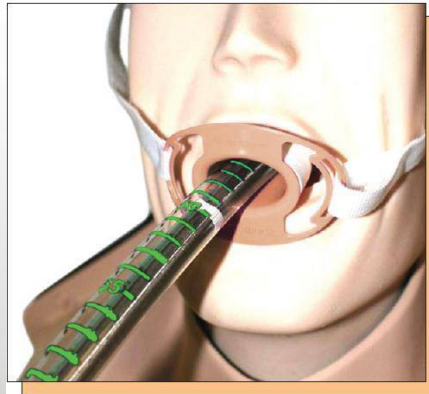


NOTES

Natural Orifices Transluminal Endoscopic Surgery



DEFINITION

NOTES is scar less abdominal surgery with an endoscope passed through a natural orifice (MOUTH, URETHRA, ANUS, VAGINA) then through an internal incision in the stomach, vagina, bladder or colon, thus avoiding any external incisions or scars

HISTORY



❖ 1901 – Dimitri Ott
from St. Petersburg from
Russia called
Ventroscopy. He used
transvaginal inspection
of the peritoneal cavity



HISTORY

NOTES was originally described in animals
by researchers at Johns Hopkins University
by Dr. Anthony Kalloo and on human by
Dr. G.V. Rao and Dr. N. Reddy

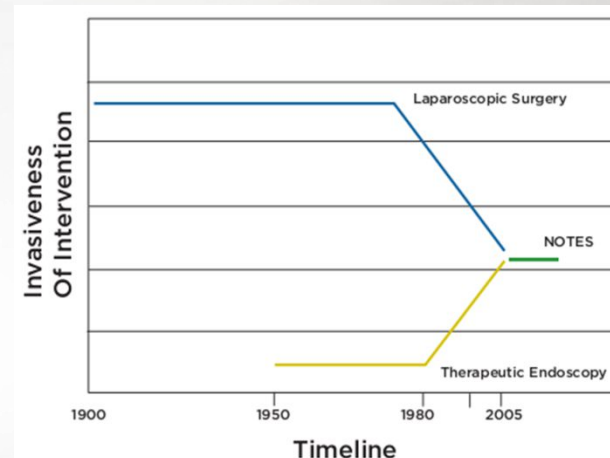
June 20th 2007

ACCEPTANCE IN INDIA

Famous bollywood actress SHILPA SHETTY and
South Indian actress KHUSBOO undergone
Transgastric Appendicectomy

VISION

*Kalloo et al. Gastro&Endos
News 2007*

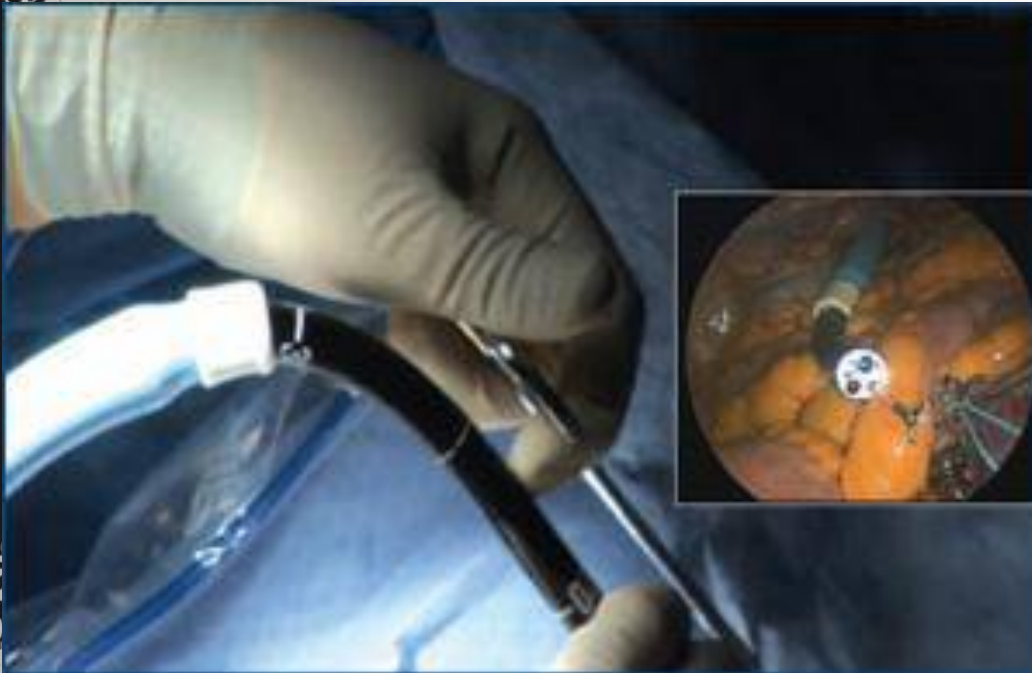


NOTES as the possible convergence of laparoscopic surgery and therapeutic endoscopy

