Neuroendoscopy

Recommended Sets acc. to GAAB
Neuroendoscopy represents a further step in appropriate minimally invasive neurosurgery, which means further minimizing damage to normal functional tissue with maximum efficacy in terms of pathology. However, endoscopy of the central nervous system is especially complicated: unlike arthroscopy or peritoneal and thoracic endoscopy, work in the ventricular system or in brain cysts is performed in liquor - under water so to speak - (except where complex drainage is necessary with heavy bleeding). Gas insufflation and any overpressure with fluid perfusion to optimize the endoscopic viewing field are not possible (with the exception of discoscopy). Hemostasis thus calls for maximum precision, where possible on a preventive basis, and maintaining absolute sterility is essential. For this reason, special endoscopes with small diameters are required for the delicate CNS, as well as specialized irrigation techniques, modified endoscopic instruments and surgical techniques.

For this purpose, a complete system has been developed for the two fundamental techniques of neuroendoscopy:

- for neuroendoscopy via an air-filled cavity: here the endoscopic procedure is performed using an existing natural cavity, which is enlarged as necessary (e.g. our set for transnasal neurosurgery) or via an artificially prepared cavity, e.g. with endoscopically assisted or controlled microsurgery or with surgery of the carpal and cubital tunnel. For transnasal and endoscopically assisted surgery we sometimes use the same endoscopes, which are fixed where possible with a holder at the optimum distance for a view of the process. Instruments are inserted around the endoscope using modified microsurgical instruments, with hemostasis and tissue ablation taking place according to the same principles, but with modified instruments as in microsurgery (monopolar, pseudomonopolar and bipolar coagulation, ultrasonic aspiration etc.). For intracerebral, purely endoscopic speculum access we use the same specula as for transnasal procedures, with a blunt trocar and neuronavigational positioning, where possible also with fixation to a holder.

For the carpal and cubital tunnel the same endoscopes are used as for ventriculoscopy, just sometimes with altered access of the fiberoptic light cable (30° telescope) and a special slit cannula/hook knife with the (biportal) carpal tunnel technique.

- for neuroendoscopy in liquor-filled cavities of the CNS: here the liquor-filled cavity is accessed via puncture with a guide tube ('operating sheath'); during puncture the blunt trocar in the operating sheath can be steered with neuronavigation while a particularly narrow telescope (28018 AA) also permits 'viewing through the trocar tip' of puncture using the optical obturator. The operating sheath then accommodates the telescope and is used to steer the specially modified surgical instruments at the same time (for the CNS using uniportal 'coaxial' access in the vast majority of cases). Once again, there are 2 principles:

  a) The channel endoscope. Here the sheath (e.g. DECQ endoscope) or the endoscope itself (e.g. the miniature endoscope 28162 AM) contains several channels which are used to steer instruments with an appropriate diameter and for irrigation (separate inlet and outlet). The advantages are the precise steering of instruments and mechanical protection of the endoscope. The disadvantage is the small effective lumen of the channels, which barely permits the removal of significant tumor or cyst
material or the implantation of stents or efficacious hemostasis. We thus apply this principle with especially small atraumatic outside sheath diameters of < 4 mm (28162 C), i.e. purely for ventriculostomy and cystostomy, e.g. with infants, possibly also in combination with a biopsy using straight 1 mm instruments that are easy to steer.

b) The space endoscope: Here the entire instrument channel of the operating sheath is available for manipulation (28162 BS). Diagnostic endoscopy is first of all performed with the optimum quality of the 4 mm endoscope; in addition to the straight telescope, an overview of the entire cavity (ventricle, cyst) is available using angled telescopes (30°, 45°, 70°), which can be rotated through 360°. With the 120° telescope a ‘retrograde’ view is even possible (e.g. to check for complete capsule resection in the case of colloid cysts). For surgical manipulation the extremely narrow 2 mm OR endoscope (28096 AGA) occupies little space in the guide channels so that instruments up to 3 mm in size can be used, with the irrigation cannula positioned alongside. Large tumor sections can be removed with the endoscope or stents inserted. The sensitive OR endoscope with a 6° field of view, which thus shows the instrument in the middle, should not be put down without the protection tube.

