CARTilage GRAFTS AND PREASSEMBLED AUTOGRaFTS FOR RHINOPLASTY AND AURICULAR RECONSTRUCTION

Part I: Endoscopy-Assisted Extranasal Rhinoplasty

Part II: Auricular Reconstruction

Professor François DISANT
Edouard Herriot Hospital
Otolaryngology-Head and Neck Surgery Unit
Lyon, France
Cartilage Grafts and Preassembled Autografts for Rhinoplasty and Auricular Reconstruction

Part I: Endoscopy-Assisted Extranasal Rhinoplasty
Part II: Auricular Reconstruction

Professor François DISANT
Edouard Herriot Hospital, Otolaryngology – Head and Neck Surgery Unit
Pavillon U
Lyon, France

Address for correspondence:
Prof François Disant
Hôpital Edouard Herriot
Service ORL et CCF – Pavillon U
Place d’Arsonval
69437 Lyon Cedex 03, France
Phone: +33 04 72 11 05 32
E-mail: francois.disant@chu-lyon.fr

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Endoscopy-Assisted Extranasal Rhinoplasty

1.0 Introduction

Endoscopy-assisted extranasal rhinoplasty is another advancement in septoplasty procedures involving extraction, shaping/assembly and reimplantation in that it integrates the major reconstruction grafts commonly used in augmentation rhinoplasty:

- Spreader graft
- Dorsal onlay graft
- Columellar strut

The various grafts are fashioned and recombined on a board. The assembled autograft, fashioned in this way, is reimplanted under endoscopic vision, once its stability and position in relation to the patient's anatomical structures have been confirmed:

- Nasal bones
- Lateral nasal cartilage
- Anterior nasal spine

2.0 Clinical Data

Successful rhinoplasty requires good coaptation between the new osteocartilaginous framework and the cutaneous covering. Even though a variety of factors account for optimum coaptation, the following are of crucial importance:

- Smoothness of the reconstructed osteocartilaginous framework.
- Normal development of the skin during the wound healing process, that is, no fibrosis or dermal sclerosis that would reveal any irregularities of the new osteocartilaginous framework.
3.0 State of the Art

Rhinoplasty is currently performed using two techniques; each has its advantages and drawbacks:

- **Endonasal (closed) rhinoplasty** involves minimal dissection, thus the duration of wound healing is shortened. However, using this technique, it is more difficult to control changes related to the osteocartilaginous framework and graft stability, thereby increasing the risk of secondary irregularities, which is particularly visible if the skin is susceptible to retraction or atrophic alterations.

- **External (open) rhinoplasty** allows for precise visual control over the reduction or augmentation of the osteocartilaginous framework. However, the extensive skin dissection inherent to the technique can lead to delayed healing and postoperative complications, involving the risk of dermal fibrosis and secondary impairment of the morphological results.

Endoscopy-assisted extranasal rhinoplasty is an alternative treatment option when the primary technical challenge lies in the dorsum or the middle third of the nasal pyramid.

However, the endonasal technique is not supposed to replace the external approach in advanced cases of nose tip correction.

The procedure combines the advantages of the open standard approach:

- Fashioning of the cartilaginous autograft outside the nasal cavity is facilitated, considerably contributing to a regular morphological and mechanical outcome of the graft.
- Simplicity of the endonasal approach, which favors normal wound healing.
- Endoscopic visualization allows the position and stability of the reconstructed anatomical configuration to be assessed.

4.0 Surgical Technique

In the following, the surgical technique will be described step-by-step:

1. Hemitransfixion, inter-septo-columellar incision, then en bloc removal of septal (quadrangular) cartilage and cartilaginous dorsum by subperichondrial dissection.

2. Dorsal bone slotting by creation of an open roof at the dorsum and lateral osteotomy using green-stick type fractures, to partially reduce the open roof and maintain stability of the bone flaps.
3. Skeletonization of the anterior nasal spine while preserving integrity of the base of the bony septum (to the extent possible) to provide a stable native unit.