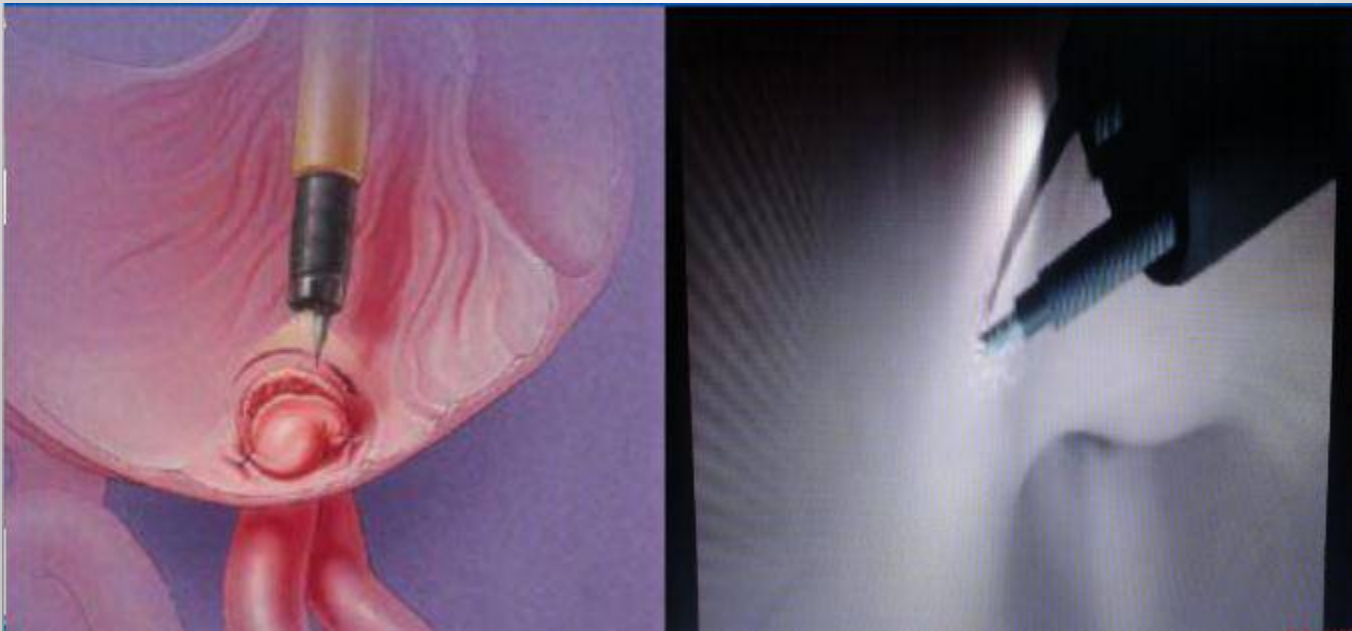
INSTRUMENT



MINIMALLY INVASIVE SURGERY: NOTES



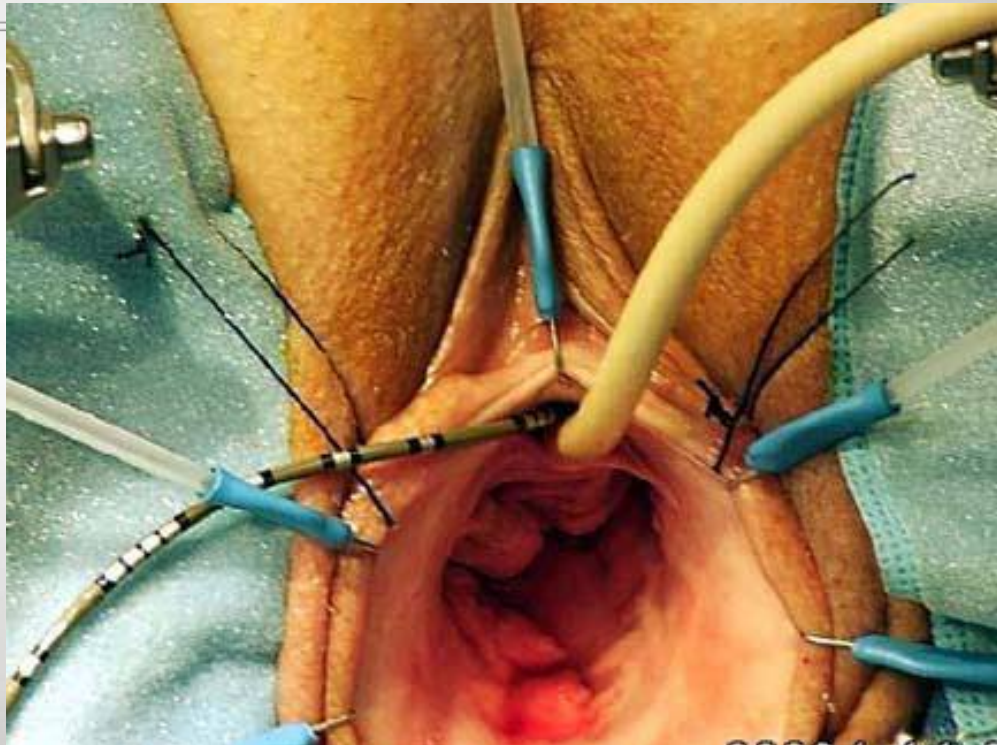
INTERNAL INCISION



POTENTIAL BENEFITS

- ❖ Postoperative abdominal wall pain ↓↓↓↓
- ❖ Wound infections ↓↓↓
- ❖ Adhesions ↓↓↓
- ❖ No hernias
- ❖ Possibly non-impaired immune function ↓↓↓↓
- ❖ 'Scarless' surgery
- ❖ Morbidly obese patients (?)
- ❖ High risk patients (?)

