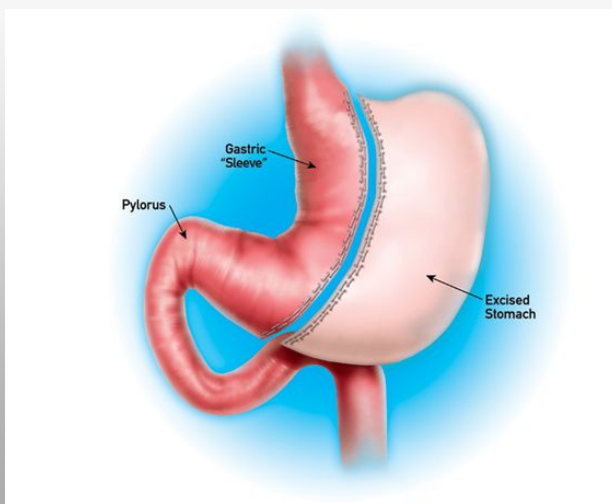
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Gastric Sleeve Resection



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Transvaginal Gastric Sleeve Resection




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Umbilical Hernia Repair




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Transvaginal Umbilical Hernia Repair



Transvaginal Hernia Repair

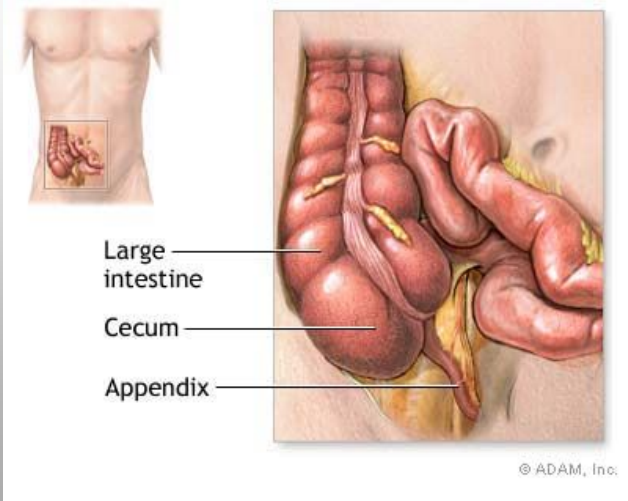
Garth Jacobsen MD	Monika Hagen MD
Kari Thompson MD	Lauren Fischer MD
Oliver Wagner MD	Adam Spivack MD
Brian Wong MD	Santiago Horgan MD

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Appendectomy



Large intestine

Cecum


Appendix

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Transgastric Appendectomy



A presentation slide with a blue background and white text. The title 'Transgastric Appendectomy' is at the top. Below it, two columns of names are listed. The UCSD logo and 'Center for the Future of Surgery' are at the bottom right.

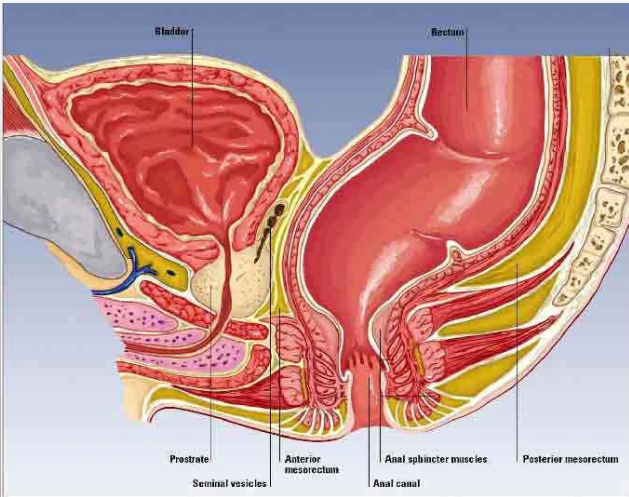
Santiago Horgan MD Adam Spivack MD
Kari Thompson MD John Cullen MD
Lauren Fischer MD Brian Sandler MD
Brian Wong MD Mark Talamini MD
Garth Jacobsen MD

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Transresctal Surgery I



An anatomical diagram showing a cross-section of the rectum and sigmoid colon. Labels point to various structures: Bladder, Rectum, Prostate, Seminal vesicles, Anterior mesorectum, Anal sphincter muscles, Anal canal, and Posterior mesorectum.

