DISSECTION MANUAL FOR THE TEMPORAL BONE LABORATORY

KHAIERY ALHAG ABU SHARA
Khairy Alhag Abu Shara, M.D.
Senior consultant ENT, Head and Neck Surgeon, Sabah and MTC Hospitals, Kuwait

Education:
- M.D. Ear, Nose and Throat Surgery. May 1992, Faculty of medicine, Cairo University Kasr Al-Ainy Medical School
- M.S. Ear, Nose and Throat Surgery. May 1985 (very good degree), faculty of medicine, Cairo University Kasr Al-Ainy Medical School
- M B & Bch Nov. 1981 (very good degree), faculty of medicine, Cairo University Kasr Al-Ainy Medical School

Posts:
- Senior Consultant at ENT department, Sabah and MTC hospitals, Ministry of Health (MOH), Kuwait
- Lecturer of otorhinolaryngology, department of surgery, faculty of medicine, Kuwait university 1996, ongoing. (Mandated from MOH).
- X-Chairman of ENT department, Al-Sabah Hospital, Kuwait, July 1999 – April 2006.
- Resident at Cairo University Medical School, ENT department, Kasr Al-Ainy Hospital, Egypt, from 2nd March 1983 until 28 Feb. 1986.

Licensures and activities:
- Licensed as ENT Consultant in Kuwait, Egypt and Sudan.
- Referee of the Kuwait Medical Journal.
- Member of the Faculty of Surgery, Kuwait Institute for Medical Specialization (KIMS) since October 1998, ongoing.
- X-chairman of the inspection board for private hospitals, MOH, Kuwait.
- X-Member of the operational policy follow-up team MOH, Kuwait.
- X-Member of the accreditation standards setup committee for hospitals and primary health care centers, MOH, Kuwait.
- Visiting professor, Khartoum university, faculty of medicine.
- Director of the first temporal bone course, Kuwait, November 2005.

Publications:
19 publications in national, regional and international journals, 12 presentations, 8 posters and booklets.

Awards and certificates of honor:
1. From KMA on the occasion of obtaining the M.D. degree.
2. From the Egyptian medical syndicate on the occasion of obtaining the M.D. degree.
5. From the Sudanese ENT association.
6. From the minister of health of Kuwait for editing the operational policy of the ENT departments in Kuwait, May 2000.
7. From the minister of health, Kuwait, for the 3rd edition of the operational policy of the ENT departments in Kuwait, Febr. 2002.
8. Support for research from the “Kuwait Foundation for Advancement of Science” (KFAS).
9. From the faculty of surgery, Kuwait Institute for Medical Specialization (KIMS)
10. From the director of Sabah medical area.
DISSECTION MANUAL FOR THE TEMPORAL BONE LABORATORY

KHAIRY ALHAG ABU SHARA, M.D.

Senior Consultant ENT, Head and Neck Surgeon
Sabah and MTC Hospitals, Kuwait
X-Chairman of ENT Medical Council – MOH 99-06

To my mother,
from whom I have learned how sincere hard work can be an endless source of enjoyment.

To my Family,
for their unlimited support and understanding of the medical profession as well as its obligations and commitments.
Acknowledgement

The growth of medico-legal problems related to surgical practices necessitates greater emphasis on clinical training. Lab practice on cadavers and various models is becoming increasingly popular for both research and training.

The challenges of ear surgery are unique because the density of anatomical structures in a relatively small space is unlike any other organ in the human body. This consequently calls for extensive lab training before starting to operate in the theater – a step that should only be taken once both the trainer and trainee are satisfied with the level of skills achieved.

For those reasons, the establishment of a temporal bone lab within the otology center is an inevitable option.

Considering the short time frame given during a temporal bone dissection course – in which the participants are concerned mainly with hands-on training rather than going into further theoretical details – this manual nevertheless provides practical and concise orientation to the topic. The author’s aim was not to write a textbook, but to address the actual needs in a temporal bone lab, which is why this manual should be supported by more detailed training instructions and further readings.

I hope, this booklet will be of great help to our junior candidates and to the seniors who are planning to establish a temporal bone lab.

A special word of gratitude goes to KARL STORZ company for their kind support and valuable assistance in the preparation of this booklet.

Khairy Alhag Abu Shara, M.D.
Senior Consultant ENT, Head and Neck Surgeon
Sabah and MTC Hospitals, Kuwait
Email: Khairy86@yahoo.com
Phone: 00965 9784104
Foreword

Middle ear surgery involves procedures that are among the most challenging in the field of ORL, demanding a high degree of technical skill, expertise and precision. To become a proficient otologist requires good orientation skills and thorough knowledge of numerous anatomical structures confined to a space amounting to less than one cubic inch. Furthermore, the introduction of the surgical microscope, dental drill and fine instruments requires the development of precise operative techniques.

The introduction of high-resolution CT scanners, 1 mm cuts and MRI enables surgeons to gain a more detailed knowledge of fine anatomical structures, e.g., the thickness of the stapes foot plate in stapes surgery, the facial nerve anatomy, and the possibility of any associated congenital anomalies in cochlear implantation.

Full anatomical orientation regarding both normal and abnormal variants is the first step to be taught in temporal bone labs. Otherwise avoidable complications could occur.

It has been suggested by many authors that prior to performing in-vivo surgery in an operating theater, a trainee surgeon should acquire good knowledge of temporal bone anatomy and develop proper navigational skills to such a degree comparable to the uncanny sense of direction that allows us to find our way through our own bedroom in complete darkness. It takes a long time to become an ear surgeon and even more time to gain the required level of proficiency to successfully manage difficult and complicated cases. The temporal bone dissection lab provides an entry point, where candidates can devote their efforts to working toward this goal.

In this manual, information is given about the anatomy of the temporal bone, the various surgical procedures, that can be practiced on cadaver specimen in the lab (including photos, addressing procedures, and concepts), imaging procedures, and a suggested temporal bone laboratory setup.
Anatomical schematic drawings:
Mr. Andreas Mücke
Karl-Frank-Str. 32
12587 Berlin, Germany

Most of the photographs shown in this manual were taken by the author during dissection sessions in the temporal bone laboratory.

Important notes:
Medical knowledge is ever changing. As new research and clinical experience broaden our knowledge, changes in treatment and therapy may be required. The authors and editors of the material herein have consulted sources believed to be reliable in their efforts to provide information that is complete and in accord with the standards accepted at the time of publication. However, in view of the possibility of human error by the authors, editors, or publisher, or changes in medical knowledge, neither the authors, editors, publisher, nor any other party who has been involved in the preparation of this booklet, warrants that the information contained herein is in every respect accurate or complete, and they are not responsible for any errors or omissions or for the results obtained from use of such information. The information contained within this booklet is intended for use by doctors and other health care professionals. This material is not intended for use as a basis for treatment decisions, and is not a substitute for professional consultation and/or use of peer-reviewed medical literature.

Some of the product names, patents, and registered designs referred to in this booklet are in fact registered trademarks or proprietary names even though specific reference to this fact is not always made in the text. Therefore, the appearance of a name without designation as proprietary is not to be construed as a representation by the publisher that it is in the public domain.

The use of this booklet as well as any implementation of the information contained within explicitly takes place at the reader’s own risk. No liability shall be accepted and no guarantee is given for the work neither from the publisher or the editor nor from the author or any other party who has been involved in the preparation of this work. This particularly applies to the content, the timeliness, the correctness, the completeness as well as to the quality. Printing errors and omissions cannot be completely excluded. The publisher as well as the author or other copyright holders of this work disclaim any liability, particularly for any damages arising out of or associated with the use of the medical procedures mentioned within this booklet.

Any legal claims or claims for damages are excluded.

In case any references are made in this booklet to any 3rd party publication(s) or links to any 3rd party websites are mentioned, it is made clear that neither the publisher nor the author or other copyright holders of this booklet endorse in any way the content of said publication(s) and/or web sites referred to or linked from this booklet and do not assume any form of liability for any factual inaccuracies or breaches of law which may occur therein. Thus, no liability shall be accepted for content within the 3rd party publication(s) or 3rd party websites and no guarantee is given for any other work or any other websites at all.
## Table of Contents

- Acknowledgement ........................................ 4
- Forword .................................................. 5
- 1.0 Introduction ......................................... 8
- 2.0 Training Procedures ................................. 13
- 3.0 Endoscopic Views of the Temporal Bone .......... 24
- 4.0 Temporal Bone CT Images
  - 4.1 Axial CT Scans ....................................... 28
  - 4.2 Coronal CT Scans .................................... 35
- 5.0 Exposure of the Temporal Bone: Genuine Dissections .......... 39
- Remember ............................................... 42
1.0 Introduction

Fig. 1
Left temporal bone, lateral view with the squama sculptured as an auricle. There are two temporal bones. Each is composed of five parts: mastoid, petrous, squamous, tympanic plate and styloid process.

Fig. 2
Right temporal bone attached to the occipital bone. View of the posterior cranial fossa. The internal auditory meatus (IAM), jugular foramen and notch, sigmoid sinus, superior and inferior petrosal sinuses, petrous apex, clivus, and hypoglossal canal can be seen.
Fig. 3
Right temporal bone attached to sphenoid and occipital bones. View of the middle cranial fossa. The foramina (rotundum, ovale, spinosum, and lacerum), the superior orbital fissure, internal carotid artery, anterior clinoid process, clivus, petrous apex, cavum trigeminale, greater wing of the sphenoid, petro-sphenoid and petro-occipital suture lines are visible.

Fig. 4
External view of the skull base. The jugular foramen, carotid canal, greater wing of the sphenoid, the foramina (ovale, spinosum, lacerum), zygomatic root, mandibular fossa, styloid process, squamo-sphenoid suture, occipital condyle, digastric fossa, stylo-mastoid foramen, and mastoid tip are visible.
Fig. 5
Superior SCC
Common crus
Posterior SCC

Cochlea
Oval window
Lateral SCC

Fig. 6
Left inner ear. The superior and lateral SCC, facial nerve, oval and round windows, cochlea, modulus, and promontory.
Fig. 7
Anatomy of the left middle ear: The incudo-stapedial joint, the stapes head and the crura, facial nerve, stapedial tendon, promontory, and tympanomeatal flap are visible.