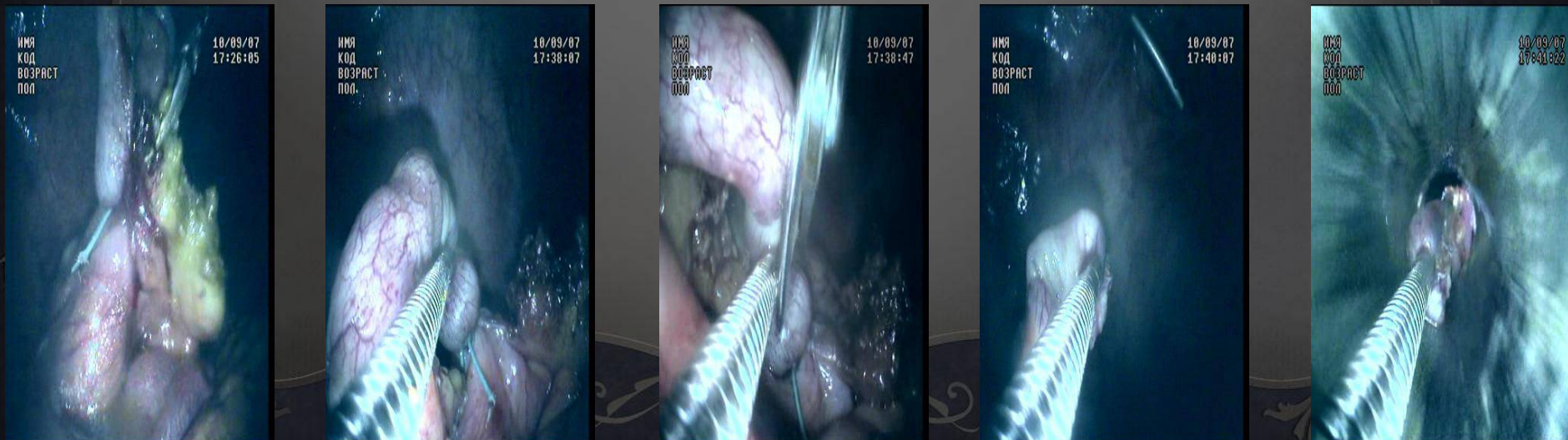
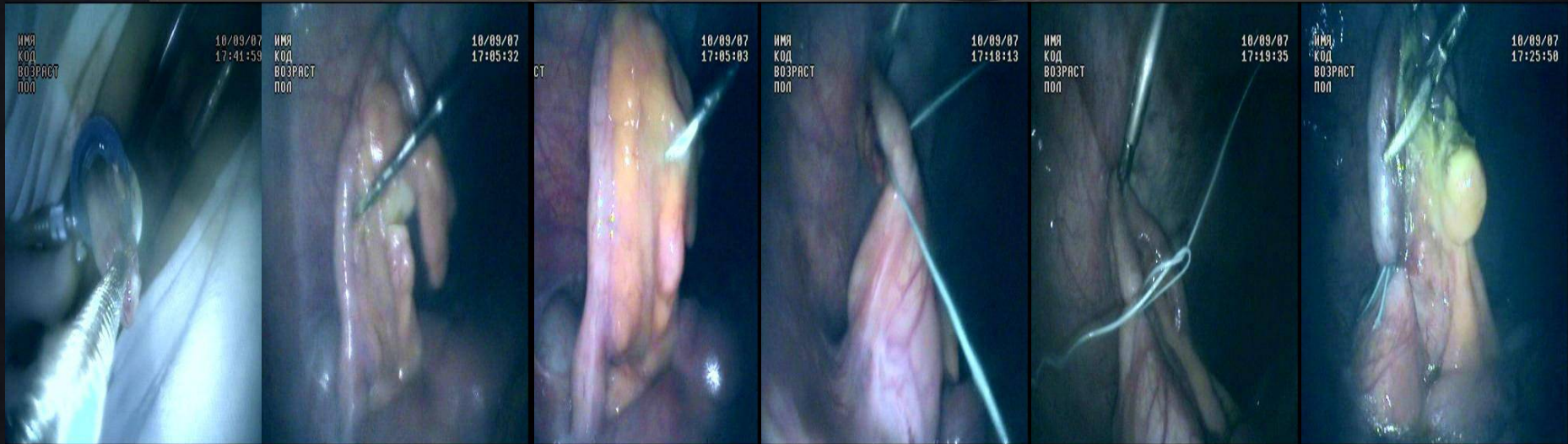
SCAR COMPARISON



POTENTIAL BARRIERS

- ❖ Access to peritoneal cavity
- ❖ Gastric (intestinal) closure
- ❖ Prevention of infection
- ❖ Development of suturing device
- ❖ Development of anastomotic (nonsuturing) device
- ❖ Development of a multitasking platform to accomplish procedures
- ❖ Control of intraperitoneal hemorrhage
- ❖ Management of iatrogenic intraperitoneal complications
- ❖ Physiologic untoward events
- ❖ Compression syndromes
- ❖ Training other providers

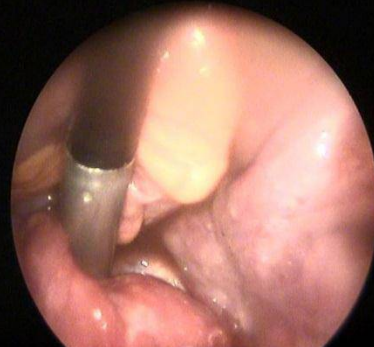
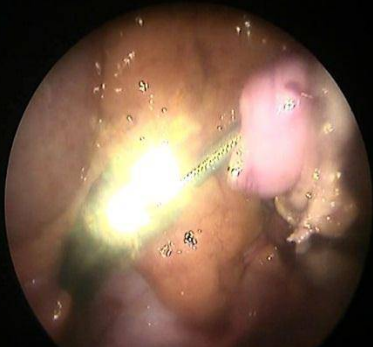
NOTES: TRANSVAGINAL APPENDECTOMY



World Laparoscopy Hospital

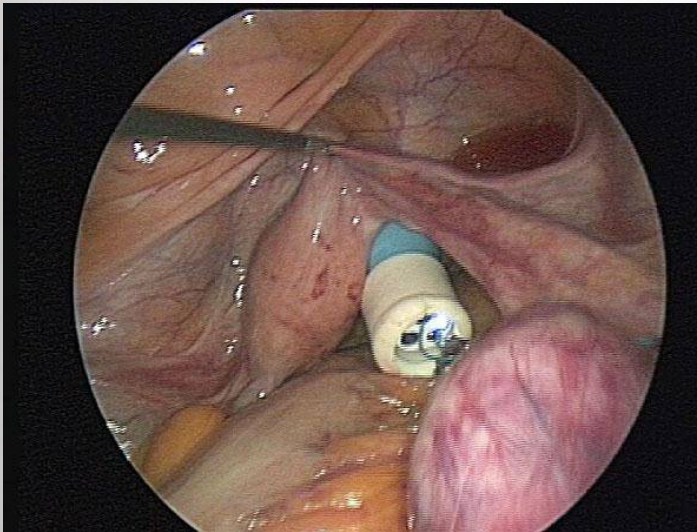
Sergey Baido MD, PhD, *Personal communications*

