VAAFT: Video-Assisted Anal Fistula Treatment
with closure of the internal fistula opening by stapler –
the MEINERO technique
The VAAFT technique is performed for the surgical treatment of complex anal fistulas and their recurrences. Key points are the correct localization of the internal fistula opening under vision, the fistula treatment from inside, and the hermetic closure of the internal opening. This technique comprises two phases: a diagnostic one and an operative one. There is no need to know the fistula classification which obviously saves time and money. Moreover, surgical wounds in the perianal region are prevented and the risk of faecal incontinence is avoided because no sphincter damages are provoked.

Piercarlo Meinero, M.D  
Chief of Proctology  
Surgery Department - ASL 4 Chiavarese  
S. Margherita Ligure – Lavagna Hospital, Italy  
e-mail: pmeinero@asl4.liguria.it  
Tel.: 0039 320 4391395  
www.piercarlomeinero.it
KARL STORZ Equipment is used (Fig. 1). The personal kit includes the MEINERO Fistuloscope (Fig. 2), a unipolar electrode (Fig. 3) connected to a high frequency unit, a fistula brush (Fig. 4) and a forceps (Fig. 5). Moreover, a semicircular or linear stapler and 0.5 ml of synthetic cyanoacrylate with a tiny catheter are used as well.

The fistuloscope is equipped with an optical channel, a working channel and an irrigation channel. The working length adds up to 18 cm; the use of a handle reduces it to an effective length of 14 cm.
The optimal patient positioning is the lithotomic position. Spinal anaesthesia is required. The fistuloscope is connected to the KARL STORZ equipment and to the washing solution bag (5000 cc glycine and mannitol 1% solution). Fig. 6 shows an example of an anal fistula with its external (E.O.) and internal (I.O.) openings.

The technique comprises a diagnostic phase and an operative phase.

1. The diagnostic phase

The purpose of the diagnostic phase is the correct localization of the internal fistula opening.

The fistuloscope is inserted through the external fistula opening with the washing solution (glycine 1% and mannitol 1%) already running; providing a clear view of the fistula pathway which appears on the screen (Fig. 7). Blocking tissue can be removed using the 2 mm forceps to facilitate the insertion of the fistuloscope. The direction of the telescope is correct when the obturator appears in the lower part of the screen (Fig. 8).
The surgeon follows the fistula pathway using slow left-right and up-down movements. Since the fistuloscope is rigid it helps to guide it using a transanally inserted finger. These maneuvers are favored by the complete relaxation of the surrounding tissue induced by the spinal anesthesia.

The continuous flow of the glycine-mannitol solution allows for an optimal view of the fistula's inside up to the internal opening.

The assistant can insert an anal retractor in order to localize the internal fistula opening by looking for the light of the telescope in the rectum or anal canal. Dimming the lights in the operating theatre enables an easy localization of the fistuloscope light in the rectum.

When the fistuloscope exits through the internal opening the rectal mucosa clearly appears on the screen. In some cases the internal opening might be very narrow; in this case, its location is suspected viewing the fistuloscope light behind the rectal mucosa. (Fig. 9–11).
At this point, we put two or three stitches in two opposite points of the internal opening margin in order to isolate and, above all, not to loose it. We must be sure to capture sufficient tissue thickness (Fig. 12–14).
2. The operative phase

Purpose of this phase is the destruction of the fistula from the inside. As a next step, the fistula canal is cleaned / the waste material removed and its internal opening is then closed hermetically. We start destroying the fistula under vision using a unipolar electrode which can be passed through the operative channel of the fistuloscope and is connected to the electrosurgical power unit (Fig. 15–18).