Fig. 8
The auditory ossicles.
1. The malleus, head, neck, lateral process, and handle.
2. The incus: body, short, long, and lenticular processes.
3. The stapes: head, neck, anterior and posterior crura, and footplate.
Fig. 9
Right side dissection. Notice the jugular bulb, carotid canal, both vertical and horizontal parts, carotico-jugular septum, and foramen for the IX cranial nerve, cochlea, oval window, facial nerve, cochleariform process, semi-canal of the tensor tympani muscle, and lateral SCC.
2.0 Training Procedures

General rules
- Specimen should be taken out of the refrigerator one hour before dissection.
- All needed instruments should be available.
- Temporal bone should be in surgical position.
- Rapid review of the gross anatomy.
- Verify operational integrity of the drill and perform an initial function test.
- Leave your bones in a labeled plastic bag

Sanitary rules
- Anti-hepatitis vaccination.
- Wear gowns, gloves, overshoes, safety glasses and face mask to prevent bone dust inhalation and entry of a bone splinter into the eye.
- Avoid injuries by using proper instruments.
- Remaining bones and dust should be handled as medical wastes.
- Leave the working area clean and tidy for the next group.

The bones should be removed from the refrigerator at least one hour before dissection. First, determine whether the bone is right or left, and secure it with a temporal bone holder in a surgical position, as if in the operating theater. The zygomatic root is anterior, and the mastoid tip is inferior (Fig. 10a).

Identify important landmarks related to different anatomic views of the temporal bone, for example:
- Zygomatic root
- Mastoid tip
- Digastric notch
- External auditory meatus
- Squamous part of temporal bone
- Petrous part of temporal bone and its apex
- Cavum trigeminale
- Arcuate eminence
- Internal auditory meatus
- Cranial nerves VII, VIII, IX and X (spaghetti-like structure)
1. Attempt soft tissue procedures, such as:
   - Periosteal incision and dissection
   - Dissection of the posterior meatal skin down to the annulus.

Sometimes the candidate cannot practice the soft tissue work properly if formalinized specimens or macerated bones are used.

The candidate should be familiar with the anatomy of macerated bones (Figs. 10d and 10e).

The Golden Rules of Drilling:
- Hold the drill securely with a steady hand
- Never perform blind drilling!
- Proper burr type, size and shape.
- Parallel direction
- Excavate, but never penetrate.
- Use suction-irrigation and prevent overheating.

2. Drill a code number on the squama to practice control of the drill handpiece, which should be held and used like a pencil. Never apply undue force to avoid losing control and causing subsequent, potentially catastrophic injury.
Fig. 10c
The art of drilling.

Fig. 10d
Anatomy of macerated bones. Lateral surface.

Fig. 10e
Anatomy of macerated bones: Medial surface.
Fig. 10f
Left myringotomy and grommet insertion.

Fig. 11
Left anterior tympanotomy.
3. Practice myringotomy and grommet insertion (Fig. 10f).

4. Practice anterior tympanotomy: a tympanomeatal flap is created by removal of the posterior meatal wall and exploration of the middle ear (Figs. 11, 12a). Practice stapedectomy and teflon piston insertion (Fig. 12b). In-vitro fixation can be achieved by injecting adhesive glue around the footplate or into the labyrinth through a “decapitated” superior SCC at the arcuate eminence.

Check the annulus, incudo-stapedial joint, stapes suprastructures, stapedial tendon, pyramidal process, facial nerve, chorda tympani, malleus handle, tympanic membrane, promontory, and round window.
5. Perform myringoplasty, in which a piece of periosteum is harvested and used as a graft which is positioned with the underlay technique to repair a previously created tympanic membrane perforation.

6. Practice a cortical mastoidectomy (Figs. 13, 14). Identify the spine of Henle, then start with the largest cutting burr in the MacEwen’s triangle between the inferior temporal line, tangent to the posterior meatal wall and the spine of Henle. This triangle serves as a landmark for localizing the mastoid antrum. Drilling should be accompanied by continuous irrigation and performed parallel to the anticipated border without leaving behind any overhangs. Never work blindly. The antrum, which is the largest mastoid air cell, has the lateral SCC on its floor. Cells over the dural and sinus plates are drilled, the sinodural angle is identified, and cells behind the sinus are cleared. Identify the digastric ridge and clear the peri-facial and deep mastoid air cells. Keep the posterior bony meatal wall intact.
7. Perform posterior tympanotomy (Figs. 15, 16) by initially gaining access to the middle ear from the mastoid cavity while ensuring that the tympanic membrane and annulus remain intact. A cortical mastoidectomy is performed to deepen the sinodural angle and thin the posterior meatal wall. The incus body and its short process are identified. Drilling begins with the 2 mm-diamond burr between the incus short process, chorda tympani, and facial nerve down to the middle ear. The incudo-stapedial joint, promontory and round window niche should be visible.

**Note:** You can fill the external auditory meatus with a colored fluid. This fluid should not leak into the mastoid. If leakage occurs, it is an early alarm that the annulus, tympanic membrane or posterior meatal wall was injured.
8. Identify the endolymphatic sac (Figs. 17, 18). Both lateral and posterior SCCs are exposed but not opened. The peri-sinus cells are drilled, and an imaginary line is passed along the lateral SCC, perpendicular to the posterior SCC. The bone inferior to this line is then thinned out and removed with a needle. The lateral wall of the sac is identified and incised using a sickle knife.
9. A cochleostomy is performed (Fig. 20) after preparation of the cochlear implant bed (Fig. 19) and cortical mastoidectomy with posterior tympanotomy. An attempt can be made under visual control with the cochlea opened from posterior so the electrode is constantly under direct vision during insertion (Fig. 21).

Note: This step needs to be performed under supervision of a trainer.
10. Perform a radical mastoidectomy (Figs. 22, 23) by drilling through the posterior meatal bony wall down to a level just above a line from the lateral SCC to the digastric ridge, removing the bridge over the attic area, as well as the anterior and posterior buttresses. The anterior attic is also cleared. Identify the facial nerve, semicanal of the tensor tympani muscle and the cochleariform process tendon. Try to complete an ossiculoplasty procedure.
11. Perform a labyrinthectomy (Figs. 24, 25) by first identifying the domes of the three SCC. Open the canals and follow with a small diamond burr to the vestibule. Preserve the anterior part of the lateral SCC to avoid injury to the facial nerve.
3.0 Endoscopic Views of the Temporal Bone

Fig. 26
Right tympanic membrane.

Fig. 27
Oto-endoscopic view of the right middle ear through the Eustachian tube.
Fig. 28
Left middle ear.

Fig. 29
Right internal auditory meatus.
Fig. 30
Left internal auditory meatus.

Fig. 31a, b
a Right internal auditory meatus (de-roofed) and cochlea opened with modiolus and spiral lamina visible.
b MRI insert image provides orientation about the position of the cochlea in (a).
Fig. 32
Endoscopic view of the right internal auditory meatus (IAM). The vestibular, cochlear and facial nerves are contained within the sheath of the dura mater.
4.0 Temporal Bone CT Images

The following CT images very effectively illustrate the osteological details needed for this course.

4.1 Axial CT Scans

Axial CT sections that include 1 mm cuts with overlap are appropriate for temporal bone visualization. The cuts start from the level of the mastoid tip and continue up to the level of the superior SCC.

<table>
<thead>
<tr>
<th>Mnemonic symbols</th>
<th>Anatomical structure</th>
<th>Mnemonic symbols</th>
<th>Anatomical structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duck bill</td>
<td>Jugular bulb and inferior petrosal sinus</td>
<td>Funnel</td>
<td>Internal auditory meatus (IAM)</td>
</tr>
<tr>
<td>Horn</td>
<td>Cochlear aqueduct</td>
<td>Ice cream cone</td>
<td>Incus and malleus</td>
</tr>
<tr>
<td>Smile</td>
<td>Basal turn of the cochlea</td>
<td>Hour glass</td>
<td>Attic, aditus, and antrum</td>
</tr>
<tr>
<td>Horns</td>
<td>Cochlea</td>
<td>Inverted L</td>
<td>Carotid artery</td>
</tr>
<tr>
<td>Spot</td>
<td>Common crus</td>
<td>Slit</td>
<td>Vestibular aqueduct</td>
</tr>
<tr>
<td>Bucket handle</td>
<td>Lateral SCC</td>
<td>Snake eyes</td>
<td>Superior SCC</td>
</tr>
</tbody>
</table>
Try to refresh your knowledge with the axial sections listed below.

Fig. 33

- Foramen spinosum
- Anterior cranial fossa
- Squamo-sphenoid suture
- Great wing of the sphenoid
- Foramen ovale
- Carotid artery (transverse)
- Sphenoid body
- Carotid artery (vertical)
- Inferior petrosal sinus
- Jugular vein
- Posterior cranial fossa

Fig. 34

- Anterior cranial fossa
- Sphenoid sinus
- Foramen spinosum
- Foramen ovale
- Mandibular condyle
- Carotid artery (transverse)
- Petrous apex
- Sphenoid body
- Jugular vein
- Posterior cranial fossa
Fig. 35

Notice the basal turn of the cochlea, middle ear and the cochlear aqueduct.
Fig. 37
Notice the cochlea, posterior SCC, sinus tympani, semi-canal of the tensor tympani muscle, round window, facial nerve, chorda tympani, tympanic membrane, and malleus handle.

Fig. 38

Fig. 39
Notice the long incus process.

Fig. 40
Notice the stapes, vestibule, common crus, and facial nerve.
Fig. 41
Notice the “ice cream cone” (incus and malleus) ossicular complex, vestibule, lateral SCC, facial nerve, IAM, and attic.

Fig. 42
Notice the posterior and superior semicircular canals.
Fig. 43
Notice the superior SCC extending to the dome, which is equivalent to the arcuate eminence at the mid-cranial fossa.
### 4.2 Coronal CT Scans

A series of 1 mm cuts with overlap are appropriate for temporal bone coronal CT imaging. The cuts start from anterior to posterior from the level of the cochlea back to the level of the posterior SCC.