Bladder Rectum

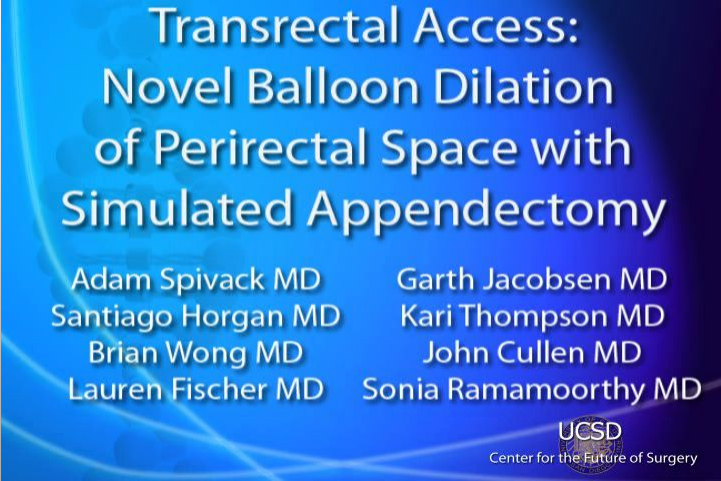
Prostate Anterior mesorectum Anal sphincter muscles Posterior mesorectum

Seminal vesicles Anal canal

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Transresctal Surgery II



Transrectal Access:
Novel Balloon Dilation
of Perirectal Space with
Simulated Appendectomy


Adam Spivack MD Garth Jacobsen MD
Santiago Horgan MD Kari Thompson MD
Brian Wong MD John Cullen MD
Lauren Fischer MD Sonia Ramamoorthy MD

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NOTES Limitations



- Safe Access
- Installation and Maintenance of Pneumoperitoneum
- Unstable Vision & Operating Platform
- Insufficient Tools
- Limited Retraction
- Closure

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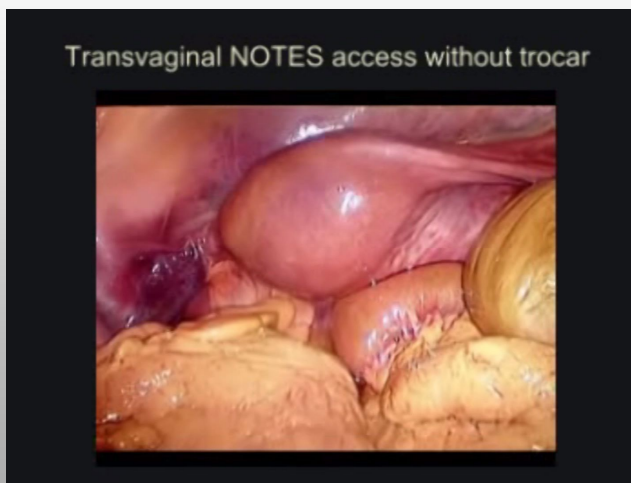
NOTES: Access