Starting at the internal fistula opening, all fragments of the whitish material adhering to the fistula wall and all granulation tissue are coagulated. We complete this phase of the operation, centimeter by centimeter, from the internal opening to the external opening not forgetting any abscessual cavity.
The necrotic material is removed under vision using the fistula brush (Fig. 19–21). Until that time, the isolated internal fistula opening remains open to allow the leakage of waste and washing material into the rectum.
At this point we completely remove the fistuloscope. The assistant stretches the threads towards the internal rectal space or rather the anal canal using a straight forceps in order to lift the internal fistula opening at least 2 cm into the shape of a volcano. Subsequently, we insert a stapler (e.g. CCS30 Transtar Contour from ETHICON EndoSurgery) at the volcano’s base (Fig. 22–25) and complete the mechanical cutting and suturing.
The hermetic closure of the internal fistula opening can also be accomplished by using a linear stapler (Fig. 26–28). This also depends on the internal opening position.

Using a semicircular stapler, the suture will be horizontal. Using a linear stapler, the suture will be vertical (Fig. 29–31)
When the tissue in the area of the internal opening is not sclerotic and allows to form a good "volcano", the stapler can be used, however if the tissue around the internal opening is too rigid and sclerotic, the use of the stapler might be difficult. In this case a cutaneous mucosal flap would be preferred (Fig. 32).

As a last step we insert 0,5 ml of synthetic cyanoacrylate right after the suture / staple line via the fistula pathway to further reinforce the suture. So the use of the synthetic cyanoacrylate behind the suture line or behind the flap assures the perfect opening closure. It is essential to keep in mind that not the whole fistula tract is filled up with the synthetic cyanoacrylate; only a small amount is inserted directly below the suture line. That’s why the fistula pathway has to stay open to allow the passage of secretions. (Fig. 33–36).

This procedure assures a perfect excision and a hermetic closure of the internal fistula opening, excluding the risk of stool passage. Since the suture is situated tangential to the sphincter, the postoperative pain is low even if the suture falls both in the anal canal and the rectum.
Conclusion

The advantages of the VAAFT technique are evident: no surgical wounds on the buttocks or in the perianal region are provoked, there is complete certainty in the localization of the internal fistula opening (a key point in all fistula surgical treatments), and the fistula can be completely destroyed from the inside. There is no requirement to know if the fistula is transphincteric, extrasphincteric or above sphincteric because operating from the inside no damage is caused to the anal sphincters. Therefore, no preoperative examination is necessary. The risk of postoperative faecal incontinence is excluded. Moreover, the patient doesn’t need any medications and he can start working again after a few days since the VAAFT technique can be performed in day surgery.
VAAFT Instrument Set for Video-Assisted Anal Fistula Treatment acc. to MEINERO

24511 Fistulectomy Set, consisting of:
   24511 AA Telescope 8°, angled eyepiece, O.D. 3.3 x 4.7 mm, working length 18 cm, autoclavable, with straight instrument channel for instruments diameter 2.5 mm, fiber optic light transmission incorporated, colour code green,

   39501 XP Sterilization Tray

   24513 Obturator

24511AA Telescope 8°, angled eyepiece, O.D. 3.3 x 4.7 mm, working length 18 cm, autoclavable, with straight instrument channel for instruments diameter 2.5 mm, fiber optic light transmission incorporated, colour code green,

24512 Handle

24513 Obturator for the endoscope

24515 Coagulating Electrode, 7 Fr., for the Fistulectomy
39501 XP **Wire Basket Tray** for cleaning, sterilization and storage. Including cleaning adaptor for washer-disinfector. With lid, spare parts basket 39501 XS and silicone telescope holders. External dimensions (w x d x h): 460 x 150 x 80 mm. For instruments with up to 27 cm working length.

24514 **Fistula Brush**, with handle consisting of:
- 3-Ring Handle,
- Outer Sheath,
Three different Fistula Brush Inserts: with 4.0 mm; 4.5 mm and 5.0 mm outer diameter.