Some authors link the anatomical structures with mnemonic cartoon symbols that aid in memorizing the major structures and their characteristics, such as:

<table>
<thead>
<tr>
<th>Mnemonic symbols</th>
<th>Anatomical structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three fingers</td>
<td>Superior SCC, lateral SCC, basal turn of cochlear</td>
</tr>
<tr>
<td>Transverse crest IAM</td>
<td>Vestibule and round window</td>
</tr>
<tr>
<td>Inverted tear drop</td>
<td>Cochlea</td>
</tr>
<tr>
<td>Snail shell</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mnemonic symbols</th>
<th>Anatomical structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pyramid</td>
<td>Scutum</td>
</tr>
<tr>
<td>Hammer</td>
<td>Malleus</td>
</tr>
<tr>
<td>Snail eyes</td>
<td>Labyrinth and tympanic facial nerve segments</td>
</tr>
<tr>
<td>Inverted triangle</td>
<td>Eustachian tube</td>
</tr>
</tbody>
</table>
Try to refresh your knowledge with the coronal sections listed below.

**Fig. 44**
Notice the cochlea, carotid artery, Eustachian tube, middle ear, attic, digastric notch, tympanomastoid suture, and mandibular condyle.

**Fig. 45**
Notice the attic, malleus head and neck, tendon of tensor tympani muscle, tympanic membrane, middle and external ear, Eustachian tube, petro-occipital suture, cochlea, mandibular condyle, petrous apex, annulus, scutum, tegmen and cochleariform process.

**Fig. 46**
Notice the internal auditory meatus and transverse crest, attic, malleus, scutum, tegmen, mastoid air cells, external auditory meatus, tympanic membrane, mandibular condyle, annulus, petro-occipital suture, petrous apex and middle ear.
Fig. 47
Notice the internal auditory meatus, basal turn of the cochlea, superior (arcuate eminence) and lateral SCC, tegmen tympani, mastoid air cells, body of incus, scutum, external ear, incudo-stapedial joint, vestibule, petrous apex, petro-occipital fissure and middle ear.

Fig. 48
Notice the vestibule, round window, petromastoid suture, hypoglossal canal, and jugular bulb.

Fig. 49
Notice the jugular bulb, hypoglossal canal, mastoid cells, and SCC.
Fig. 50
Notice the posterior SCC, mastoid air cells, jugular bulb, tegmen tympani, mastoid tip, lateral and superior SSCs and hypoglossal canal.
5.0 Exposure of the Temporal Bone: Genuine Dissections

Fig. 51

- Superior SCC
- Lateral SCC
- Solid angle
- Posterior SCC
- Cochleostomy
- Eustachian tube
- Facial nerve
- Digastric ridge

Fig. 52

- Superior incudal ligament
- Body of incus
- Attic
- Lateral SCC
- Posterior meatal wall
- Short process of incus
- Fossa incudis
- Posterior tympanotomy
Fig. 53

- External auditory meatus
- Incudostapedial joint
- Annulus
- Umbo
- Facial nerve
- Lateral SCC
- Posterior SCC
- Fossa incudis
- Attic
- Incus
- Antrum
- Superior SCC
- Tympanic plate

Fig. 54

- Chorda tympani
- Semicanal of tensor tympani
- Cochleariform process
- Facial nerve
- Incudostapedial joint
- Superior SCC
- Lateral SCC
- Short process of incus
- Tympanic membrane
- Tendon of the tensor tympani muscle
- Malleus handle
- Head of malleus
- Body of incus

Fig. 55

- Anterior wall of external auditory meatus
- Malleus
- Incus
- Attic
- Lateral SCC
- Pyramidal process
- Promontory
- Tympanic membrane
- Incudostapedial joint
- Malleus handle
Körner's septum is an internal extension of the petrosquamous suture. May mislead into a false antrum.

Fig. 56

Fig. 57

- Oval window
- Promontory
- Round window
- Facial nerve
- Tegmen tympani
- Superior SCC
- Lateral SCC
- Posterior SCC
- Sinus plate
- Facial nerve
- Jugular bulb
Remember

When is the right time to begin with training in the operating room?
- When both the trainer and trainee are equally satisfied about the outcome.
- When the trainee is able to identify ear structures as if within one’s own bedroom in the dark.
- After watching various live surgeries.

When back to the operating room, never forget
- Morbid anatomy.
- Congenital anomalies.
- Continuous polishing of your skills.

Remember, that ear surgery is not for amateurs; it can end with unpleasant complications like facial nerve palsy, perilymph fistula and vertigo, fatal intracranial complications or hearing loss.
Dissection Manual for the Temporal Bone Laboratory

Instruments, Units, Video Systems and Accessories
Please note: The temporal bone dissection laboratory should be located away from all clinical and surgical activities with sanitary ts. The main station should be equipped with a video camera and monitor for demonstration purposes. The lab should be equipped with a large double level refrigerator for storage of the temporal bone specimens.

Checklist: Instruments for the Temporal Bone Dissection Laboratory

Each participant and main station:

- 123207 HOLMGREEN Endaural Ear Speculum, self-retaining, outer diameter 7 mm
- 223803 Seeker, with ball end, angled 45°, size 3, length 15.5 cm
- 224001 HOUSE Curette, large, spoon sizes 2 x 3.2 mm and 1.6 x 2.6 mm, length 15 cm
- 225205 Pick, 90°, size 0.5 mm, length 16 cm
- 152301 Ear Hook, without ball end, size 1, length 15.5 cm
- 212803 LEMPERT Raspatory, width 3 mm, length 19 cm
- 213008 PLESTER Raspatory, width 8 mm, length 18 cm
- 208000 Surgical Handle, Fig. 3, length 12.5 cm, for Blades 208010 – 15, 208210 – 15
- 208015 Blade, Fig. 15, non-sterile, package of 100
- 203710 Suction Tube, cylindrical, LLER, outer diameter 1 mm, working length 9 cm
- 203730 Suction Tube, cylindrical, LLER, outer diameter 3 mm, working length 11 cm
- 206500 FISCH Suction and Irrigation Tube, cylindrical, suction tube outer diameter 3 mm, irrigation tube outer diameter 2 mm, working length 9.5 cm
- 161000 HARTMANN Ear Forceps, serrated, working length 8 cm
- 223500 ROSEN Elevator, tip angled 15°, 12 mm long, width 1.5 mm, length 16 cm
- 280120 Temporal Bone Holder, bowl-shaped, with 3 fixation screws for tensioning the petrosal bone, with outflow tube for irrigation liquid and stabilizing weight, including Rubber Ring 8575 GKR as nonslip support

Checklist: Powered Instrumentation – UNIDRIVE® ENT SCB

Each participant and main station:

- 40701601-1 UNIDRIVE® S III ENT SCB, motor control unit with color display, touch screen, two motor outputs, integrated irrigation pump and SCB module, power supply 100–240 VAC, 50/60 Hz including:
  - Mains Cord
  - Irrigator Rod
  - Two-Pedal Footswitch, two-stage, with proportional function
  - Clip Set, for use with silicone tubing set
  - SCB Connecting Cable, length 100 cm
  - Single Use Tubing Set*, sterile, package of 3
- 20711033 High-Performance EC Micro Motor II
- 20711173 Connecting Cable, to connect High-Performance EC Micro Motor 20 711033 to UNIDRIVE® S III ENT/ECO/NEURO
- 252570 INTRA Drill Handpiece, angled, length 12.5 cm, transmission 1:1 (40,000 rpm), for use with KARL STORZ high-performance EC micro motor II and burrs
- 260000 Standard Straight Shaft Burr, stainless, sizes 006 – 070, length 7 cm, set of 15
- 262000 Diamond Straight Shaft Burr, stainless, sizes 006 – 070, length 7 cm, set of 15

Checklist: General Equipment for Participants

Each participant:

- Zeiss Operating Microscope with side tube

Main station:

- Main station operating microscope with:
  - Camera control unit 22 201011U102
  - Camera head 22 220055-3
  - 20 923055 QUINTUS Z 55 TV-Adapter
  - Optical Beamsplitter 50/50, for use with Zeiss operating microscope 301513
  - 26” FULL-HD Monitor 9826 NB

Each participant and main station:

- Suction and irrigation unit
- Gowns
- Gloves
- Overshoes
- Head caps
- Fluid soap
- Tissues
- Disposable syringe
Instruments for the Temporal Bone Dissection Laboratory

- **123207**  HOLMGREEN *Endaural Ear Speculum*, self-retaining, outer diameter 7 mm
- **212803**  LEMPERT *Raspatory*, width 3 mm, length 19 cm
- **213008**  PLESTER *Raspatory*, width 8 mm, length 18 cm
- **208000**  Surgical Handle, Fig. 3, length 12.5 cm, for Blades 208010 – 15, 208210 – 15
- **208015**  Blade, Fig. 15, non-sterile, package of 100
- **223803**  Seeker, with ball end, angled 45°, size 3, length 15.5 cm
- **224001**  HOUSE Curette, large, spoon sizes 2 x 3.2 mm and 1.6 x 2.6 mm, length 15 cm
- **225205**  Pick, 90°, size 0.5 mm, length 16 cm

It is recommended to check the suitability of the product for the intended procedure prior to use.
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>152301</td>
<td><strong>Ear Hook</strong>, without ball end, size 1, length 15.5 cm</td>
</tr>
<tr>
<td>223500</td>
<td>ROSEN <strong>Elevator</strong>, tip angled 15°, 12 mm long, width 1.5 mm, length 16 cm</td>
</tr>
<tr>
<td>161000</td>
<td>HARTMANN <strong>Ear Forceps</strong>, serrated, working length 8 cm</td>
</tr>
<tr>
<td>203710</td>
<td><strong>Suction Tube</strong>, cylindrical, LUER, outer diameter 1 mm, working length 9 cm</td>
</tr>
<tr>
<td>203730</td>
<td><strong>Suction Tube</strong>, cylindrical, LUER, outer diameter 3 mm, working length 11 cm</td>
</tr>
<tr>
<td>206500</td>
<td>FISCH <strong>Suction and Irrigation Tube</strong>, cylindrical, suction tube outer diameter 3 mm, irrigation tube outer diameter 2 mm, working length 9.5 cm</td>
</tr>
<tr>
<td>280120</td>
<td><strong>Temporal Bone Holder</strong>, bowl-shaped, with 3 fixation screws for tensioning the petrosal bone, with outflow tube for irrigation liquid and stabilizing weight, including Rubber Ring 8575 GKR as nonslip support</td>
</tr>
</tbody>
</table>
UNIDRIVE® S III ENT SCB/UNIDRIVE® S III ECO

The multifunctional unit for ENT

Special Features:

