The future of surgery: The „Natural Orifice Surgery“ Concept

The New European Surgical Academy
19th Century

First successful laparotomy performed longitudinally

Ephraim McDowell 1771 - 1830
First transverse laparotomy

Johannes Pfannenstiel 1862-1909
# Abdominal Wound Dehiscence (vertical vs. Pfannenstiel)

<table>
<thead>
<tr>
<th></th>
<th>Vertical</th>
<th>Transverse</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>1635</td>
<td>540</td>
</tr>
<tr>
<td>Dehiscence</td>
<td>48</td>
<td>2</td>
</tr>
<tr>
<td>Rate</td>
<td>2.94 %</td>
<td>0.37 %</td>
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</tbody>
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Endoscopy

20th Century

Georg Kelling
1866-1945

Kurt Semm
1927-2003
Quo vademus?
NOS

The use of natural openings to perform surgical procedures
Peritoneoscopy and liver biopsy were performed via a transgastric pathway.

In 9 female animals, transgastric operations were performed.

In 6 cases, oophorectomy and partial hysterectomy was performed.

Instruments used:

single and double channel gastroendoscopes (GIF Q 140 and GIF 2T 100, Olympus), re-usable endoscopic forceps, esophageal overtube, snares, endoloops (Olympus), dilatation balloons (microinvasive CRE balloon, Boston Scientific / Microinvasive, Natrick, MA), needle knives (Huibregtse RAMP needle-knife, Wilson-Cook Winston-Salem, NC), endoclips (Olympus)
Conventional instruments, adapted to NOS

*Natural Orifice Surgery Consortium for Assessment and Research*
Transoral-transgastric - Experimental

Jagannath SB et al. Ligation of fallopian tubes
Gastrointest Endosc 2005; 61: 449-453

Kantsevoy SV et al. Gastro-entero-anastomosis
Gastrointest Endosc 2005; 62: 287-292

Kantsevoy SV et al. Splenectomy
Surg Endosc 2006; 20: 522-525
Transoral-transgastric

Park PO et al. Cholecystectomy and cholecysto-gastrostomy
Gastrointest Endosc 2005; 61: 601-606, experimental

Venkat Rao (Hyderabad, India) Transoral-transgastric appendicectomy
Not published, human application

Lee Swanstrom (Oregon, USA) Transoral-transgastric cholecystectomy
July, 2007 (+3 Trocars!), not published, human application
N.O.T.E.S

vs.

N.O.S
“The term difference is not accidental. “T” in NOTES stands for transluminal. NOS includes NOTES because it refers to all surgical procedures performed through natural openings, such as the mouth, nose, urethra, and vagina.”

The Transdouglas Surgical Approach
First successful performance of incidental vaginal appendectomy at the time of vaginal hysterectomy

Bueno B. Primer caso de appendicetomia por via vaginal. Tokoginecol Pract (Madrid) 1949; 8: 152-154
8 cases of incidental vaginal appendectomy following vaginal hysterectomy.
The Douglas pouch was used to extract a gallbladder removed endoscopically.

NOS – Human application

Marc Bessler (New York, USA)
→ Transvaginal cholecystectomy, March 2007 (+3 Trocars!)

Jacques Marescaux (Strasbourg, France)
→ Transvaginal cholecystectomy, April 2007 (+1 Trocar!)
What are the challenges to realise Transdouglas Operations?

- Develop adapted instruments and revise operative methods
- Re-learn anatomy
- Develop patient biosimulation software for training and development
- Gain surgical experience
The TED is a multichannel, flexible endoscope. It can be S- or U-shape.

The **S-shape** TED is adapted to the pelvic anatomy and designed to perform all upper abdominal operations.

The **U-shape** TED allows to perform all operations in the pelvis.
A short introduction of
Trans-Douglas Endoscopical Surgical Device (TED)

by Prof. h.c. Dr. Michael Stark

First European working group on Natural Orifice Surgery
View of the pelvic organs through the U-shape TED
Advantages

Intraoperative

- Introduction of instruments under vision and parallel rather than perpendicular to major blood vessels
- Lower $\text{CO}_2$ pressure needed, peridural anesthesia possible
- Improved ergonomics (one-man [woman] show)
- Single entry procedures
Advantages

Postoperative

- No risk for herniation or eventration
- Lower risk for wound infection and adhesions
- Less pain
- Early mobility
- No scar
- Very short hospital stay
As surgical procedures are to be performed through a „gynecological pathway“, **interdisciplinarity** is the key to realise successful NOS operations.
The interdisciplinary NOS working group of the NESA
Members of the working group

General surgery

Eckhard Bärlehner, Tahar Benhidjeb, Germany; Moshe Zvi Papa, Israel; Sebastian Roka, Austria; Svend Schulze, Denmark; Kai Witzel, Austria

Urology

Jacques Corcos, Harold Drutz, Canada

Gynecology

Ciro Luise, Italy; Farr Nezhat, USA; Liselotte Mettler, Irmgard Posch, Marc Possover, Achim Schneider, Michael Stark, Germany; Antoine Watrelot, France
Anaesthesiology
Peter Biro, *Switzerland*; Gerald Burgard, Jochen Strauss, *Germany*

Pharmacology
Petra Thuermann, *Germany*

Physiology
Peter Reeh, *Germany*

Scientific Counsellors
Parwis Fotuhi, Joachim Linke, Manfred Ottow, *Germany*
In Dec. 2006, the NESA and the Society of Laparoendoscopic Surgeons (SLS) signed an agreement to cooperate in clinical studies concerning NOS.
NESA’s Vision:

• NOS interdisciplinary team working in designed surgical departments based mainly on day care basis or short hospital stay

• NOS training programmes using biosimulators, certifying surgeons prior to actual operation

• Reduction of absence from work, thus minimizing economic costs.
Occam's razor (ca. 1285-1349)  
Lex parsimoniae
Thanks for your attention.