30221 KJ **clickline REDDICK-OLSEN Grasping Forceps**, rotating, size 2 mm, length 30 cm, with connector pin for unipolar coagulation, double action jaws, with LUER lock adaptor for cleaning, consisting of:
- 33121 **Plastic Handle**, without ratchet
- 30210 KJ **Outer Tube** with insert, insulated

24981 AUCKLAND EASI **Anal Distending Speculum**, for anal examinations, with 3 blades, outer diameter 27 mm, working length 6 cm, with obturator 24981 O, with ratchet
20133027  Xenon-Spare-Lamp-Module, 300 Watt, 15 Volt
20133028  XENON Spare Lamp, only, 300 Watt, 15 Volt
495 NL    Fiber Optic Light Cable, size 3.5 mm, length 180 cm
495 NA    Fiber Optic Light Cable, size 3.5 mm, length 230 cm
IMAGE 1™ HD
HD hub Camera Control Unit

- Maximum resolution and the consistent use of the 16:9 aspect ratio guarantee FULL HD
- Endoscopic camera systems have to be equipped with three-CCD chips that support the 16:9 input format as well as capturing images with a resolution of 1920 x 1080 pixels

The benefits of High Definition Technology (HD) for medical applications are
- Up to 6 times higher input resolution of the camera delivers more detail and depth of focus
- Using 16:9 format during image acquisition enlarges the field of vision and supports ergonomic viewing
- The brilliance of color enables optimal diagnosis
- Lateral view is enhanced by 32% when the endoscope is withdrawn slightly, providing the same image enhancement as a standard system. Any vertical information loss is restored and the lens remains clean

for use with IMAGE 1™ HD and standard one- and three-chip camera heads, max. resolution 1920 x 1080 Pixel, with integrated KARL STORZ SCB® and integrated digital Image Processing Module, color systems PAL/NTSC, power supply 100 – 240 VAC, 50/60 Hz

consisting of:

<table>
<thead>
<tr>
<th>22 2010 20-102</th>
<th>IMAGE 1 HUB™ HD Camera Control Unit (CCU) with SDI Module</th>
</tr>
</thead>
<tbody>
<tr>
<td>400 A</td>
<td>IMAGE 1 HUB™ HD (with SDI) Camera Control Unit Mains Cord</td>
</tr>
<tr>
<td>3 x 536 MK</td>
<td>BNC/BNC Video Cable, length 180 cm</td>
</tr>
<tr>
<td>547 S</td>
<td>S-Video (Y/C) Connecting Cable, length 180 cm</td>
</tr>
<tr>
<td>20 2032 70</td>
<td>Special RGB Connecting Cable</td>
</tr>
<tr>
<td>2x 20 2210 70</td>
<td>Connecting Cable, for controlling peripheral units, length 180 cm</td>
</tr>
<tr>
<td>20 0400 86</td>
<td>DVI Connecting Cable, length 180 cm</td>
</tr>
<tr>
<td>20 0901 70</td>
<td>SCB Connecting Cable, length 100 cm</td>
</tr>
<tr>
<td>20 2001 30U</td>
<td>Keyboard, with English character set</td>
</tr>
</tbody>
</table>

Specifications:

<table>
<thead>
<tr>
<th>Signal-to-noise ratio</th>
<th>AGC</th>
<th>Video output</th>
<th>Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMAGE 1 HUB™ HD</td>
<td>Micro-processor-controlled</td>
<td>- Composite signal to BNC socket</td>
<td></td>
</tr>
<tr>
<td>Three-chip camera systems ≥ 60 dB</td>
<td></td>
<td>- S-Video signal to 4-pin Mini DIN socket (2x)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- RGBS signal to D-Sub socket</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- SDI signal to BNC socket (only IMAGE 1 HUB™ HD with SDI Module)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- HDTV signal to DVI-D socket (2x)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Control output/input</th>
<th>Dimensions w x h x d (mm)</th>
<th>Weight (kg)</th>
<th>Power supply</th>
<th>Certified to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- KARL STORZ-SCB® at 6-pin Mini DIN socket (2x)</td>
<td>305 x 89 x 335</td>
<td>2.95</td>
<td>100-240 VAC, 50/60 Hz</td>
<td>IEC 601-1, 601-2-18, CSA 22.2 No. 601, UL 2601-1 and CE acc. to MDD, protection class 1/CF</td>
</tr>
</tbody>
</table>