4. Fashioning of a standardized septal cartilage autograft that combines:
   a) A sagittal ‘set square’, where the anterior part rests on the anterior nasal spine, made from the thick posterior part of the removed septal (quadrangular) cartilage (acts as a strut and supports the nasal base).
   b) Two spreader grafts that extend posteriorly, beyond the posterior edge of the septal ‘set square’, and act as a tenon over their entire length (lateral nasal cartilage and nasal bone).
   c) An onlay graft that is sutured to the posterior extension of the spreader grafts; the height of the spreader graft is reduced in this segment to accommodate the onlay graft; the latter’s thickness exactly makes up for this reduction.

The resulting projection of the dorsum is perfectly linear.

Fixation of the spreader graft onto the septal ‘set square’.

Fixation of the onlay graft onto the spreader graft and septal ‘set square’.

View of the autograft from below.

View of the graft from above.

Assembled graft, three-quarter view.

Profile view of the autograft.

View of graft from above.

Measurement of graft length.
5. Dissection of an interposed columellar bed in front of the anterior nasal spine designed to accommodate the anterior part of the septal ‘set square’.

6. Implantation of the assembled autograft through the inter-septo-columellar route using a long grasping forceps and a transcolumellar guiding / traction suture.

7. “Push down” maneuver to lock in the dorsum. The assembled autograft is the matching part (tenon) of a mortise, corresponding to the open roof of the native nasal dorsum.

8. “Push-down” maneuver used to insert the assembled autograft in the open roof of the nasal dorsum, as in a mortise and tenon joint (a–c).
8. Assessment of the autograft’s position on the anterior nasal spine; if deemed necessary, the height of the septal ‘set square’ may be reduced to make sure that it snugly fits on the anterior spine and forms a stable compound.

9. Endoscopic assessment of the match between the projection of the spreader grafts and that of the lateral nasal cartilages, including the option to reduce any excess lateral cartilage.

10. Endoscopic assessment to make sure that the onlay graft is flush with the nasal bones; finger palpation to confirm that the dorsum is even and the onlay graft does not efface the nasofrontal angle.

9 Endoscopic view of the implanted autograft.

10 External view during endoscopic assessment.

10 Open roof after resection of the nasal dorsum and prior to lateral osteotomies.

Locking of the autograft into the open roof.

The autograft is locked in place similarly to a mortise and tenon joint.
11. Closure of the inter-septo-columellar incision and placement of a bivalve (Reuter type) septal external splint.

12. Stabilization of the skin layer with multiple layers of Steri-strips and a heat-malleable splint. The threedimensional stability of the autograft is maintained in the following planes:
   a) Vertically, as it rests on the anterior nasal spine.
   b) Sagittally, as it rests against the nasion, the engaged nasal bones and the anterior nasal spine.
   c) Transversally, through the mortise and tenon type joint in the neo-dorum.

Model of the assembled autograft engaging into the nasal bones by applying the mortise and tenon principle (a-d).
5.0 Outcomes of Clinical Cases

Deviated Nose

Frontal aspect, preoperative (a) and post-operative (b) views.

Lateral aspect, preoperative (a) and post-operative (b) views.

Tension Nose with Thin, Retractile Skin

Frontal aspect, preoperative (a) and post-operative (b) views.

Lateral aspect, preoperative (a) and post-operative (b) views.

Alar region, preoperative (a) and post-operative (b) submental views.
6.0 Limitations

The technique can be routinely applied by senior and novice surgeons and features a short learning curve. Thus, it is not reserved for experienced surgeons only. However, the technique is contraindicated when attempting to elongate a short nose, since the vertical skin retraction could raise the graft and cause effacement of the nasofrontal angle.

The ‘expanded septal graft’ technique is preferable in such a case, as it leaves the septum in place. Secondary septorhinoplasty involves the risk of a septal cartilage defect. The bony part of the perpendicular plate of the ethmoid or the vomer can be used to reconstruct the osteocartilaginous graft.

The spreader grafts require a sufficiently large cartilage fragment. Cartilaginous autograft may also be harvested from the auricular concha to reconstruct the nasal dorsum.