NOTES: TRANSVAGINAL APPENDECTOMY NEEDLE-SCOPE VIEW



SILS VERSUS NOTES

NOTES is Dying SILS is progressing due to high patient Acceptance



PROCEDURE

**Access to the peritoneal
cavity through the
incision of the gastric wall**



STUDENT:



PROCEDURE



NOTES/TEM

- ❖ Natural Orifice Translumenal Endoscopic Surgery (**NOTES**)
 - Use of flexible endoscopy to perform surgery through natural orifices (rectum, vagina, stomach)
- ❖ Transanal Endoscopic Microsurgery (**TEM**)
 - First attempt at minimally invasive surgery through, and in, a natural orifice
 - Use laparoscopic instruments through a rigid operating proctoscope

TEM

- ▣ Developed by Professor Gerhard Buess
From Tuebingen, Germany
- ▣ Became available for widespread use in
1983
- ▣ One of the first methods of
endoluminal surgery
- ▣ Uses the view of a proctoscope and the
instruments of laparoscopy



Professor Gerhard Buess

USE OF TEM

- ❖ For minimally invasive excision
 - Large endoscopically irretrievable rectal polyps and T₁ rectal cancers; some extended used for more advanced disease
- ❖ More precise than traditional transanal excision
 - More likely to get clean margins with less manipulation of the mass
- ❖ Avoids abdominal incision

INDICATIONS OF TEM

❖ Benign

- Rectal polyps
- Carcinoid tumors
- Retrorectal masses
- Anastomotic strictures
- Extrasphincteric fistulae
- Pelvic abscesses

❖ Malignant

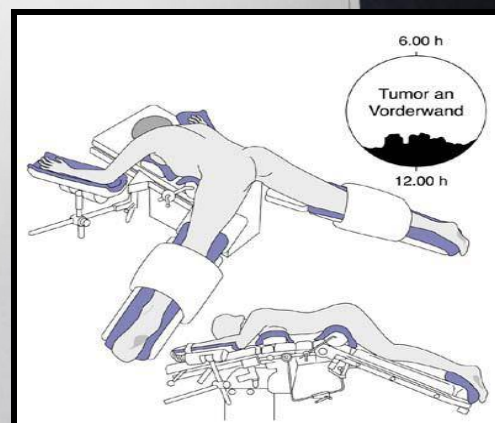
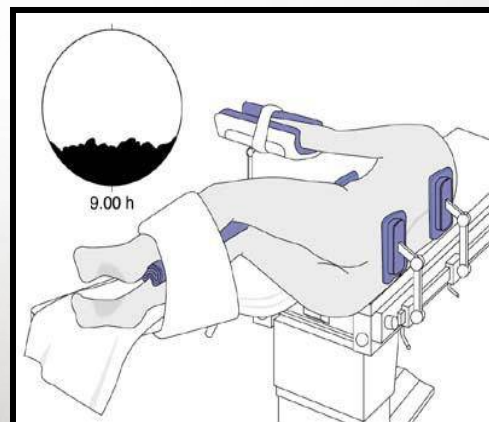
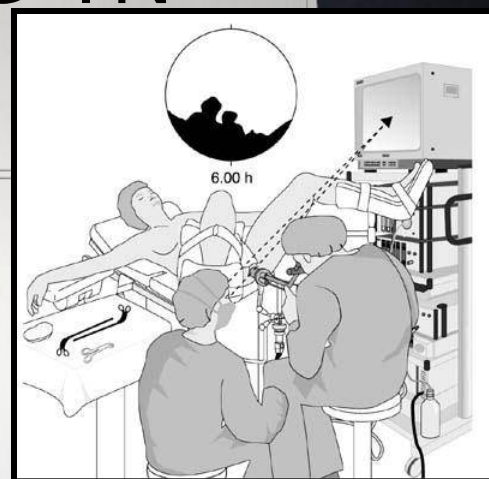
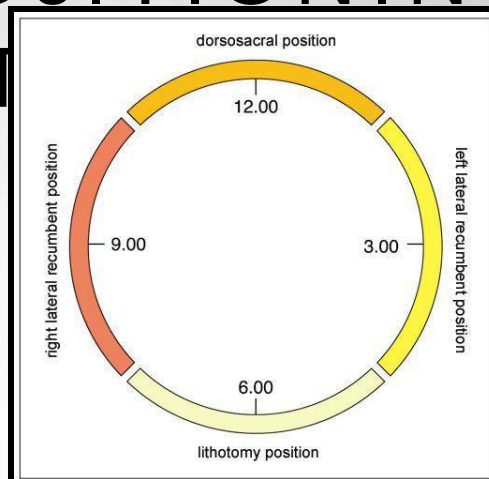
- Malignant rectal polyps
- T₁-T₂ rectal cancer
- Palliative excision of T₃ cancer

PREOPERATIVE EVALUATION OF TEM

- ❖ Full colonoscopy
 - Rule out synchronous lesions
- ❖ Rigid proctoscopy
 - Determine level and position of lesion
- ❖ Endorectal ultrasound
 - Confirm stage of lesion/depth of penetration
 - Confirm uT₀ or uT₁ status
 - If uT₂ or uT₃ should do definitive surgery if patient a candidate
 - TEM is not generally used to treat N₁ disease

PATIENT POSITIONING IN

- Position of lesion determines positioning of patient on the operating room table
- The lesion should be made to be in the 6 o'clock position for the operator



PATIENT POSITIONING IN



Lesion at right lateral position

EQUIPMENTS USED IN TEM

- ❖ Rigid proctoscope
 - ❖ Operating instruments
 - ❖ Stereoscope
 - ❖ Insufflator-suction device
-
- ❖ Setup available by Wolf Surgical Instruments Co. (Vernon Hills, IL, USA) or Karl Storz GmbH & Co. (Tuttlingen, Germany)