SDI – Serial Digital Interface: optimized to display medical images on Flat Screens, Routing with OR1™ and digital recording with AIDA-DVD-M

ICM: USB-connector for recording video streams and stills on USB storage media or for connection of USB printers for direct printing of the recorded stills
**IMAGE 1™ HD**
**HD Camera Head**

Max. resolution 1920 x 1080 pixels, progressive scan, soakable, gas and plasmasterilizable, with integrated Parfocal Zoom Lens, focal length f = 15 – 31 mm (2x), 2 freely programmable camera head buttons, for use with color system PAL/NTSC

### Specifications:

| Image sensor | 3x 1/3" CCD-Chip |
| Dimensions | 1920 x 1080 |
| Weight | Diameter 32-44 mm, length 114 mm |
| Min. sensitivity | 246 g |
| Lens | F 1,4/1,17 Lux |
| Grip mechanism | Integrated Parfocal Zoom Lens, f = 15-31 mm |
| Cable | Standard eyepiece detector, non-detachable |
| Cable length | 300 cm |

### KARL STORZ HD Flat Screens

**Color systems PAL/NTSC**

<table>
<thead>
<tr>
<th>Version</th>
<th>Order No.</th>
<th>Screen diagonal</th>
<th>Max. screen resolution</th>
<th>Video input</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall mounted with VESA 100-adaption</td>
<td>9524 NB</td>
<td>24&quot;</td>
<td>1920 x 1200</td>
<td>Composite signal to BNC socket, S-Video to 4-pin socket, Mini-DIN to 4-pin socket, RGB to 15-pin socket, HD-D-Sub socket, SDI to HD-SDI to BNC socket, DVI to DVI-D socket</td>
</tr>
<tr>
<td>9526 NB</td>
<td>26&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Desktop with pedestal</td>
<td>9524 N</td>
<td>24&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9526 N</td>
<td>26&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**The following accessories are included:**

- 400 A Mains Cord
- 9523 PS External 24VDC Power Supply
- 9419 NSF Pedestal
Data Management and Documentation

KARL STORZ AIDA® compact NEO (HD/SD)
Brilliance in documentation continues!

AIDA compact NEO from KARL STORZ combines all the required functions for integrated and precise documentation of endoscopic procedures and open surgeries in a single system.

Data acquisition
Still images, video sequences and audio comments can be recorded easily during an examination or intervention on command by either pressing the on screen button, voice control, foot switch or pressing the camera head button. All captured images will be displayed on the right hand side as a “thumbnail” preview to ensure the still image has been generated.

The patient data can be entered by the on-screen keyboard or by a standard keyboard.

Flexible post editing and data storage
Captured still images or video files can be previewed before final storage or can be edited and deleted easily in the edit screen.

Reliable storage of data
- Digital saving of all image, video and audio files on DVD, CD-ROM, USB stick, external/internal hard-drive or to the central hospital storage possibilities over DICOM/HL7
- Buffering ensures data backup if saving is temporarily not possible
- Continuous availability of created image, video and sound material for procedure documentation and for research and teaching purposes.

Efficient data archiving
After a procedure has been completed, KARL STORZ AIDA® compact HD/SD saves all captured data efficiently on DVD, CD-ROM, USB stick, external hard-drive, internal hard-drive and/or the respective network on the FTP server. Furthermore the possibility exists to store the data directly on the PACS respective HIS server, over the interface package AIDA communication HL7/DICOM.

Data that could not be archived successfully remains in a special buffered procedure until it is finally saved. A two-line report header and a logo can be used by the user to meet his or her needs.