7.0 Indications

The following are the major indications for this technique:

- Deviated nose, especially when the septum exhibits complex deformities.
- In our hands, it has always been feasible to construct a completely linear graft on the board.
- The stability of the assembled autograft provides reproducible results.
- The tension nose with thin, retractile skin requires the dorsum to be perfectly smooth to prevent the occurrence of secondary irregularities. Having a large piece of septal (quadrangular) cartilage allows the construction of a well-nourished, completely even graft, which is assembled and implanted using the very reliable mortise and tenon principle.

In our experience, the major indication for the external approach is advanced nasal tip surgery. Conversely, the middle third of the nose can be addressed by extranasal rhinoplasty, avoiding tip dissection which is only needed for creating the surgical access, but not for managing an advanced-level nasal tip correction.

8.0 Conclusion

Endoscopy-assisted extranasal rhinoplasty allows to precisely manage nasal dorsum deformities through a minimally invasive approach, facilitating post-operative recovery and avoiding secondary deformities related to the reconstructed osteocartilaginous framework or to skin healing.
Auricular Reconstruction

1.0 Introduction

The external ear, an aerated structure that projects from both sides of the skull, plays a mostly esthetic role. When missing, either due to a congenital defect related to microtia or as a result of amputation, the face looks unbalanced, which is poorly tolerated by school-aged children.

The goal of auricular reconstruction is to restore the main features of the ear: delicate contours, symmetry relative to the contralateral ear and stable retroauricular sulcus.

Auricular reconstruction is based on the interposition of a sculptured rib cartilage autograft. This procedure was first described by Radfort Tanzer in the late 1950s and then improved upon by Burt Brent; it is now considered well-established. Although the first reconstruction procedures were accomplished in at least three stages, today most surgeons employ a two-staged approach. The first stage involves harvest, sculpturing and implantation of the assembled cartilage framework; the second stage consists of lateral transposition of the auricle itself. However, the outcomes of the second stage procedure are unpredictable, notably because of scar retraction at the new retroauricular sulcus, leading to a loss of auricular contour.

2.0 Surgical Technique

Auricular reconstruction is performed in two stages, usually scheduled four months apart. Occasionally, a third stage is needed to refine the results.

First Stage:
The key elements contributing to the anticipated auricular framework are harvested, assembled and implanted during the first stage.

- Cartilage is harvested from the sixth to eighth ribs contralateral to the ear in question. The procedure is facilitated by use of bipolar scissors, allowing for a bloodless, extra-perichondrial harvest. Always make sure to maintain integrity of the parietal pleura. The muscle and skin layers are carefully closed over a suction drain, followed by post-operative lung X-rays for reassessment purposes, and removal of the chest drain on the second day to rule out pneumothorax.

- The costal cartilage is carved and assembled with 3-0 metal sutures to form a three-dimensional auricular framework. The size of this graft must match the contralateral ear. Cartilage harvested from the sixth and seventh ribs are used to support those grafts that will make up the helix and antihelix. The front part of the cartilage is hollowed-out to form the cavum conchae. The inferior part is used to build the structure of the lobule. A cartilage graft is attached in front to form the tragus.
The retroauricular region must be carefully prepared and shaved a few centimeters. A small (3 to 4 cm), sloping V-shaped retroauricular incision is made and the subcutaneous-adipose tissue released in the temporomastoid area overlying the anticipated position of the auricle. Detachment of the skin is done over the temporoparietal fascial flap in a plane below the superficial adipocutaneous system (SACS). If undermining is carried too deep, the delicate contours are at risk of being compromised. The cartilage of the patient’s remnant ear / lobule is carefully mobilized and removed making sure not to tranfix the skin.

In the first stage, a small, crescent-shaped costal cartilage graft is placed, concave side facing down, under the temporoparietal fascial flap above and behind the neo-auricle. The graft will serve as a wedge to elevate the auricle during the second stage of surgery.

The graft is positioned, angled upwards and backwards, with the superior margin at the same level as the brow line. A gentle suction drain, which is kept in place for seven days, coapts the skin to the cartilage framework.
The lower part of the retroauricular sulcus is fashioned during the first stage to allow the lobule to be laterally repositioned on the spot. We favour a primary lateral transposition of the microtic ear lobule and cartilage over a secondary approach with the same intent, which is always challenging because the lower part of the graft is susceptible to become trapped between the anterior edge of the sternocleidomastoid muscle and the mastoid.