Prof. Dr. habil. M. R. GAAB
Department of Neurosurgery
Klinikum Hannover Nordstadt
The optical system of the GAAB neuroendoscope remains unchanged, but the telescope sheath has been modified and enhanced. In the sensitive neuroendoscope with 6° field of view, the light cable and telescope, which were previously located side-by-side and insulated, are now encased in a kidney-shaped sheath, which also provides extra strength. The outer diameter of the operating sheath, on the other hand, remains unchanged at 6.5 mm. To ensure the same-sized working channel, the centering of the telescope has been optimized. The kidney-shaped sheath thus strengthens the telescope without making the working channel narrower.

The existing obturators are compatible with the new system.

Another innovation is the holding systems from KARL STORZ, with a quick-release coupling. You can find an overview of the holding systems on the next page.
### Clamping Jaw Catalog number of the entire holding system

<table>
<thead>
<tr>
<th>Socket</th>
<th>Articulated stand</th>
</tr>
</thead>
<tbody>
<tr>
<td>28172 HK</td>
<td>28272 HA</td>
</tr>
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<td><img src="28172-HK.png" alt="Image" /></td>
<td><img src="28272-HA.png" alt="Image" /></td>
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<tr>
<td>A 30 cm</td>
<td>B –</td>
</tr>
<tr>
<td>C 20 cm</td>
<td>D 17 cm</td>
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</tbody>
</table>

#### Clamping Jaw, metal, with fastener KSLock, for use with all square headed KARL STORZ telescopes, clamping range 16.5 up to 23 mm

<table>
<thead>
<tr>
<th>Clamping Jaw</th>
<th>Catalog number of the entire holding system</th>
</tr>
</thead>
<tbody>
<tr>
<td>28272 UG</td>
<td>28272 KGA</td>
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<tr>
<td></td>
<td>28272 RGA</td>
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<tr>
<td>28272 UF</td>
<td>28272 KFA</td>
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<tr>
<td></td>
<td>28272 RFA</td>
</tr>
</tbody>
</table>

#### Clamping Jaw, with fastener KSLock, for use with all KARL STORZ polymer housing fiberscopes

- **Clamping Jaw**
- **Catalog number of the entire holding system**
Recommended Sets for Neuroendoscopy acc. to GAAB
Recommended Sets for Neuroendoscopy acc. to GAAB

1. **28162 PK**  
Injection Needle, diameter 1.7 mm

2. **28161 LD**  
Deflecting Mechanism, for LASER probe, with proximal bend protection, with ring-grip handle, diameter 2.9 mm, length 38 cm

3. **28162 U**  
Grasping Forceps, single action jaws, diameter 2.7 mm, working length 30 cm

4. **28162 ZE**  
Biopsy Forceps, single action jaws, diameter 2.7 mm, working length 30 cm

5. **28162 EP**  
Scissors, pointed, single action jaws, diameter 2.7 mm, working length 30 cm

6. **28162 EM**  
Scissors, pointed, slightly curved jaws, double action jaws, diameter 1.7 mm, working length 30 cm

7. **28162 Z**  
Biopsy Forceps, double action jaws, diameter 1.7 mm, working length 30 cm

8. **28160 TVX**  
Forceps, for ventriculostomy, flexible, diameter 1.7 mm, working length 30 cm

9. **28762 KB**  
Coagulating Electrode, bipolar, diameter 1.7 mm

10. **28762 K**  
Coagulating Electrode, unipolar, diameter 1.7 mm

11. **28272 KKA**  
Holding System, autoclavable consisting of:  
28172 HK Socket, with clamp for fixation to the operating table’s sliding rail  
28272 HA Articulated Stand, straight  
28272 UK Clamping Jaw, metal, with axial intake