Conventional laparoscopic trocars



NOTES: Access without trocars

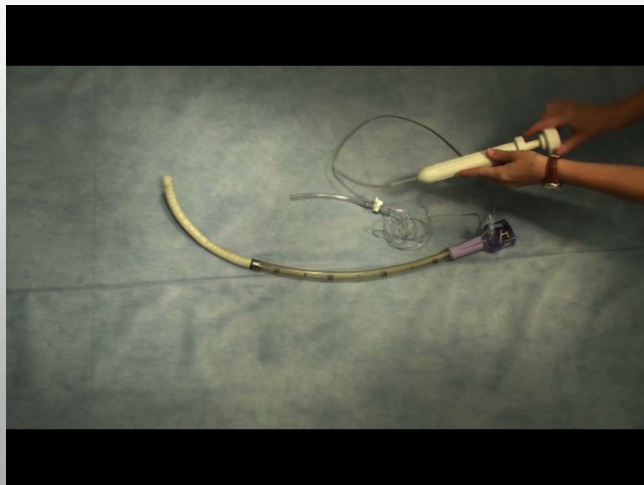




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NOTES: Access I



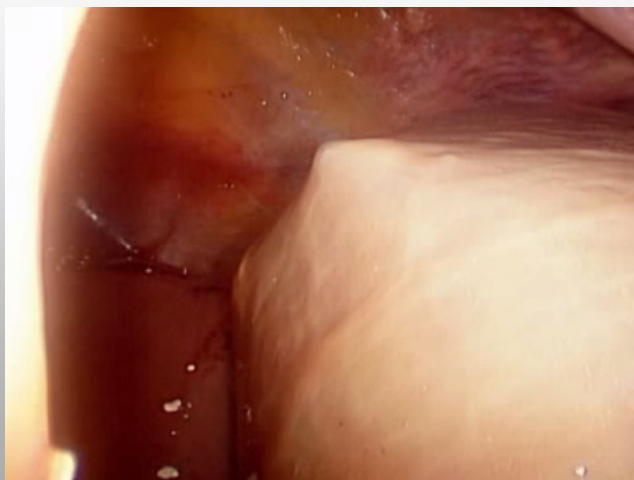
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NOTES: Access II



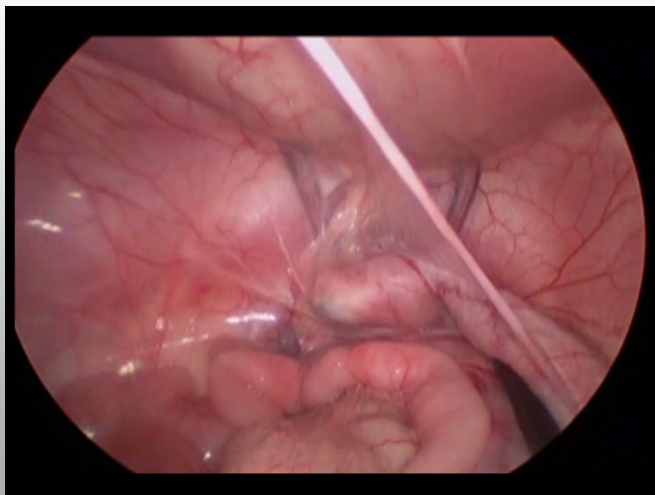
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NOTES: Access III



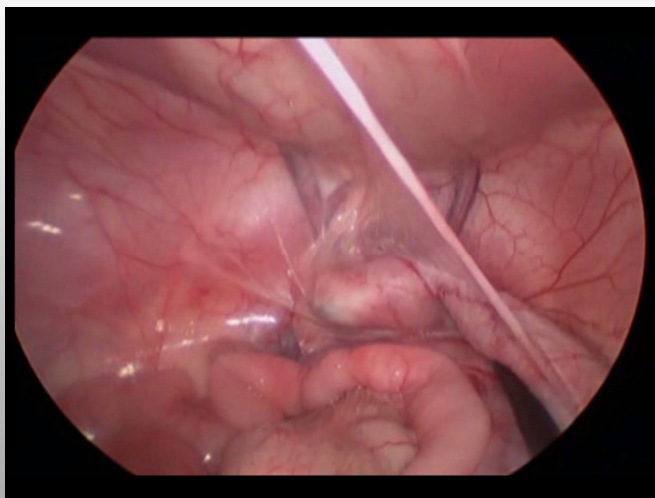
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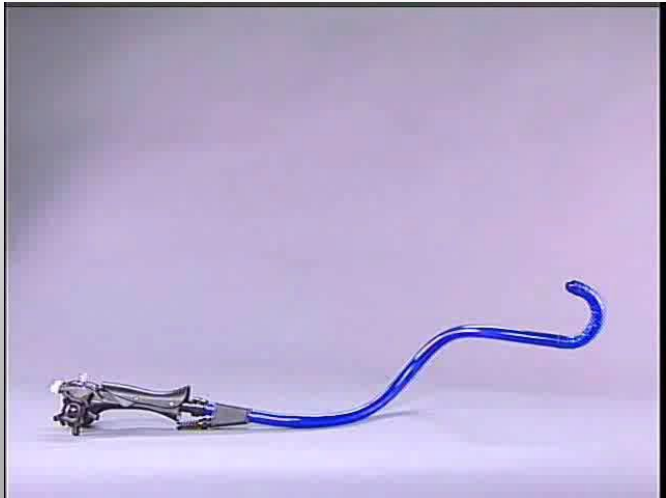
NOTES: Access III