Multi-session and Multi-patient
Efficient data archiving is assured as several treatments can be saved on a DVD, CD-ROM or a USB stick.
Features and Benefits
- Digital storage of still images with a resolution of 1920 x 1080 pixels, video sequences in 720p and audio files with AIDA compact NEO HD
- Optional interface package DICOM/HL7
- Sterile, ergonomic operation via touch screen, voice control, camera head buttons and/or foot switches
- Auto detection of the connected camera system on HD-SDI/SD-SDI input
- Efficient archiving on DVD, CD-ROM or USB stick, multi-session and multi-patient
- Network saving
- Automatic generation of standard reports
- Approved use of computers and monitors in the OR environment as per EN 60601-1
- Compatibility with the KARL STORZ Communication Bus (SCB) and with the KARL STORZ OR1™ AV NEO
- KARL STORZ AIDA® compact NEO HD/SD is an attractive, digital alternative to video printers, video recorders and dictaphones.

Specifications:

<table>
<thead>
<tr>
<th>Video Systems</th>
<th>PAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal Inputs</td>
<td>NTSC</td>
</tr>
<tr>
<td>Image Formats</td>
<td>- S-Video (Y/C)</td>
</tr>
<tr>
<td></td>
<td>- Composite</td>
</tr>
<tr>
<td></td>
<td>- RGBS</td>
</tr>
<tr>
<td></td>
<td>- SDI</td>
</tr>
<tr>
<td></td>
<td>- HD-SDI</td>
</tr>
<tr>
<td></td>
<td>- DVI</td>
</tr>
<tr>
<td>Video Formats</td>
<td>MPEG2</td>
</tr>
<tr>
<td>Audio Formats</td>
<td>WAV</td>
</tr>
<tr>
<td>Storage Media</td>
<td>- DVD+R</td>
</tr>
<tr>
<td></td>
<td>- DVD+RW</td>
</tr>
<tr>
<td></td>
<td>- DVD-R</td>
</tr>
<tr>
<td></td>
<td>- DVD-RW</td>
</tr>
<tr>
<td></td>
<td>- CD-R</td>
</tr>
<tr>
<td></td>
<td>- CD-RW</td>
</tr>
<tr>
<td></td>
<td>- USB stick</td>
</tr>
</tbody>
</table>
AUTOCON® II 400 HF surgical unit
for interdisciplinary high-frequency surgery

- Can be used across a wide range of surgical disciplines
- The world’s only HF unit with a 6.5” touch screen for easy, safe, ergonomic operation and cleaning
- Preprogrammed settings available for certain procedures; settings for procedures can be additionally programmed easily and quickly

**205352 01-115**  
**KARL STORZ AUTOCON® II 400 High End**  
power supply: 230 VAC, 50/60 Hz  
HF Connecting Sockets: Bipolar Standard, Bipolar multifunction, Unipolar 3-Pin + Erbe, Neutral electrode 6.3 mm jack, consists of:  
**205352 20-115**  
**AUTOCON® II 400 with KARL STORZ SCB® Mains Cord**  
**200901 70**  
**SCB Connection Cable**, length 100 cm

**Necessary accessories:**

**20 0138 30**  
**Double Pedal Footswitch**  
for 205352 01-11x

**26176 LE**  
**Bipolar High Frequency Cord**  
for KARL STORZ AUTOCON® system (50, 200, 350), AUTOCON® II 400 (Tpe 111, 113, 115) and Erbe-Coagulator, T- and ICC-row, length 300 cm

**26005 M**  
**Unipolar High Frequency Cord**  
with 5 mm plug for HF unit, models KARL STORZ AUTOCON® system (50, 200, 350) AUTOCON® II 400 (Tpe 111, 115) and Erbe type ICC; length 300 cm

**27805**  
**Neutral Electrode** made of conductive silicone, with 2 rubber straps for fastening, for use with KARL STORZ AUTOCON® (type 200, 350), AUTOCON® II 400 (type 111, 115) A= 500 cm² surface area

**27806**  
**Connecting Cord**, for connecting the neutral electrodes 27805 and 860021 E, length 400 cm