12. **28096 AGA**  
HOPKINS® Wide Angle Straight Forward Telescope 6°, stable version, with angled eyepiece, with instrument channel diameter 3 mm, length 15 cm, autoclavable, fiber optic light transmission incorporated, color code: green

13. **28162 BS**  
Operating Sheath, O.D. 6.5 mm, working length 13 cm, with graduated scale, with lateral stopcock and Inlet for catheter, for use with 28096 AGA

14. **28162 BO**  
Obturator included with 28162 B

15. **28162 BB**  
Obturator included with 28162 B, with central hole 2 mm for stereotactic positioning

16. **28162 BD**  
Optical Obturator, for positioning of operating sheath 28162 B under visual control, for use with HOPKINS® telescope 28018 AA

17. **28132 BWA**  
HOPKINS® Wide Angle Forward-Oblique Telescope 30°, enlarged view, diameter 4 mm, length 18 cm, autoclavable, fiber optic light transmission incorporated, color code: red

18. **28132 AA**  
HOPKINS® Straight Forward Telescope 0°, enlarged view, diameter 4 mm, length 18 cm, autoclavable, fiber optic light transmission incorporated, color code: green

19. **28018 AA**  
HOPKINS® Straight Forward Telescope 0°, diameter 2.7 mm, length 18 cm, autoclavable, fiber optic light transmission incorporated, color code: green

20. **28132 FA**  
HOPKINS® Forward-Oblique Telescope 45°, enlarged view, diameter 4 mm, length 18 cm, autoclavable, fiber optic light transmission incorporated, color code: black

21. **7219 FA**  
HOPKINS® Forward-Oblique Telescope 45°, diameter 2.7 mm, length 18 cm, autoclavable, fiber optic light transmission incorporated, color code: black

22. **28162 EA**  
Telescope Bridge, for use with HOPKINS® telescopes 28162 AA and 28132 AA through operating sheath 28162 B

23. **28162 E**  
Telescope Bridge, for use with HOPKINS® telescopes 28162/28132 BA/BWA/CA through operating sheath 28162 B

24. **28160 SF**  
Suction Catheter, flexible, diameter 3.0 mm, working length 45 cm, disposable

25. **28162 SN**  
Irrigation Tube, autoclavable, with Luer-Lock

26. **533 TVA**  
Adaptor, autoclavable, permits telescope changing under sterile conditions

27. **28162 GB**  
Balloon Catheter, O.D. 1.0 mm, single use, 10 pieces (not pictured)

**Recommended Containers for Sterilization:**  
Telescopes: 39301 A (3x)  
Angled Telescopes: 39314 G  
Instruments: 39360 BK
Genuine HD is guaranteed by a maximum resolution and the consistent use of the native 16:9 aspect ratio from image capture, signal transmission to display devices.

- HD-compatible endoscopic video camera systems must be equipped with a CCD chip supporting the 16:9 input format and require that image capture be performed at a resolution of 1920 x 1080 pixels.

The benefits of High Definition (HD) for medical applications are:
- 5 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.
- The 16:9/16:10 format of the widescreen monitor supports ergonomic viewing.
- Enhanced color brilliance for optimal diagnosis.
- Progressive scan technology provides a steady, flicker-free display and helps eliminate eyestrain and fatigue.