- Touch Screen: Straightforward function selection via touch screen
- Set values of the last session are stored
- Optimized user control due to touch screen
- Choice of user languages
- Operating elements are single and clear to read due to color display
- One unit – multifunctional:
  - Shaver system for surgery of the paranasal sinuses and anterior skull base
  - INTRA Drill Handpieces (40,000 rpm and 80,000 rpm)
  - Sinus Shaver
  - Micro Saw
  - Dermatome
  - High-Speed Handpieces (60,000 rpm and 100,000 rpm)
- Two motor outputs: Two motor outputs enable simultaneous connection of two motors: For example, a shaver and micro motor
- Soft start function
- Textual error messages
- Integrated irrigation and coolant pump:
  - Absolutely homogeneous, micro-processor controlled irrigation rate throughout the entire irrigation range
  - Quick and easy connection of the tubing set
- Easy program selection via automated motor recognition
- Continuously adjustable revolution range
- Maximum number of revolutions and motor torque: Microprocessor-controlled motor rotation speed. Therefore the preselected parameters are maintained throughout the drilling procedure
- Maximum number of revolutions can be preset
- SCB model with connections to the KARL STORZ Communication Bus (KARL STORZ-SCB)
- Irrigator rod included
Motor Systems
Specifications

System specifications

<table>
<thead>
<tr>
<th>Mode</th>
<th>Order No.</th>
<th>rpm</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Shaver mode</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation mode:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. rev. (rpm):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oscillating in conjunction with Handpiece:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DrillCut-X® II Shaver Handpiece</td>
<td>40 7120 50</td>
<td>10,000*</td>
</tr>
<tr>
<td>DrillCut-X® II N Shaver Handpiece</td>
<td>40 7120 55</td>
<td>10,000*</td>
</tr>
<tr>
<td><strong>Sinus burr mode</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation mode:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. rev. (rpm):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotating in conjunction with Handpiece:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DrillCut-X® II Shaver Handpiece</td>
<td>40 7120 50</td>
<td>12,000</td>
</tr>
<tr>
<td>DrillCut-X® II N Shaver Handpiece</td>
<td>40 7120 55</td>
<td>12,000</td>
</tr>
<tr>
<td><strong>High-speed drilling mode</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation mode:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. rev. (rpm):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Counterclockwise or clockwise in conjunction with:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High-Speed Micro Motor</td>
<td>20 7120 33</td>
<td>60,000/100,000</td>
</tr>
<tr>
<td><strong>Drilling mode</strong></td>
<td>[20 7110 33]</td>
<td>40,000/80,000</td>
</tr>
<tr>
<td>[20 7111 73]</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Micro saw mode</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. rev. (rpm):</td>
<td>[20 7110 33]</td>
<td>15,000/20,000</td>
</tr>
<tr>
<td>[20 7111 73]</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dermatome mode</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. rev. (rpm):</td>
<td>[20 7110 33]</td>
<td>8,000</td>
</tr>
<tr>
<td>[20 7111 73]</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Power supply:</strong></td>
<td>100 – 240 VAC, 50/60 Hz</td>
<td></td>
</tr>
<tr>
<td><strong>Dimensions:</strong></td>
<td>300 x 165 x 265 mm</td>
<td></td>
</tr>
<tr>
<td><strong>Two outputs for parallel connection of two motors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Integrated irrigation pump:</strong> Flow:</td>
<td>adjustable in 9 steps</td>
<td></td>
</tr>
</tbody>
</table>

* Approx. 4,000 rpm is recommended as this is the most efficient suction/performance ratio.

<table>
<thead>
<tr>
<th>UNIDRIVE® S III ENT SCB</th>
<th>UNIDRIVE® S III ECO</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Touch Screen:</strong></td>
<td>6.4&quot; / 300 cd/m²</td>
</tr>
<tr>
<td><strong>Weight:</strong></td>
<td>5.2 kg</td>
</tr>
<tr>
<td><strong>Certified to:</strong></td>
<td>IEC 601-1 CE acc. to MDD</td>
</tr>
<tr>
<td><strong>Available languages:</strong></td>
<td>English, French, German, Spanish, Italian, Portuguese, Greek, Turkish, Polish, Russian</td>
</tr>
<tr>
<td><strong>Certified to:</strong></td>
<td>IEC 60601-1</td>
</tr>
<tr>
<td><strong>Available languages:</strong></td>
<td>numerical codes</td>
</tr>
</tbody>
</table>
Motor Systems
Special features of high-performance EC micro motor II and of the high-speed micro motor

Special features of high-performance EC micro motor II:
- Self-cooling, brushless high-performance EC micro motor
- Smallest possible dimensions
- Autoclavable
- Reprocessable in a cleaning machine
- Detachable connecting cable
- INTRA coupling enables a wide variety of applications
- Maximum torque 4 Ncm
- Number of revolutions can be continuously adjusted up to 40,000 rpm
- Provided a suitable handle is used, the number of revolutions can be continuously adjusted up to 80,000 rpm

20711033

20711033 High-Performance EC Micro Motor II, for use with UNIDRIVE® II/UNIDRIVE® ENT/OMFS/NEURO/ECO and Connecting Cable 20711073, or for use with UNIDRIVE® S III ENT/ECO/NEURO and Connecting Cable 20711173

20711173 Connecting Cable, to connect High-Performance EC Micro Motor 20711033 to UNIDRIVE® S III ENT/ECO/NEURO

Special Features of the high-speed micro motor:
- Brushless high-speed micro motor
- Smallest possible dimensions
- Autoclavable
- Reprocessable in a cleaning machine
- Maximum torque 6 Ncm
- Maximum torque 6 Ncm
- Number of revolutions can be continuously adjusted up to 60,000 rpm
- Provided a suitable handle is used, the number of revolutions can be continuously adjusted up to 100,000 rpm

20712033

20712033 High-Speed Micro-Motor, max. speed 60,000 rpm, including connecting cable, for use with UNIDRIVE® S III ENT/NEURO
UNIDRIVE® S III ENT SCB
UNIDRIVE® S III ECO
Recommended System Configuration

**UNIDRIVE® S III ENT SCB**
- Motor control unit with color display, touch screen, two motor outputs, integrated irrigation pump and SCB module, power supply 100 – 240 VAC, 50/60 Hz
- Mains Cord
- Irrigator Rod
- Two-Pedal Footswitch, two-stage, with proportional function
- Clip Set, for use with silicone tubing set
- SCB Connecting Cable, length 100 cm
- Single Use Tubing Set*, sterile, package of 3

**UNIDRIVE® S III ECO**
- Motor control unit with two motor outputs and integrated irrigation pump, power supply 100 – 240 VAC, 50/60 Hz
- Mains Cord
- Two-Pedal Footswitch, two-stage, with proportional function
- Clip Set, for use with silicone tubing set
- Single Use Tubing Set*, sterile, package of 3

**Specifications:**

<table>
<thead>
<tr>
<th>Feature</th>
<th>UNIDRIVE® S III ENT SCB: 6,4*/300 cd/m²</th>
<th>Dimensions w x h x d</th>
<th>Weight</th>
<th>Certified to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Touch Screen</td>
<td>9 steps</td>
<td>300 x 165 x 265 mm</td>
<td>5.2 kg</td>
<td>EC 601-1, CE acc. to MDD</td>
</tr>
<tr>
<td>Flow</td>
<td>9 steps</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply</td>
<td>100–240 VAC, 50/60 Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*mtp medical technical promotion gmbh, Take-Off GewerbePark 46, 78579 Neuhausen ob Eck, Germany*
UNIDRIVE® S III ENT SCB
UNIDRIVE® S III ECO
System Components

UNIT SIDE
PATIENT SIDE

Two-Pedal Footswitch
Single Use Tubing Set

20 0166 30
031131-10

UNIT SIDE
PATIENT SIDE

High-Speed Micro Motor
High-Speed EC Micro Motor II

20 7120 33
20 7110 33
20 7111 73

High-Speed Handpieces
INTRA Drill Handpieces
Micro Saw
Dermatome

252660 – 252692
252575 – 252590
254000 – 254300
253000 – 253300
Optional Accessories
for UNIDRIVE® S III ENT SCB and UNIDRIVE® S III ECO

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>280053</td>
<td><strong>Universal Spray</strong>, 6x 500 ml bottles – HAZARDOUS GOODS – UN 1950 including:</td>
</tr>
<tr>
<td></td>
<td><strong>Spray Nozzle</strong></td>
</tr>
<tr>
<td>280053 C</td>
<td><strong>Spray Nozzle</strong>, for the reprocessing of INTRA burr handpieces, for use with Universal Spray 280053 B</td>
</tr>
<tr>
<td>031131-10*</td>
<td><strong>Tubing Set</strong>, for irrigation, for single use, sterile, package of 10</td>
</tr>
</tbody>
</table>

*mtp medical technical promotion gmbh,
Take-Off GewerbePark 46, 78579 Neuhausen ob Eck, Germany
INTRA Drill Handpieces
for Ear Micro Surgery

Special Features:
- Tool-free closing and opening of the drill
- Right/left rotation
- Max. rotating speed up to 40,000 rpm / 80,000 U/min
- Detachable irrigation channels
- Light construction
- Operates with little vibrations
- Low maintenance
- Reprocessable in a cleaning machine
- Safe grip

252570
INTRA Drill Handpiece, angled, length 12.5 cm, transmission 1:1 (40,000 rpm), for use with KARL STORZ high-performance EC micro motor II and straight shaft burrs

252573
INTRA Drill Handpiece, angled, length 12.5 cm, transmission 1:2 (80,000 rpm), for use with KARL STORZ high-performance EC micro motor II and straight shaft burrs

252590
INTRA Drill Handpiece, straight, length 11 cm, transmission 1:1 (40,000 rpm), for use with KARL STORZ high-performance EC micro motor II and straight shaft burrs
### Burrs