PROCTOSCOPE USED IN TEM



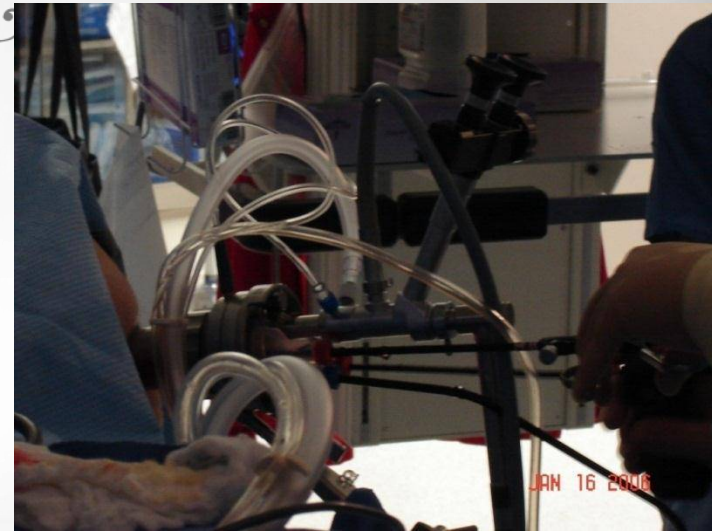
❖ 40 mm operating proctoscope

OPERATING INSTRUMENTS IN TEM



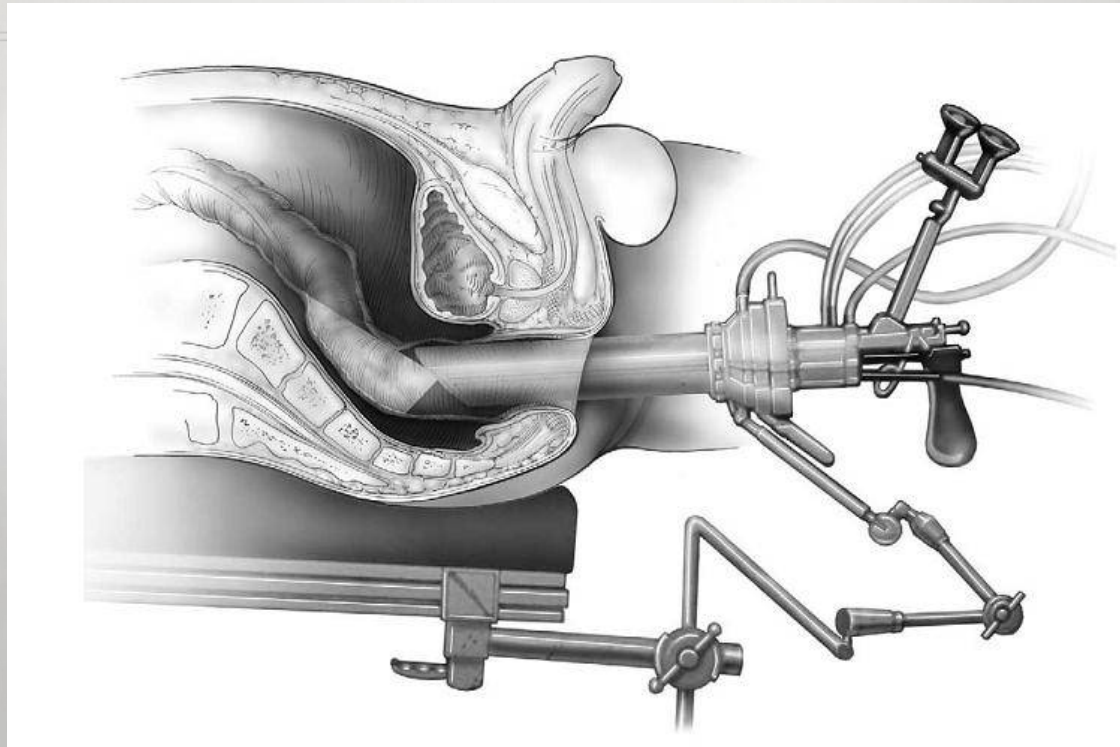
- ▣ Angle of instruments key in manipulation of tissues with limited range of motion
- ▣ Graspers, suction, electrocautery, needle-holders, etc.

STEREOSCOPE USED IN TEM

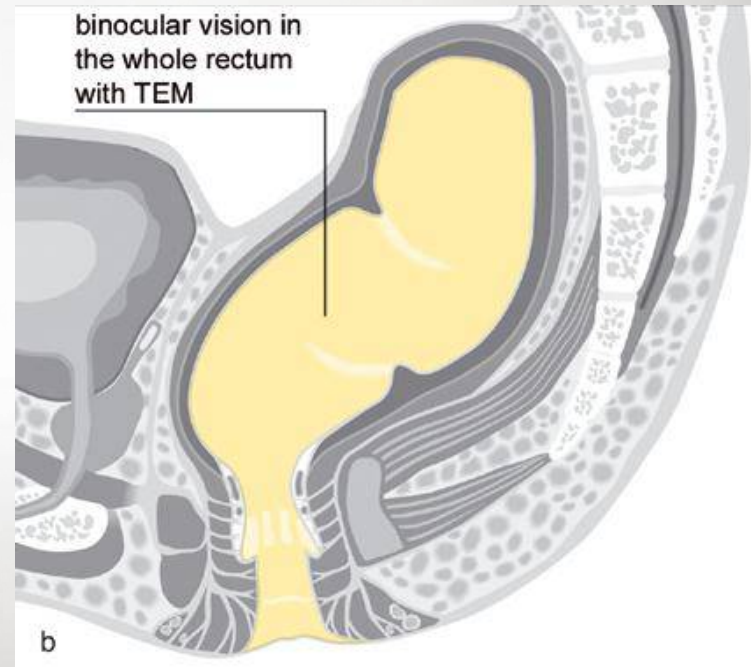
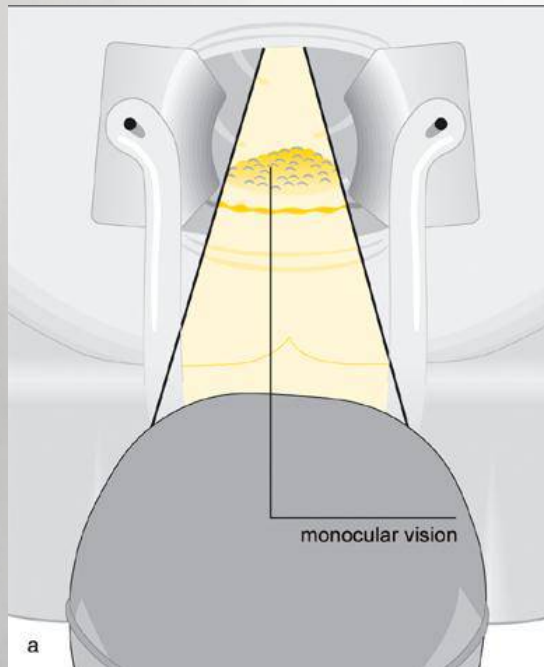