**IMAGE1™ HD**
HD camera control unit

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**222010 11U102**
**IMAGE1™ HD hub camera control unit (CCU)**

for use with IMAGE1™ HDTV and standard one and three-chip camera heads, max. resolution 1920 x 1080 pixels, with integrated KARL STORZ-SCB® and integrated image processing module, color system PAL/NTSC, power supply 100–240 VAC, 50/60 Hz

**consisting of:**

- **222010 20U102**
  - IMAGE1™ HD (with SDI) camera control unit
  - 400 A Mains Cord
  - 3 x 536 MK BNC/BNC Video Cable, length 180 cm
  - 547 S S-Video (Y/C) Connecting Cable, length 180 cm
  - 202032 70 Special RGB Connecting Cable
  - 2x 202210 70 Connecting Cable, for controlling peripheral units, length 180 cm
  - 202040 86 DVI Connecting Cable, length 180 cm
  - 202091 70 SCB Connecting Cable, length 100 cm
  - 202001 30U Keyboard, with English character set

Specifications:

<table>
<thead>
<tr>
<th>Signal-to-noise ratio</th>
<th>AGC</th>
<th>Video output</th>
<th>Input</th>
</tr>
</thead>
</table>
| IMAGE1™ Three-chip camera systems ≥ 60 dB | Microprocessor-controlled | - Composite signal to BNC socket  
- S-Video signal to 4-pin Mini DIN socket (2x)  
- RGB signal to D-Sub socket  
- DV signal to DV socket (only IMAGE1™ with DV module)  
- SDI signal to BNC socket (only IMAGE1™ with SDI module)(2x)  
- HDTV signal to DVI-D socket (2x) | Keyboard for title generator, 5-pin DIN socket |

<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>
</table>
| - KARL STORZ-SCB® at 6-pin Mini DIN socket (2x)  
- 3.5 mm stereo jack plug (ACC 1, ACC 2),  
- Serial port at RJ-11 | 305 x 89 x 335 | 2.95 | 100-240 VAC, 50/60 Hz | IEC 601-1, 601-2-18, CSA 22.2 No. 601, UL 2601-1 and CE acc. to MDD, protection class 1/CF |
**IMAGE1™ HD**

**HD camera head**

**22 2200 50-3** 50 Hz IMAGE1™ H3, three-chip HD camera head

max. resolution 1920 x 1080 pixel progressive scan, 50 Hz, with 2 freely programmable camera head buttons, with integrated parfocal zoom, focal length f = 14 – 30 mm (2x)

**22 2201 50-3** 60 Hz IMAGE1™ H3, three-chip HD camera head

max. resolution 1920 x 1080 pixel, progressive scan, 60 Hz, with 2 freely programmable camera head buttons, with integrated parfocal zoom focal length f = 14 – 30 mm (2x)

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**Specifications:**

<table>
<thead>
<tr>
<th>Image sensor</th>
<th>Pixels</th>
<th>Dimensions</th>
<th>Weight</th>
<th>Lens</th>
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</thead>
<tbody>
<tr>
<td>IMAGE1™ three-chip camera head 3x 1/3 CCD chip</td>
<td>1920 (H) x 1080 (V) pixels per chip</td>
<td>31 x 114 x 48 mm (w x h x d)</td>
<td>210 g</td>
<td>Integrated parfocal zoom lens, f = 14–30 mm</td>
</tr>
</tbody>
</table>

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Standard IMAGE1™ camera heads may also be connected to IMAGE1™ HD hub camera control unit (CCU).

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<table>
<thead>
<tr>
<th>KARL STORZ HD flat screens</th>
<th>Screen diagonal</th>
<th>Max. screen resolution</th>
<th>Video input</th>
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<tbody>
<tr>
<td>Art no.</td>
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<td>1920 x 1200</td>
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</tr>
<tr>
<td>Wall-mounted with VESA 100-adaption</td>
<td>9523 NB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Desktop with pedestal</td>
<td>9523 N</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The following accessories are included:

- 400 A Mains cord
- 9523 PS External 24 VDC power supply
- 9419 SF Pedestal (only 9523 N)
Cold Light Fountain XENON 300 SCB®

201340 01  KARL STORZ Cold Light Fountain XENON NOVA 300, 300 W XENON lamp, power supply: 100–120/220–240 VAC, 50/60 Hz, including: 400 A Mains Cord

495 NCS  Fiber Optic Light Cable, size 4.8 mm, length 250 cm, heat resistant