**Straight Shaft Burrs, length 7 cm,**
for use with INTRA Drill Handpieces 252590, 252570, 252573

<table>
<thead>
<tr>
<th>Detail</th>
<th>Size (mm)</th>
<th>Dia. (mm)</th>
<th>Standard</th>
<th>Tungsten Carbide</th>
<th>Transverse Tungsten Carbide</th>
<th>Diamond</th>
<th>Diamond, coarse</th>
</tr>
</thead>
<tbody>
<tr>
<td>006</td>
<td>0.6</td>
<td>260006</td>
<td>261006</td>
<td>–</td>
<td>262006</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>007</td>
<td>0.7</td>
<td>260007</td>
<td>261007</td>
<td>–</td>
<td>262007</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>008</td>
<td>0.8</td>
<td>260008</td>
<td>261008</td>
<td>–</td>
<td>262008</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>010</td>
<td>1.0</td>
<td>260010</td>
<td>261010</td>
<td>–</td>
<td>262010</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>014</td>
<td>1.4</td>
<td>260014</td>
<td>261014</td>
<td>261114</td>
<td>262014</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>018</td>
<td>1.8</td>
<td>260018</td>
<td>261018</td>
<td>–</td>
<td>262018</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>023</td>
<td>2.3</td>
<td>260023</td>
<td>261023</td>
<td>261123</td>
<td>262023</td>
<td>262223</td>
<td>–</td>
</tr>
<tr>
<td>027</td>
<td>2.7</td>
<td>260027</td>
<td>261027</td>
<td>–</td>
<td>262027</td>
<td>262227</td>
<td>262227</td>
</tr>
<tr>
<td>031</td>
<td>3.1</td>
<td>260031</td>
<td>261031</td>
<td>261131</td>
<td>262031</td>
<td>262231</td>
<td>262231</td>
</tr>
<tr>
<td>035</td>
<td>3.5</td>
<td>260035</td>
<td>261035</td>
<td>–</td>
<td>262035</td>
<td>262235</td>
<td>262235</td>
</tr>
<tr>
<td>040</td>
<td>4.0</td>
<td>260040</td>
<td>261040</td>
<td>261140</td>
<td>262040</td>
<td>262240</td>
<td>262240</td>
</tr>
<tr>
<td>045</td>
<td>4.5</td>
<td>260045</td>
<td>261045</td>
<td>–</td>
<td>262045</td>
<td>262245</td>
<td>262245</td>
</tr>
<tr>
<td>050</td>
<td>5.0</td>
<td>260050</td>
<td>261050</td>
<td>261150</td>
<td>262050</td>
<td>262250</td>
<td>262250</td>
</tr>
<tr>
<td>060</td>
<td>6.0</td>
<td>260060</td>
<td>261060</td>
<td>261160</td>
<td>262060</td>
<td>262260</td>
<td>262260</td>
</tr>
<tr>
<td>070</td>
<td>7.0</td>
<td>260070</td>
<td>261070</td>
<td>–</td>
<td>262070</td>
<td>262270</td>
<td>262270</td>
</tr>
</tbody>
</table>

260000 **Standard Straight Shaft Burr**, stainless, sizes 006 – 070, length 7 cm, set of 15

261000 **Tungsten Carbide Straight Shaft Burr**, stainless, sizes 006 – 070, length 7 cm, set of 15

261100 **Tungsten Carbide Straight Shaft Burr**, with cross cut, stainless, sizes 014 – 060, length 7 cm, set of 6

262000 **Diamond Straight Shaft Burr**, stainless, sizes 006 – 070, length 7 cm, set of 15

262200 **Rapid Diamond Straight Shaft Burr**, stainless, with coarse diamond coating for precise drilling and abrasion without hand pressure and generating minimal heat, sizes 023 – 070, length 7 cm, set of 9, color code: gold
Burrs

Straight Shaft Burrs, length 5.7 cm, for use with INTRA Drill Handpieces 252590, 252570, 252573

<table>
<thead>
<tr>
<th>Detail</th>
<th>Size</th>
<th>Dia. mm</th>
<th>Standard</th>
<th>Tungsten Carbide</th>
<th>Transverse Tungsten Carbide</th>
<th>Diamond</th>
<th>Diamond, coarse</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>014</td>
<td>1.4</td>
<td>649614 K</td>
<td>649614 HK</td>
<td>649614 Q</td>
<td>649714 K</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>018</td>
<td>1.8</td>
<td>649618 K</td>
<td>649618 HK</td>
<td>–</td>
<td>649718 K</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>023</td>
<td>2.3</td>
<td>649623 K</td>
<td>649623 HK</td>
<td>649623 Q</td>
<td>649723 K</td>
<td>649723 GK</td>
</tr>
<tr>
<td></td>
<td>027</td>
<td>2.7</td>
<td>649627 K</td>
<td>649627 HK</td>
<td>–</td>
<td>649727 K</td>
<td>649727 GK</td>
</tr>
<tr>
<td></td>
<td>031</td>
<td>3.1</td>
<td>649631 K</td>
<td>649631 HK</td>
<td>649631 Q</td>
<td>649731 K</td>
<td>649731 GK</td>
</tr>
<tr>
<td></td>
<td>035</td>
<td>3.5</td>
<td>649635 K</td>
<td>649635 HK</td>
<td>–</td>
<td>649735 K</td>
<td>649735 GK</td>
</tr>
<tr>
<td></td>
<td>040</td>
<td>4</td>
<td>649640 K</td>
<td>649640 HK</td>
<td>649640 Q</td>
<td>649740 K</td>
<td>649740 GK</td>
</tr>
<tr>
<td></td>
<td>045</td>
<td>4.5</td>
<td>649645 K</td>
<td>649645 HK</td>
<td>–</td>
<td>649745 K</td>
<td>649745 GK</td>
</tr>
<tr>
<td></td>
<td>050</td>
<td>5</td>
<td>649650 K</td>
<td>649650 HK</td>
<td>649650 Q</td>
<td>649750 K</td>
<td>649750 GK</td>
</tr>
<tr>
<td></td>
<td>060</td>
<td>6</td>
<td>649660 K</td>
<td>649660 HK</td>
<td>649660 Q</td>
<td>649760 K</td>
<td>649760 GK</td>
</tr>
<tr>
<td></td>
<td>070</td>
<td>7</td>
<td>649670 K</td>
<td>649670 HK</td>
<td>–</td>
<td>649770 K</td>
<td>649770 GK</td>
</tr>
</tbody>
</table>

649600 K **Standard Straight Shaft Burr**, stainless, sizes 014 – 070, length 5.7 cm, set of 11
649600 HK **Tungsten Carbide Straight Shaft Burr**, stainless, sizes 014 – 070, length 5.7 cm, set of 11
649700 K **Diamond Straight Shaft Burr**, stainless, sizes 014 – 070, length 5.7 cm, set of 11
649700 GK **Rapid Diamond Straight Shaft Burr**, stainless, with coarse diamond coating for precise drilling and abrasion without hand pressure and generating minimal heat, sizes 023 – 070, length 5.7 cm, set of 9, color code: gold

Straight Shaft Burrs, cylindrical, barrel-shaped, and bud-shaped

<table>
<thead>
<tr>
<th>Size</th>
<th>Dia. mm</th>
<th>cylindrical</th>
<th>barrel-shaped</th>
<th>bud-shaped</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>length 7 cm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>020</td>
<td>2</td>
<td>262560</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>040</td>
<td>4</td>
<td>262561</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>050</td>
<td>5</td>
<td>263050</td>
<td>–</td>
<td>263050</td>
</tr>
<tr>
<td>060</td>
<td>6</td>
<td>263060</td>
<td>–</td>
<td>263060</td>
</tr>
<tr>
<td>070</td>
<td>7</td>
<td>263070</td>
<td>–</td>
<td>263070</td>
</tr>
</tbody>
</table>
**Burrs and Accessories**

**LINDEMANN Burrs, conical, stainless, length 7 cm**

<table>
<thead>
<tr>
<th>Size</th>
<th>Diameter mm</th>
<th>Conical sterilizable</th>
</tr>
</thead>
<tbody>
<tr>
<td>018</td>
<td>1.8</td>
<td>263518</td>
</tr>
<tr>
<td>021</td>
<td>2.1</td>
<td>263521</td>
</tr>
<tr>
<td>023</td>
<td>2.3</td>
<td>263523</td>
</tr>
</tbody>
</table>

**Burrs Accessories**

280090  
**Size Template**, for drills, stainless steel, sterilizable

280080  
**Brush**, for cleaning atraumatic jaws, sterilizable, package of 5

280120  
**Temporal Bone Holder**, bowl-shaped, with 3 fixation screws for tensioning the petrosal bone and with evacuation tube for irrigation liquid
Accessories for Burrs

**280030**  
**Rack**, for 36 straight shaft burrs with a length of 7 cm, foldable, sterilizable, size 22 x 11.5 x 2 cm

**280030 K**  
**Metal Bar**, for fixation at Rack 280030, to hold 18 burrs with a length of 7 cm and 16 burrs with a length of 5.7 cm, foldable, sterilizable, size 16 x 2.5 x 1 cm

**280033**  
**Rack**, for 36 straight shaft burrs with a length of 9.5 cm, foldable, sterilizable, size 22 x 14 x 2 cm

**280034**  
**Rack**, for 36 straight shaft burrs with a length of 12.5 cm, foldable, sterilizable, size 22 x 17 x 2 cm

**NEW**  
**280035**  
**Rack**, for 54 straight shaft burrs with a length of 5 cm (36 pieces) and 7 cm (18 pieces), foldable, sterilizable, size 22 x 12.5 x 3 cm

**NEW**  
**280040**  
**Rack**, flat model, to hold 21 straight shaft burrs with a length of up to 6 cm (6 pcs) and 7 cm (15 pcs), folding model, sterilizable, size 17.5 x 9.5 x 1.2 cm

**NEW**  
**280043**  
**Rack**, flat model, to hold 21 straight shaft burrs with a length of 7 cm (6 pcs) and 9.5 cm (15 pcs), folding model, sterilizable, size 17.5 x 11.5 x 1.2 cm

**Please note:** The burrs displayed are not included in the rack.
Accessories for Burrs

39552 A  **Wire Tray**, provides safe storage of accessories for KARL STORZ drilling/grinding systems during cleaning and sterilization, includes tray for small parts, for use with Rack 280030, rack **not** included

**for storage of:**
- Up to 6 drill handpieces
- Connecting cable
- EC micro motor
- Small parts

39552 B  **Wire Tray**, provides safe storage of accessories for KARL STORZ drilling/grinding systems during cleaning and sterilization, includes tray for small parts, for use with Rack 280030, rack **included**

**for storage of:**
- Up to 6 drill handpieces
- Connecting cable
- EC micro motor
- Up to 36 drill bits and burrs
- Small parts