- ❖ Provides binocular vision
- ❖ Microscope – magnifies 6x

STEREOSCOPE



VISUALIZATION WITH TEM

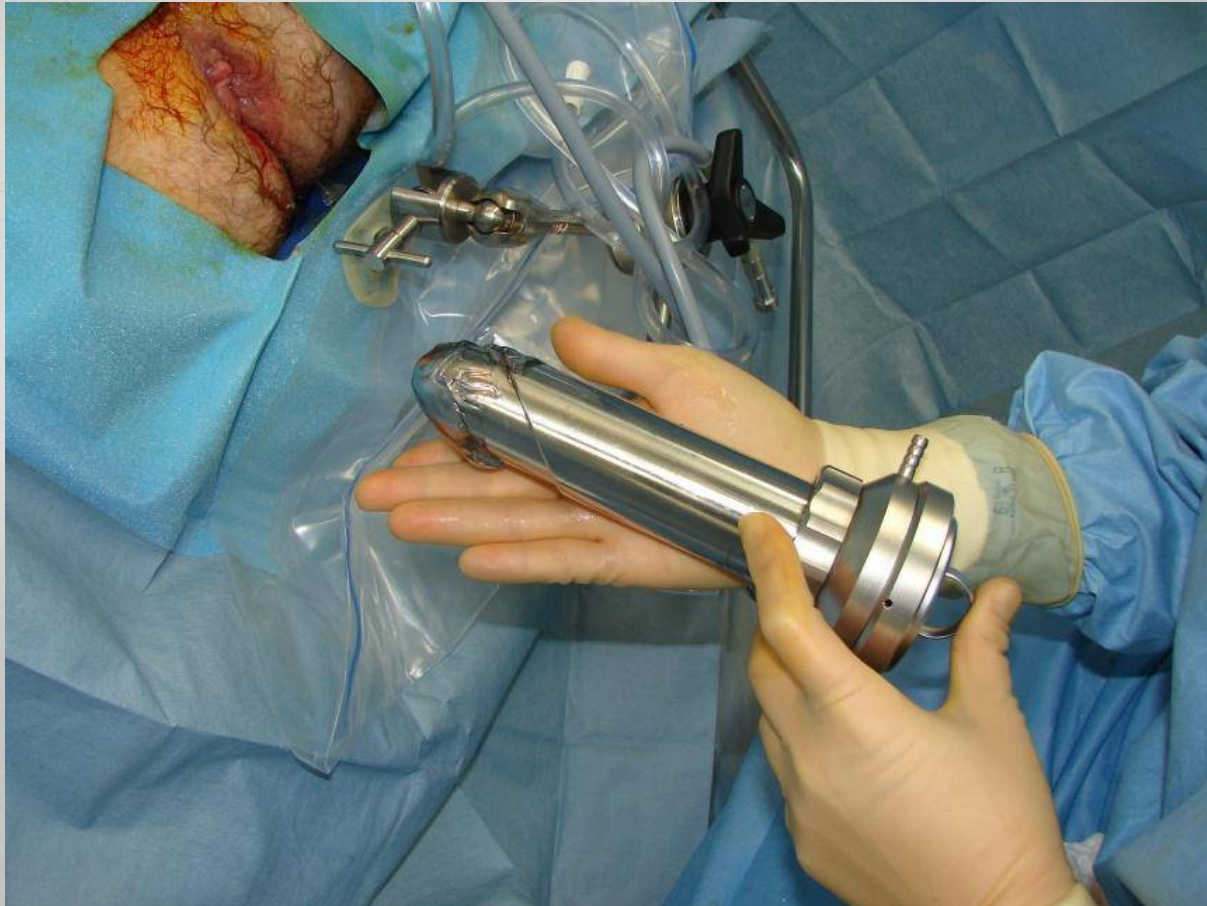


INSUFFLATOR-SUCTION DEVICE USED IN TEM

- ❖ Maintains continuous pressure by constantly insufflating CO₂ into the rectum and suctioning CO₂ out – maximizes operating field