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NOTES: Operating Platforms I

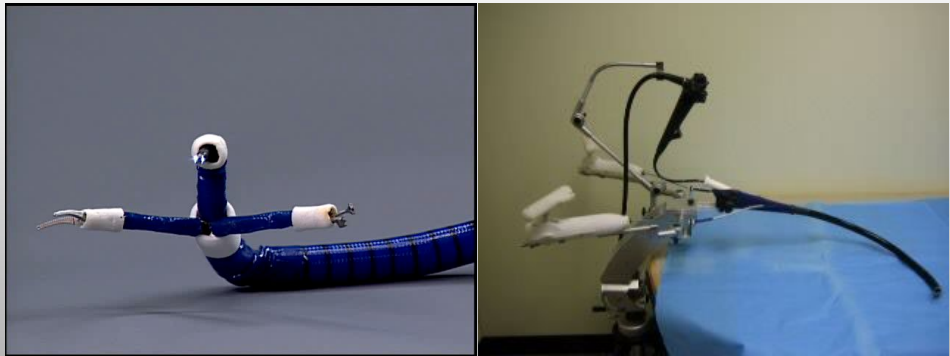


USGI, USA

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NOTES: Operating Platforms II



USGI, USA Boston Scientific, USA

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NOTES: Operating Platforms III



D. Scott, USA



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NOTES: Tools I





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NOTES: Tools II



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NOTES: Retraction



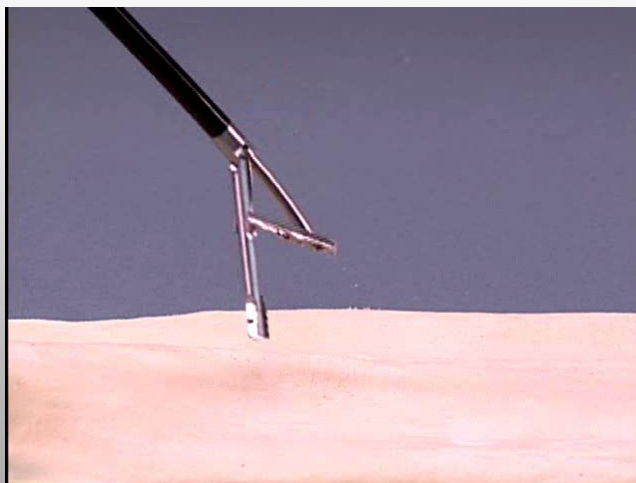
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NOTES: Closure I



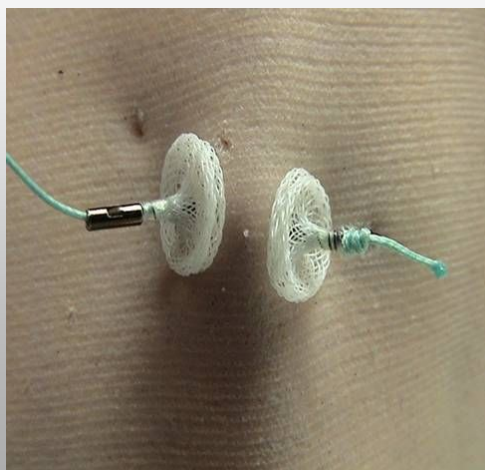
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NOTES: Closure II