**Please note:** The instruments displayed are not included in the sterilizing and storage trays.
**UNIDRIVE® S III ENT SCB**
High-Speed Handpieces, angled, 100,000 rpm

For use with High-Speed Drills, shaft diameter 3.17 mm
and with High-Speed Micro Motor 20712033

![Image of UNIDRIVE S III ENT SCB handpiece](image)

- **252680** High-Speed Handpiece, short, angled, 100,000 rpm, for use with High-Speed Micro-Motor 20712033
- **252681** High-Speed Handpiece, medium, angled, 100,000 rpm, for use with High-Speed Micro-Motor 20712033
UNIDRIVE® S III ENT SCB
High-Speed Handpieces, angled and straight, 60,000 rpm

For use with High-Speed Drills, shaft diameter 2.35 mm
and with High-Speed Micro Motor 20712033

60,000 rpm
diameter 5.5 mm

252660  High-Speed Handpiece, extra short, angled, 60,000 rpm,
for use with High-Speed Micro-Motor 20712033

252661  High-Speed Handpiece, short, angled, 60,000 rpm,
for use with High-Speed Micro-Motor 20712033

252690  High-Speed Handpiece, extra short, straight, 60,000 rpm,
for use with High-Speed Micro-Motor 20712033

252691  High-Speed Handpiece, short, straight, 60,000 rpm,
for use with High-Speed Micro-Motor 20712033
**UNIDRIVE® S III ENT SCB**  
High-Speed Standard Burrs, High-Speed Diamond Burrs

For use with High-Speed Handpieces, 100,000 rpm

![Image of burrs](image)

<table>
<thead>
<tr>
<th>Diameter in mm</th>
<th>short</th>
<th>medium</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>350110 S</td>
<td>350110 M</td>
</tr>
<tr>
<td>2</td>
<td>350120 S</td>
<td>350120 M</td>
</tr>
<tr>
<td>3</td>
<td>350130 S</td>
<td>350130 M</td>
</tr>
<tr>
<td>4</td>
<td>350140 S</td>
<td>350140 M</td>
</tr>
<tr>
<td>5</td>
<td>350150 S</td>
<td>350150 M</td>
</tr>
<tr>
<td>6</td>
<td>350160 S</td>
<td>350160 M</td>
</tr>
<tr>
<td>7</td>
<td>350170 S</td>
<td>350170 M</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diameter in mm</th>
<th>short</th>
<th>medium</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>350210 S</td>
<td>350210 M</td>
</tr>
<tr>
<td>2</td>
<td>350220 S</td>
<td>350220 M</td>
</tr>
<tr>
<td>3</td>
<td>350230 S</td>
<td>350230 M</td>
</tr>
<tr>
<td>4</td>
<td>350240 S</td>
<td>350240 M</td>
</tr>
<tr>
<td>5</td>
<td>350250 S</td>
<td>350250 M</td>
</tr>
<tr>
<td>6</td>
<td>350260 S</td>
<td>350260 M</td>
</tr>
<tr>
<td>7</td>
<td>350270 S</td>
<td>350270 M</td>
</tr>
</tbody>
</table>
### UNIDRIVE® S III ENT SCB

**High-Speed Diamond Burrs, High-Speed Acorns, High-Speed Barrel Burrs, High-Speed Neuro Fluted Burr**

For use with High-Speed Handpieces, 100,000 rpm

<table>
<thead>
<tr>
<th>Diameter in mm</th>
<th>short</th>
<th>medium</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>350330 S</td>
<td>350330 M</td>
</tr>
<tr>
<td>4</td>
<td>350340 S</td>
<td>350340 M</td>
</tr>
<tr>
<td>5</td>
<td>350350 S</td>
<td>350350 M</td>
</tr>
<tr>
<td>6</td>
<td>350360 S</td>
<td>350360 M</td>
</tr>
<tr>
<td>7</td>
<td>350370 S</td>
<td>350370 M</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diameter in mm</th>
<th>short</th>
<th>medium</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.5</td>
<td>350675 S</td>
<td>350675 M</td>
</tr>
<tr>
<td>9</td>
<td>350690 S</td>
<td>350690 M</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diameter in mm</th>
<th>short</th>
<th>medium</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>350960 S</td>
<td>350960 M</td>
</tr>
<tr>
<td>9.1</td>
<td>350991 S</td>
<td>350991 M</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diameter in mm</th>
<th>short</th>
<th>medium</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.8</td>
<td>350718 S</td>
<td>350718 M</td>
</tr>
<tr>
<td>3</td>
<td>350730 S</td>
<td>350730 M</td>
</tr>
</tbody>
</table>
**UNIDRIVE® S III ENT SCB**  
High-Speed Standard Burrs, High-Speed Diamond Burrs

For use with High-Speed Handpieces, 60,000 rpm

![Burrs](image)

<table>
<thead>
<tr>
<th>Diameter in mm</th>
<th>extra short</th>
<th>short</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>330110 ES</td>
<td>330110 S</td>
</tr>
<tr>
<td>2</td>
<td>330120 ES</td>
<td>330120 S</td>
</tr>
<tr>
<td>3</td>
<td>330130 ES</td>
<td>330130 S</td>
</tr>
<tr>
<td>4</td>
<td>330140 ES</td>
<td>330140 S</td>
</tr>
<tr>
<td>5</td>
<td>330150 ES</td>
<td>330150 S</td>
</tr>
<tr>
<td>6</td>
<td>330160 ES</td>
<td>330160 S</td>
</tr>
<tr>
<td>7</td>
<td>330170 ES</td>
<td>330170 S</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diameter in mm</th>
<th>extra short</th>
<th>short</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.6</td>
<td>330206 ES</td>
<td>330206 S</td>
</tr>
<tr>
<td>1</td>
<td>330210 ES</td>
<td>330210 S</td>
</tr>
<tr>
<td>1.5</td>
<td>330215 ES</td>
<td>330215 S</td>
</tr>
<tr>
<td>2</td>
<td>330220 ES</td>
<td>330220 S</td>
</tr>
<tr>
<td>3</td>
<td>330230 ES</td>
<td>330230 S</td>
</tr>
<tr>
<td>4</td>
<td>330240 ES</td>
<td>330240 S</td>
</tr>
<tr>
<td>5</td>
<td>330250 ES</td>
<td>330250 S</td>
</tr>
<tr>
<td>6</td>
<td>330260 ES</td>
<td>330260 S</td>
</tr>
<tr>
<td>7</td>
<td>330270 ES</td>
<td>330270 S</td>
</tr>
</tbody>
</table>
UNIDRIVE® S III ENT SCB
High-Speed Diamond Burrs, High-Speed Cylinder Burrs,
LINDEMANN High-Speed Fluted Burrs

For use with High-Speed Handpieces, 60,000 rpm

<table>
<thead>
<tr>
<th>Diameter in mm</th>
<th>extra short</th>
<th>short</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>330330 ES</td>
<td>330330 S</td>
</tr>
<tr>
<td>4</td>
<td>330340 ES</td>
<td>330340 S</td>
</tr>
<tr>
<td>5</td>
<td>330350 ES</td>
<td>330350 S</td>
</tr>
<tr>
<td>6</td>
<td>330360 ES</td>
<td>330360 S</td>
</tr>
<tr>
<td>7</td>
<td>330370 ES</td>
<td>330370 S</td>
</tr>
</tbody>
</table>

High-Speed Coarse Diamond Burrs, 60,000 rpm, for single use, sterile, package of 5

<table>
<thead>
<tr>
<th>Diameter in mm</th>
<th>extra short</th>
<th>short</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>330440 ES</td>
<td>330440 S</td>
</tr>
<tr>
<td>6</td>
<td>330460 ES</td>
<td>330460 S</td>
</tr>
</tbody>
</table>

High-Speed Cylinder Burrs, 60,000 rpm, for single use, sterile, package of 5

<table>
<thead>
<tr>
<th>Diameter in mm</th>
<th>extra short</th>
<th>short</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1/11</td>
<td>330511 ES</td>
<td>330511 S</td>
</tr>
<tr>
<td>2.3/26</td>
<td>330526 ES</td>
<td>330526 S</td>
</tr>
</tbody>
</table>
HD Imaging with Operating Microscopes

Direct Adaption

With the operating microscope the surgeon always has a perfect view of the operating field. Assistants, OR nurses and students, however, often experience poor video presentations, especially if FULL HD visualization is not available.

KARL STORZ offers a one-stop-shop solution to upgrade any surgical microscope with state-of-the-art FULL HD imaging technology.

To achieve optimal results, all components in the video chain – from the camera system to the monitor – must be of the highest quality.

The most straightforward and professional connection between camera and microscope is the so-called direct adaption.

Here the H3-M COVIEW microscope camera and the corresponding QUINTUS® TV adaptor are directly connected to the microscope via the C-MOUNT connection.
IMAGE1 S Camera Heads

For use with IMAGE1 S Camera System
IMAGE1 S CONNECT Module TC 200EN, IMAGE1 S H3-LINK Module TC 300
and with all IMAGE1 HUB™ HD Camera Control Units

TH 106  IMAGE1 S H3-M COVIEW Three-Chip FULL HD Camera Head, 50/60 Hz, IMAGE1 S compatible, progressive scan, with C-MOUNT thread for coupling to microscopes, 2 freely programmable camera head buttons, with detachable camera head cable, length 900 cm, for use with IMAGE1 S and IMAGE1 HUB™ HD/HD

20 2001 31  Keypad, for H3-M camera head, for convenient control of the most important H3-M camera functions, with PS/2 connector, cable length 1 m, alternative to a standard keyboard, for use with H3-M or H3-M COVIEW® camera heads, only compatible with IMAGE1 HUB™ HD, not compatible with IMAGE1 S

Specifications:

<table>
<thead>
<tr>
<th>IMAGE1 FULL HD Camera Heads</th>
<th>IMAGE1 S H3-M COVIEW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product code</td>
<td>TH 106</td>
</tr>
<tr>
<td>Image sensor</td>
<td>3x 1/3&quot; CCD chip</td>
</tr>
<tr>
<td>Dimensions w x h x d</td>
<td>45 x 50 x 60 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>240 g</td>
</tr>
<tr>
<td>Optical interface</td>
<td>C-MOUNT connection</td>
</tr>
<tr>
<td>Min. sensitivity</td>
<td>F 1.9/1.4 Lux</td>
</tr>
<tr>
<td>Grip mechanism</td>
<td>C-MOUNT connection</td>
</tr>
<tr>
<td>Cable</td>
<td>detachable</td>
</tr>
<tr>
<td>Cable length</td>
<td>900 cm</td>
</tr>
</tbody>
</table>
HD Imaging with Operating Microscope

System Components

QUINTUS® – High-Performance TV Adaptor for Operating Microscopes

Unleash the full performance of your operating microscope from CARL ZEISS MEDITEC – with FULL HD imaging solutions from KARL STORZ.