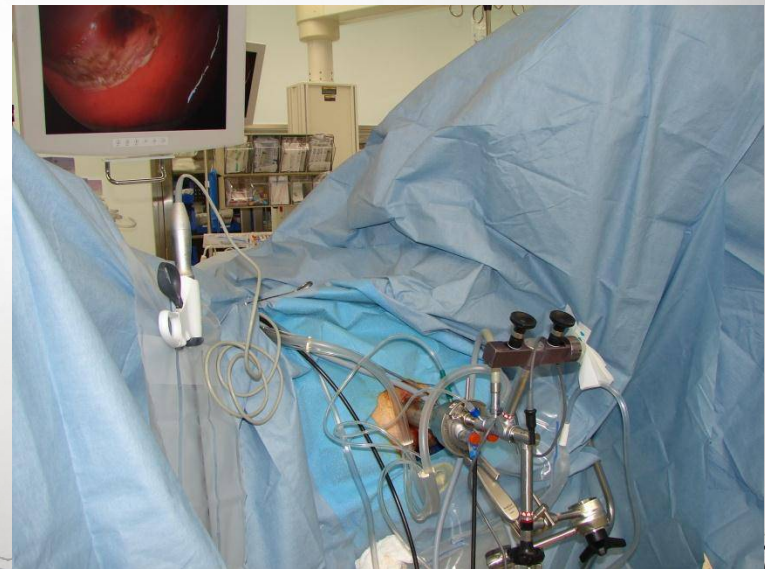
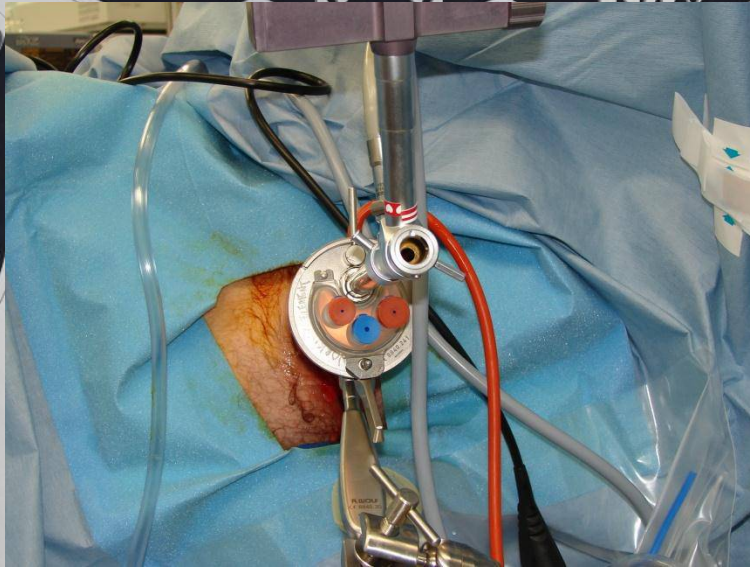