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NOTES: Closure III

- T-tag applicator + knotting element
- 2.8 mm channel
- Closure of porcine colon perforation demonstrates equivalency to surgery with advantages for adhesion formation



Ethicon Endosurgery, USA

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Robots for NOTES

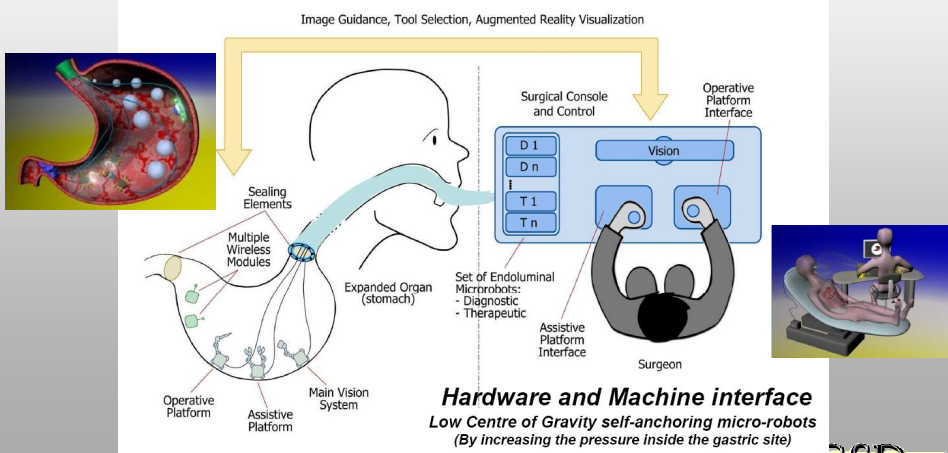


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Project "ARAKNES"

Array of robots augmenting the Kinematics of Endo-luminal surgery




Hardware and Machine interface
Low Centre of Gravity self-anchoring micro-robots
(By increasing the pressure inside the gastric site)

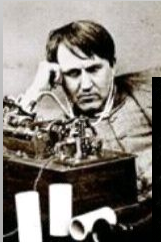
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The future is hard to predict...

640K ought to be enough for anybody." - Bill Gates, 1981





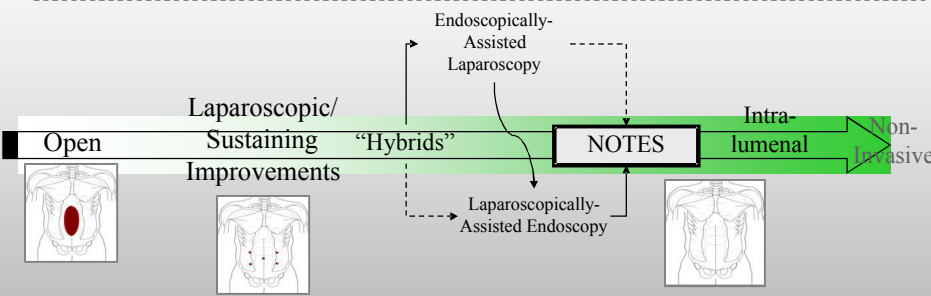
"Fooling around with alternating current is just a waste of time. Nobody will use it, ever." - Thomas Edison, 1889

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Does NOTES have a future?

NOTES, by addressing "Sources of Invasion", represents the next logical progression of surgical development, a key step along the MIS continuum



Cholecystectomy -----> ?

Appendectomy -----> ?

Ventral Hernia -----> ?

Diagnostic -----> ?

Peritoneoscopy -----> ?