The new QUINTUS® TV adaptor is the perfect interface between the operating microscope and the H3-M COVIEW FULL HD microscope camera head from KARL STORZ. The innovative features of QUINTUS® are easy to use, making it one of the most flexible TV adaptors on the market.

Product Features:

- A rotating C-MOUNT connection at the QUINTUS® TV adaptor allows immediate adaption of the camera orientation during mounting.
- The focus control makes it possible to easily achieve parfocality (perfectly sharp camera and microscope images).
- The iris control provides convenient and optimal adjustment of the depth of field.
- Pan (X) function enables adjustment of the horizontal position of the camera image.
- Tilt (Y) function enables adjustment of the vertical position of the camera image. The pan and tilt functions help the surgeon to adjust the position of the camera image according to his individual needs.
- The QUINTUS® ZOOM model also features a variable focal length \( f = 43 – 86 \text{ mm} \). This allows the surgeon greater flexibility in choosing the exact zone required for documentation.

Focal length of the QUINTUS® TV adaptor:

The QUINTUS® TV adaptor is available in the fixed focal lengths \( f = 45 \) and \( f = 55 \text{ mm} \) or as a zoom model with variable focal length \( 43 – 86 \text{ mm} \). This provides an optimal FULL HD image in 16:9 in conjunction with the H3-M COVIEW HD microscope camera head from KARL STORZ.

**Focal lengths:** H3-M COVIEW camera image detail using a QUINTUS® TV adaptor with the fixed focal lengths of 45 and 55 mm.

**Variable focal length:** Adjustable H3-M COVIEW camera image detail using a QUINTUS® zoom adaptor with variable focal length of 43 – 86 mm.
HD Imaging with Operating Microscope

System Components

QUINTUS® TV Adaptor for operating microscopes from CARL ZEISS MEDITEC with fixed focal length

20 9230 45  
QUINTUS® Z 45 TV Adaptor, for CARL ZEISS MEDITEC operating microscopes, \( f = 45 \) mm, recommended for IMAGE1 HD H3-M/H3-M COVIEW camera heads

20 9230 55  
QUINTUS® Z 55 TV Adaptor, for CARL ZEISS MEDITEC operating microscopes, \( f = 55 \) mm, recommended for IMAGE1 HD H3-M/H3-M COVIEW, H3, H3-Z as well as IMAGE1 S1 and S3 camera heads

QUINTUS® Zoom TV Adaptor for operating microscopes from CARL ZEISS MEDITEC with variable focal length

20 9230 00 Z  
QUINTUS® Zoom TV Adaptor, for CARL ZEISS MEDITEC operating microscopes, with variable focal length \( f = 43 \) – \( 86 \) mm, for use with all KARL STORZ cameras (SD and HD)

Further accessories for operating microscopes from CARL ZEISS MEDITEC

20 9250 00  
Iris, for ZEISS Pentero®, iris as a necessary extension between the QUINTUS® TV adaptor and the operating microscope ZEISS Pentero®

301513  
Optical Beamsplitter 50/50, for use with ZEISS operating microscope or colposcope

Note: Optical beamsplitters for other operating microscopes (i.e. LEICA or Möller-Wedel) are available directly from the manufacturers.
HD Imaging with Operating Microscope

System Components

**QUINTUS® TV Adaptor for operating microscopes from LEICA Microsystems with fixed focal length**

- **20 9330 45** **QUINTUS® L 45 TV Adaptor**, for LEICA Microsystems operating microscopes, f = 45 mm, recommended for H3-M microscope camera head
- **20 9330 55** **QUINTUS® L 55 TV Adaptor**, for LEICA Microsystems operating microscopes, f = 55 mm, recommended for IMAGE1 HD H3-M/H3-M COVIEW, H3, H3-Z as well as S1 and S3 camera heads

**QUINTUS® TV Adaptor for operating microscopes from LEICA Microsystems with variable focal length**

- **20 9330 00 Z** **QUINTUS® Zoom TV Adaptor**, for Leica Microsystems operating microscopes, with variable focal length f = 43 – 86 mm, for use with all KARL STORZ cameras (SD and HD)

**QUINTUS® TV Adaptor for operating microscopes from Möller-Wedel with fixed focal length**

- **20 9530 45** **QUINTUS® M 45 TV Adaptor**, for Möller-Wedel operating microscopes, f = 45 mm, recommended for IMAGE1 HD H3-M/H3-M COVIEW camera heads
- **20 9530 55** **QUINTUS® M 55 TV Adaptor**, for Möller-Wedel operating microscopes, f = 55 mm, recommended for IMAGE1 HD H3-M/H3-M COVIEW, H3, H3-Z and S1, S3 camera heads

**Note:** Optical beamsplitters for other operating microscopes (i.e. LEICA or Möller-Wedel) are available directly from the manufacturers.
**IMAGE1 S Camera System**

**Economical and future-proof**
- Modular concept for flexible, rigid and 3D endoscopy as well as new technologies
- Forward and backward compatibility with video endoscopes and FULL HD camera heads
- Sustainable investment
- Compatible with all light sources

**Innovative Design**
- Dashboard: Complete overview with intuitive menu guidance
- Live menu: User-friendly and customizable
- Intelligent icons: Graphic representation changes when settings of connected devices or the entire system are adjusted
- Automatic light source control
- Side-by-side view: Parallel display of standard image and the Visualization mode
- Multiple source control: IMAGE1 S allows the simultaneous display, processing and documentation of image information from two connected image sources, e.g., for hybrid operations

**Dashboard**

**Live menu**

**Intelligent icons**

**Side-by-side view: Parallel display of standard image and Visualization mode**
Brilliant Imaging
- Clear and razor-sharp endoscopic images in FULL HD
- Natural color rendition

Reflection is minimized
- Multiple IMAGE1 S technologies for homogeneous illumination, contrast enhancement and color shifting

FULL HD image

CLARA

FULL HD image

CHROMA

FULL HD image

SPECTRA A*

FULL HD image

SPECTRA B**

* SPECTRA A: Not for sale in the U.S.
** SPECTRA B: Not for sale in the U.S.
**IMAGE1 S Camera System**

**TC 200EN**

TC 200EN* IMAGE1 S CONNECT, connect module, for use with up to 3 link modules, resolution 1920 x 1080 pixels, with integrated KARL STORZ-SCB and digital Image Processing Module, power supply 100–120 VAC/200–240 VAC, 50/60 Hz including:

- **Mains Cord**, length 300 cm
- **DVI-D Connecting Cable**, length 300 cm
- **SCB Connecting Cable**, length 100 cm
- **USB Flash Drive**, 32 GB, USB silicone keyboard, with touchpad, US

*Available in the following languages: DE, ES, FR, IT, PT, RU

**Specifications:**

| HD video outputs | - 2x DVI-D  
| Format signal outputs | - 1x 3G-SDI | Power supply | 100–120 VAC/200–240 VAC |
| LINK video inputs | 1920 x 1080p, 50/60 Hz | Power frequency | 50/60 Hz |
| USB interface | 4x USB, (2x front, 2x rear) | Protection class | I, CF-Defib |
| SCB interface | 2x 6-pin mini-DIN | Dimensions w x h x d | 305 x 54 x 320 mm |
| | | Weight | 2.1 kg |

**For use with IMAGE1 S**

**IMAGE1 S CONNECT Module TC 200EN**

**TC 300**

TC 300 IMAGE1 S H3-LINK, link module, for use with IMAGE1 FULL HD three-chip camera heads, power supply 100–120 VAC/200–240 VAC, 50/60 Hz, for use with **IMAGE1 S CONNECT TC 200EN** including:

- **Mains Cord**, length 300 cm
- **Link Cable**, length 20 cm

**Specifications:**

<table>
<thead>
<tr>
<th>Camera System</th>
<th>TC 300 (H3-Link)</th>
</tr>
</thead>
</table>
| Supported camera heads/video endoscopes | TH 100, TH 101, TH 102, TH 103, TH 104, TH 106 (fully compatible with IMAGE1 S)  
22 2200 55-3, 22 2200 56-3, 22 2200 53-3, 22 2200 60-3, 22 2200 61-3, 22 2200 54-3, 22 2200 85-3 (compatible without IMAGE1 S technologies CLARA, CHROMA, SPECTRA*) |
| LINK video outputs | 1x |
| Power supply | 100–120 VAC/200–240 VAC |
| Power frequency | 50/60 Hz |
| Protection class | I, CF-Defib |
| Dimensions w x h x d | 305 x 54 x 320 mm |
| Weight | 1.86 kg |

* SPECTRA A: Not for sale in the U.S.
** SPECTRA B: Not for sale in the U.S.
TH 100

**IMAGE1 S H3-Z Three-Chip FULL HD Camera Head,**
50/60 Hz, IMAGE1 S compatible, progressive scan,
soakable, gas- and plasma-sterilizable, with integrated
Parfocal Zoom Lens, focal length $f = 15–31$ mm (2x),
2 freely programmable camera head buttons,
for use with IMAGE1 S and IMAGE1 HUB™ HD/HD

**Specifications:**

<table>
<thead>
<tr>
<th>IMAGE1 FULL HD Camera Heads</th>
<th>IMAGE1 S H3-Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product no.</td>
<td>TH 100</td>
</tr>
<tr>
<td>Image sensor</td>
<td>3x 1/3&quot; CCD chip</td>
</tr>
<tr>
<td>Dimensions w x h x d</td>
<td>39 x 49 x 114 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>270 g</td>
</tr>
<tr>
<td>Optical interface</td>
<td>integrated Parfocal Zoom Lens, $f = 15–31$ mm (2x)</td>
</tr>
<tr>
<td>Min. sensitivity</td>
<td>F 1.4/1.17 Lux</td>
</tr>
<tr>
<td>Grip mechanism</td>
<td>standard eyepiece adaptor</td>
</tr>
<tr>
<td>Cable</td>
<td>non-detachable</td>
</tr>
<tr>
<td>Cable length</td>
<td>300 cm</td>
</tr>
</tbody>
</table>