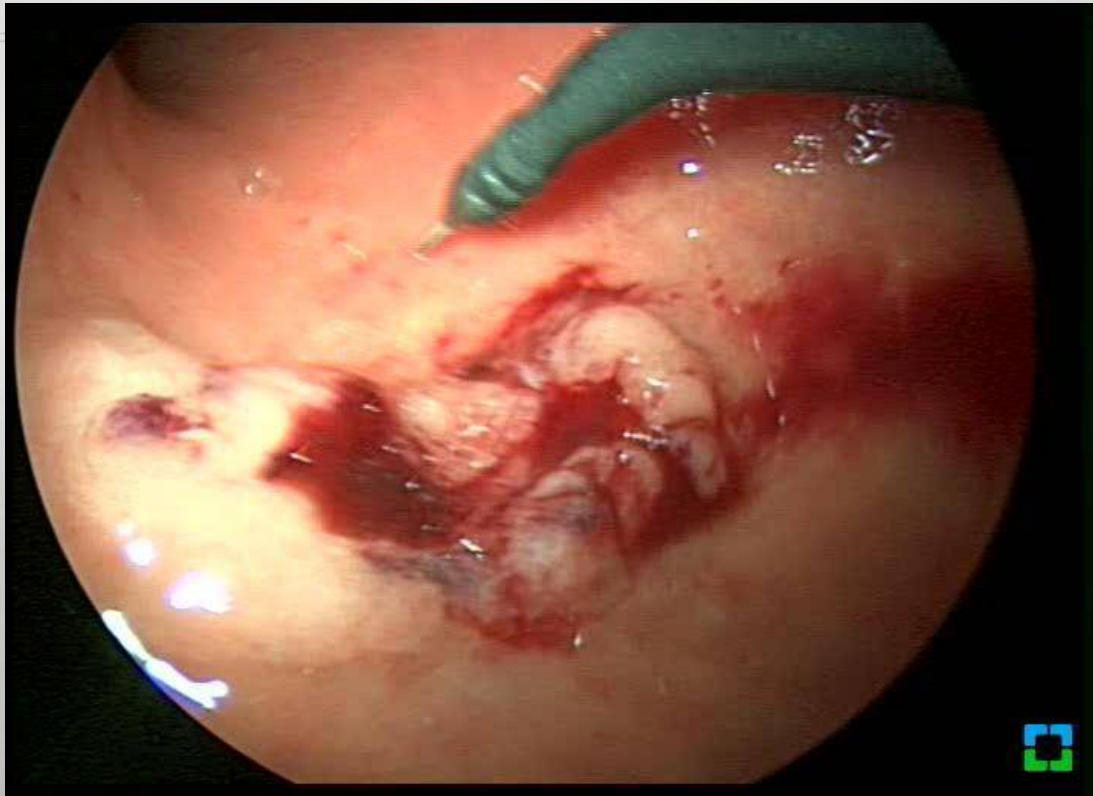
TEM



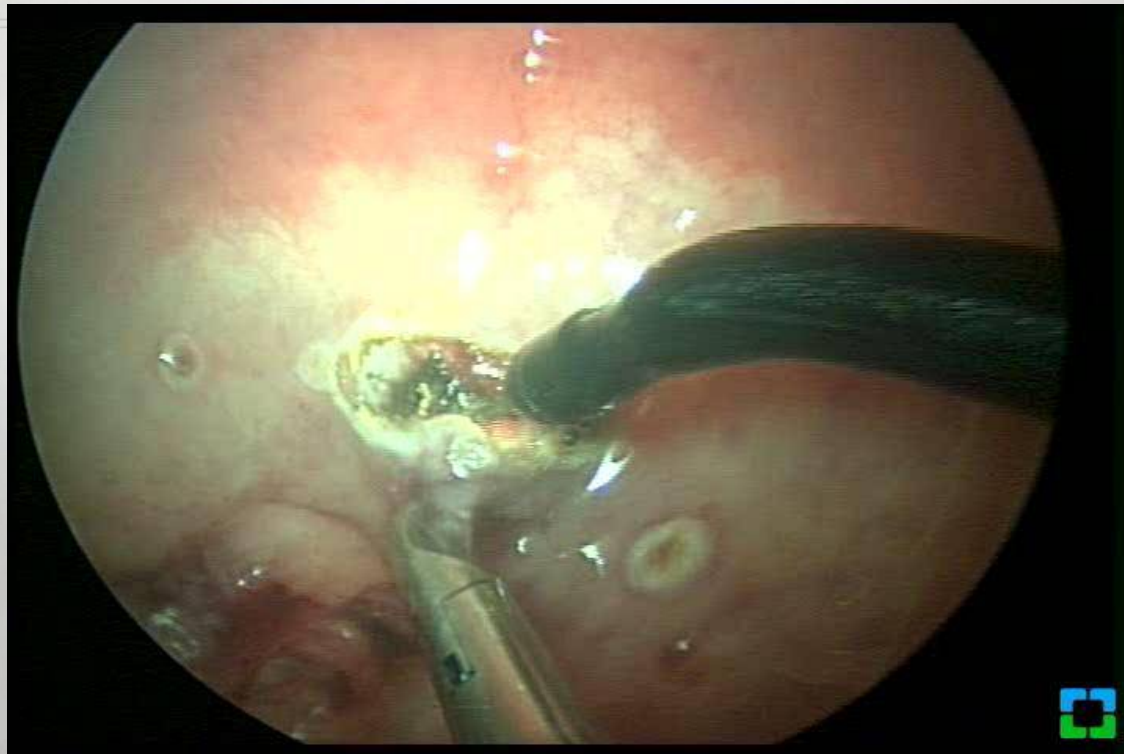
TEM: POSITIONING



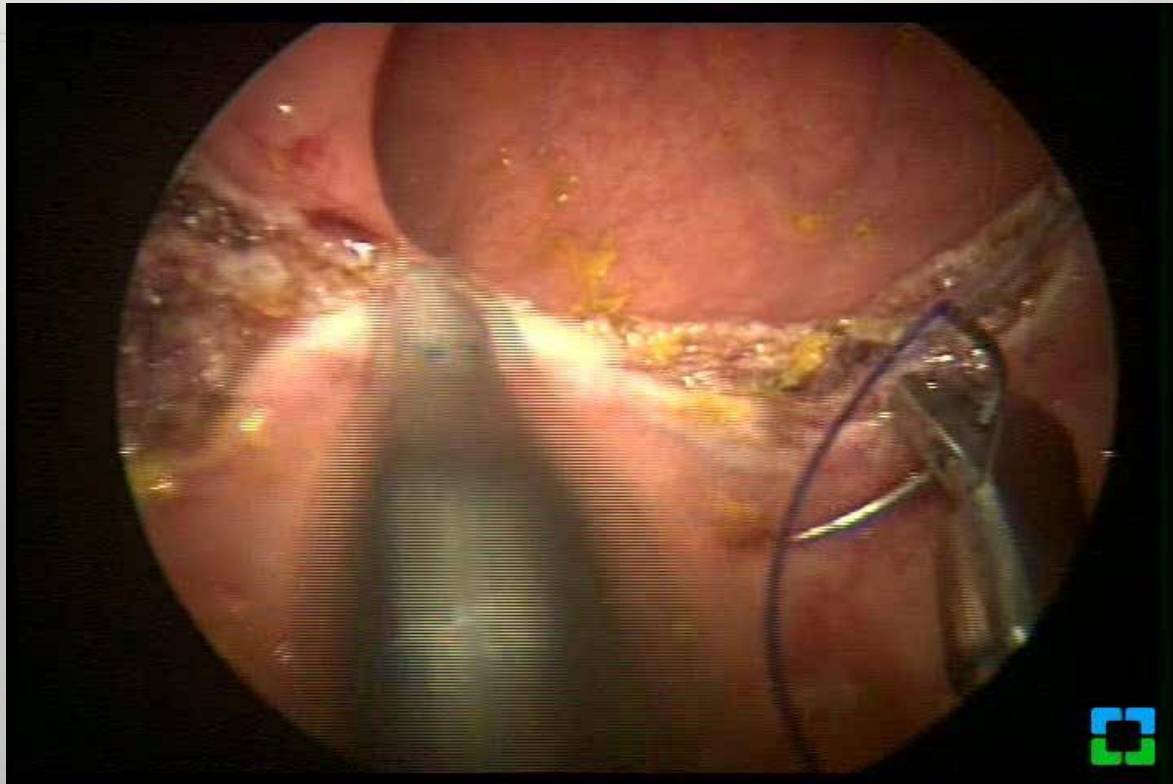
TEM: MARKING



TEM: EXCISION



TEM: CLOSURE



TEM RESULTS

❖ Professor Buess published early results in 1987

- 75 patients
- 3 experienced complications in short-term follow-up
- 1 with recurrence requiring salvage surgery

TEM RESULTS

❖ Later series by Buess in 1994

- 265 patients; 1989-1993
- 190 adenomas; 75 rectal cancers
- 14 month follow-up in >90% patients

❖ Average OR time - 92 minutes

- Mucosectomy - 62 minutes
- Partial wall excision - 77 minutes
- Full thickness excision - 96 minutes
- Segment resection - 163 minutes

TEM: FOR RECTAL TUMORS

❖ Complications

- Perforation of intraperitoneal rectal wall – unable to close using TEM in 3.9%
 - Required LAR (2 patients) or diversion (1 patient)
- Early mild incontinence/soiling in 2.6%
 - Resolved by 10 weeks

❖ No mortality

TEM: CONCLUSIONS

- ❖ Technically demanding procedure
- ❖ Utilizes highly specialized instrumentation
- ❖ Advanced endoscopic technique
- ❖ Can spare selected patients laparotomy and anterior resection
- ❖ Adequate training is imperative
- ❖ Patient selection is paramount

THANKS