Sources of Invasion

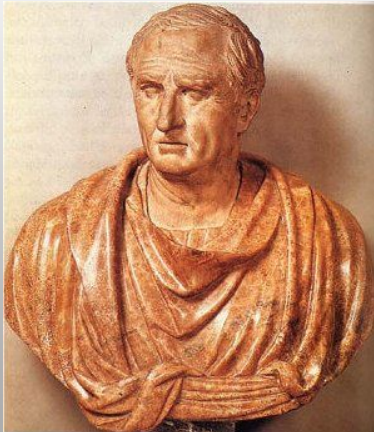
- Abdominal wall incisions
- Post-op recovery/RTNA
- General anesthesia
- Financial burden
- Site of care
- Infrastructure requirements
- Clinician skill level

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HUG HÔPITAUX UNIVERSITAIRES DE GENÈVE CALIFORNIA, SAN DIEGO 4th Summer School in Surgical Robotics, Montpellier 2009
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“We must not say every mistake is a foolish one”

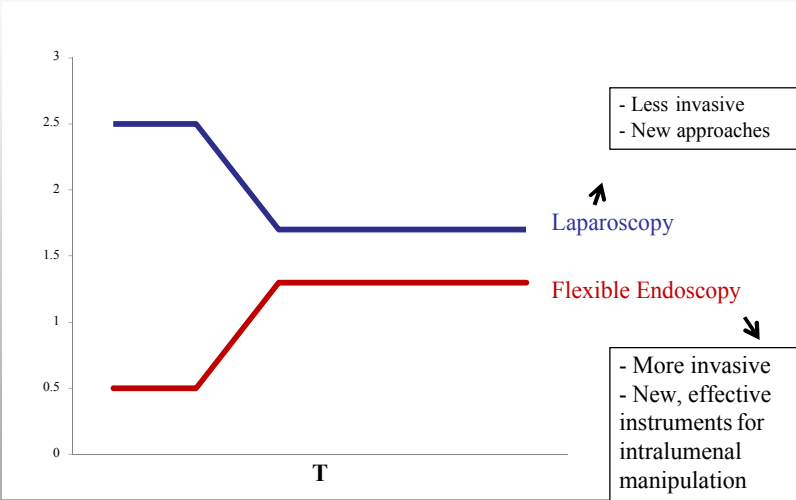
Cicero (106 BC – 43 BC)



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The effect of NOTES



Time (T)	Laparoscopy	Flexible Endoscopy
0	2.5	0.5
1	2.5	0.5
2	1.7	1.3
3	1.7	1.3


- Less invasive
- New approaches

Laparoscopy

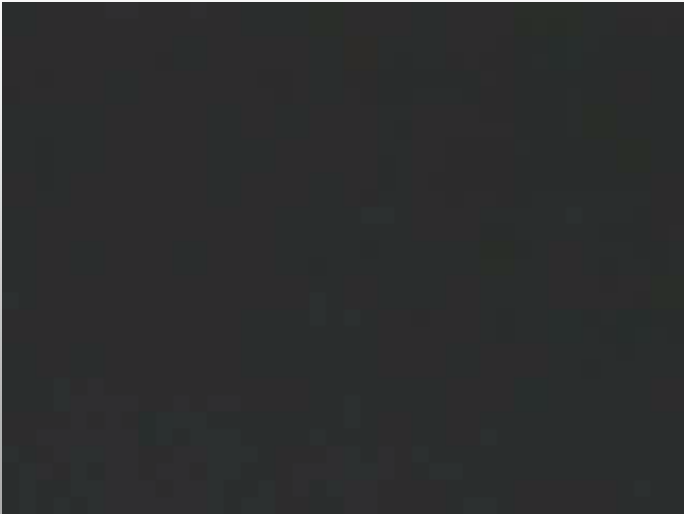
Flexible Endoscopy


- More invasive
- New, effective instruments for intraluminal manipulation

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 UNIVERSITY of CALIFORNIA, SAN DIEGO SCHOOL OF MEDICINE 4th Summer School in Surgical Robotics, Montpellier 2009

Protecting valuables!





 HUG Hôpitaux Universitaires de Genève  UNIVERSITY of CALIFORNIA, SAN DIEGO SCHOOL OF MEDICINE 4th Summer School in Surgical Robotics, Montpellier 2009

Thank you very much for your attention!