TH 104

**IMAGE1 S H3-ZA Three-Chip FULL HD Camera Head,**
50/60 Hz, IMAGE1 S compatible, [autoclavable](#),
progressive scan, soakable, gas- and plasma-sterilizable,
with integrated Parfocal Zoom Lens, focal length
$f = 15–31$ mm (2x), 2 freely programmable camera head buttons,
for use with IMAGE1 S and IMAGE1 HUB™ HD/HD

**Specifications:**

<table>
<thead>
<tr>
<th>IMAGE1 FULL HD Camera Heads</th>
<th>IMAGE1 S H3-ZA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product no.</td>
<td>TH 104</td>
</tr>
<tr>
<td>Image sensor</td>
<td>3x 1/3&quot; CCD chip</td>
</tr>
<tr>
<td>Dimensions w x h x d</td>
<td>39 x 49 x 100 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>299 g</td>
</tr>
<tr>
<td>Optical interface</td>
<td>integrated Parfocal Zoom Lens, $f = 15–31$ mm (2x)</td>
</tr>
<tr>
<td>Min. sensitivity</td>
<td>F 1.4/1.17 Lux</td>
</tr>
<tr>
<td>Grip mechanism</td>
<td>standard eyepiece adaptor</td>
</tr>
<tr>
<td>Cable</td>
<td>non-detachable</td>
</tr>
<tr>
<td>Cable length</td>
<td>300 cm</td>
</tr>
</tbody>
</table>
Monitors

**9619 NB**

19" HD Monitor, color systems **PAL/NTSC**, max. screen resolution 1280 x 1024, image format 4:3, power supply 100–240 VAC, 50/60 Hz, wall-mounted with VESA 100 adaption, including:

*External 24 VDC Power Supply*

*Mains Cord*

---

**9826 NB**

26" FULL HD Monitor, wall-mounted with VESA 100 adaption, color systems **PAL/NTSC**, max. screen resolution 1920 x 1080, image format 16:9, power supply 100–240 VAC, 50/60 Hz, including:

*External 24 VDC Power Supply*

*Mains Cord*
### Monitors

#### KARL STORZ HD and FULL HD Monitors

<table>
<thead>
<tr>
<th>Model</th>
<th>Screen Size</th>
<th>19&quot;</th>
<th>26&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall-mounted with VESA 100 adaption</td>
<td>9619 NB</td>
<td>9826 NB</td>
<td></td>
</tr>
</tbody>
</table>

#### Inputs:

<table>
<thead>
<tr>
<th></th>
<th>19&quot;</th>
<th>26&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVI-D</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Fibre Optic</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>3G-SDI</td>
<td>–</td>
<td>●</td>
</tr>
<tr>
<td>RGBS (VGA)</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>S-Video</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Composite/FBAS</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

#### Outputs:

<table>
<thead>
<tr>
<th></th>
<th>19&quot;</th>
<th>26&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVI-D</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>S-Video</td>
<td>●</td>
<td>–</td>
</tr>
<tr>
<td>Composite/FBAS</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>RGBS (VGA)</td>
<td>●</td>
<td>–</td>
</tr>
<tr>
<td>3G-SDI</td>
<td>–</td>
<td>●</td>
</tr>
</tbody>
</table>

#### Signal Format Display:

- 4:3
- 5:4
- 16:9
- Picture-in-Picture
- PAL/NTSC compatible

#### Optional accessories:

- 9826 SF Pedestal, for monitor 9826 NB
- 9626 SF Pedestal, for monitor 9619 NB

#### Specifications:

<table>
<thead>
<tr>
<th>KARL STORZ HD and FULL HD Monitors</th>
<th>19&quot;</th>
<th>26&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desktop with pedestal</td>
<td>optional</td>
<td>optional</td>
</tr>
<tr>
<td>Product no.</td>
<td>9619 NB</td>
<td>9826 NB</td>
</tr>
<tr>
<td>Brightness</td>
<td>200 cd/m² (typ)</td>
<td>500 cd/m² (typ)</td>
</tr>
<tr>
<td>Max. viewing angle</td>
<td>178° vertical</td>
<td>178° vertical</td>
</tr>
<tr>
<td>Pixel distance</td>
<td>0.29 mm</td>
<td>0.3 mm</td>
</tr>
<tr>
<td>Reaction time</td>
<td>5 ms</td>
<td>8 ms</td>
</tr>
<tr>
<td>Contrast ratio</td>
<td>700:1</td>
<td>1400:1</td>
</tr>
<tr>
<td>Mount</td>
<td>100 mm VESA</td>
<td>100 mm VESA</td>
</tr>
<tr>
<td>Weight</td>
<td>7.6 kg</td>
<td>7.7 kg</td>
</tr>
<tr>
<td>Rated power</td>
<td>28 W</td>
<td>72 W</td>
</tr>
<tr>
<td>Operating conditions</td>
<td>0–40°C</td>
<td>5–35°C</td>
</tr>
<tr>
<td>Storage</td>
<td>-20–60°C</td>
<td>-20–60°C</td>
</tr>
<tr>
<td>Rel. humidity</td>
<td>max. 85%</td>
<td>max. 85%</td>
</tr>
<tr>
<td>Dimensions w x h x d</td>
<td>469.5 x 416 x 75.5 mm</td>
<td>643 x 396 x 87 mm</td>
</tr>
<tr>
<td>Power supply</td>
<td>100–240 VAC</td>
<td>100–240 VAC</td>
</tr>
<tr>
<td>Certified to</td>
<td>EN 60601-1, protection class IPX0</td>
<td>EN 60601-1, UL 60601-1, MDD93/42/EEC, protection class IPX2</td>
</tr>
</tbody>
</table>
Data Management and Documentation
KARL STORZ AIDA® – Exceptional documentation

The name AIDA stands for the comprehensive implementation of all documentation requirements arising in surgical procedures: A tailored solution that flexibly adapts to the needs of every specialty and thereby allows for the greatest degree of customization.

This customization is achieved in accordance with existing clinical standards to guarantee a reliable and safe solution. Proven functionalities merge with the latest trends and developments in medicine to create a fully new documentation experience – AIDA.

AIDA seamlessly integrates into existing infrastructures and exchanges data with other systems using common standard interfaces.

**WD 200-XX**

**AIDA Documentation System**, for recording still images and videos, dual channel up to FULL HD, 2D/3D, power supply 100-240 VAC, 50/60 Hz

including:
- **USB Silicone Keyboard**, with touchpad
- **ACC Connecting Cable**
- **DVI Connecting Cable**, length 200 cm
- **HDMI-DVI Cable**, length 200 cm
- **Mains Cord**, length 300 cm

**WD 250-XX**

**AIDA Documentation System**, for recording still images and videos, dual channel up to FULL HD, 2D/3D, including **SMARTSCREEN® (touch screen)**, power supply 100-240 VAC, 50/60 Hz

including:
- **USB Silicone Keyboard**, with touchpad
- **ACC Connecting Cable**
- **DVI Connecting Cable**, length 200 cm
- **HDMI-DVI Cable**, length 200 cm
- **Mains Cord**, length 300 cm

*XX Please indicate the relevant country code (DE, EN, ES, FR, IT, PT, RU) when placing your order.
Workflow-oriented use

**Patient**
Entering patient data has never been this easy. AIDA seamlessly integrates into the existing infrastructure such as HIS and PACS. Data can be entered manually or via a DICOM worklist. All important patient information is just a click away.

**Checklist**
Central administration and documentation of time-out. The checklist simplifies the documentation of all critical steps in accordance with clinical standards. All checklists can be adapted to individual needs for sustainably increasing patient safety.

**Record**
High-quality documentation, with still images and videos being recorded in FULL HD and 3D. The Dual Capture function allows for the parallel (synchronous or independent) recording of two sources. All recorded media can be marked for further processing with just one click.

**Edit**
With the Edit module, simple adjustments to recorded still images and videos can be very rapidly completed. Recordings can be quickly optimized and then directly placed in the report. In addition, freeze frames can be cut out of videos and edited and saved. Existing markings from the Record module can be used for quick selection.

**Complete**
Completing a procedure has never been easier. AIDA offers a large selection of storage locations. The data exported to each storage location can be defined. The Intelligent Export Manager (IEM) then carries out the export in the background. To prevent data loss, the system keeps the data until they have been successfully exported.

**Reference**
All important patient information is always available and easy to access. Completed procedures including all information, still images, videos, and the checklist report can be easily retrieved from the Reference module.
Equipment Cart

Equipment Cart
wide, high, rides on 4 antistatic dual wheels
equipped with locking brakes 3 shelves, mains switch on top cover, central beam with integrated electrical subdistributors with 12 sockets, holder for power supplies, potential earth connectors and cable winding on the outside,

Dimensions:
Equipment cart: 830 x 1474 x 730 mm (w x h x d),
shelf: 630 x 510 mm (w x d),
caster diameter: 150 mm

including:
Base module equipment cart, wide
Cover equipment, equipment cart wide
Beam package equipment, equipment cart high
3x Shelf, wide
Drawer unit with lock, wide
2x Equipment rail, long
Camera holder

Monitor Swivel Arm,
height and side adjustable, can be turned to the left or the right side, swivel range 180°, overhang 780 mm, overhang from centre 1170 mm, load capacity max. 15 kg, with monitor fixation VESA 5/100, for usage with equipment carts UG xxx
Recommended Accessories for Equipment Cart

**Isolation Transformer,**
200 V–240 V; 2000 VA with 3 special mains socket, expulsion fuses, 3 grounding plugs, dimensions: 330 x 90 x 495 mm (w x h x d), for usage with equipment carts UG xxx

**Earth Leakage Monitor,**
200 V–240 V, for mounting at equipment cart, control panel dimensions: 44 x 80 x 29 mm (w x h x d), for usage with isolation transformer UG 310

**Monitor Holding Arm,**
height adjustable, inclinable, mountable on left or right, turning radius approx. 320°, overhang 530 mm, load capacity max. 15 kg, monitor fixation VESA 75/100, for usage with equipment carts UG xxx