Second Stage:
Four months later, in the course of this stage, lateral transposition of the auricle is accomplished by interposing a wedge of crescent-shaped cartilage in the retroauricular sulcus; the wedge was banked under the temporoparietal fascial flap during the first stage.

- The skin incision is made along the contour of the neo-auricle and is completed by a horizontal incision extended posteriorly, towards the banked, crescent-shaped graft.
- The temporoparietal fascial flap (TPF) with anterior pedicle, which is used to mobilize the head of the crescent-shaped cartilage, is inset into the retroauricular neo-sulcus.
- The lateral side of the auricle and TPF that wrap the crescent-shaped graft are covered by a thin, 0.3 mm skin graft, while the medial side is covered by advancement of two temporomastoid scalp flaps.
Coverage of the medial side of the retroauricular sulcus by advancement of temporomastoid scalp flaps (e, f).

Coverage of the lateral side of the retroauricular sulcus with a free skin graft (g).

Retroauricular sulcus after six months of normal wound healing.

Postoperative results of two patients demonstrated in various views (a–f).
Instrument Set for Endoscopy-Assisted Extranasal Rhinoplasty

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

HOPKINS® Forward-Oblique Telescope 30°,
enlarged view, diameter 4 mm, length 18 cm, autoclavable,
fiber optic light transmission incorporated,
color code: red

- **403655** COTTLE Nasal Speculum,
  blade length 55 mm, length 13 cm
- **479408** COTTLE Raspatory,
  slightly curved, width 8 mm, length 19.5 cm
- **494500** JOSEPH Knife,
  curved, backward cutting, double beveled, length 15 cm
- **498000** JOSEPH Retractor,
  length 15.5 cm
- **536909** Dissecting and Ligature Forceps,
  straight, smooth jaws, length 9.5 cm

It is recommended to check the suitability of the product for the intended procedure prior to use.
## Instrument Set for Endoscopy-Assisted Extranasal Rhinoplasty

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<td>465001</td>
<td>BRÜNINGS-LUC Septum Forceps, size 1, working length 11 cm</td>
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<tr>
<td>465002</td>
<td>Same, size 2</td>
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<td>484800</td>
<td>MASING Chisel, straight, with rounded guard, straight, length 18 cm</td>
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<td>486223</td>
<td>BEHRBOHM-WALTER Micro-Osteotome, extra delicate, long, flat blade, double-edged grinding, with round ergonomic handle and finger grip plate, width 3 mm, length 19 cm</td>
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<td>498809</td>
<td>AIACH Osteotome for Hump Removal, with lateral guiding rod, width 10 mm</td>
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<td>498810</td>
<td>Same, width 13 mm</td>
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<td>498810 F</td>
<td>Guide Rod, for 498809 and 498810, only</td>
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<tr>
<td>174200</td>
<td>COTTLE Metal Mallet, length 18 cm</td>
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Instrument Set for Endoscopy-Assisted Extranasal Rhinoplasty

- **791803** JAMESON Scissors, curved, pointed, delicate tips, length 15.5 cm
- **792013 DS** MAYO Dissecting Scissors, with tungsten carbide inserts, curved, length 15 cm, color code: one black handle ring, one gold-plated handle ring
- **791600** Scissors, for suture, curved, sharp/sharp, length 12.5 cm
- **511814** KILNER Scissors, curved, flat end, length 14 cm
- **791202 DS** Scissors, curved, sharp/blunt, length 14.5 cm, color code: one gold-plated handle ring
- **513612** FOMON Lower Lateral Scissors, strongly curved, length 12 cm
Instrument Set for Endoscopy-Assisted Extranasal Rhinoplasty

533212  ADSON-BROWN Tissue Forceps, atraumatic, fine side grasping teeth, length 12 cm
792320  Atraumatic Tissue Forceps, tungsten carbide inserts, serrated, length 20 cm
532013  Tissue Forceps, straight, with 7 x 8 fine teeth, length 13 cm
534015  COTTLE Lower Lateral Forceps, bayonet-shaped, with set screw, serrated tips and teeth on the inside, length 15 cm
**Instrument Set for Auricular Reconstruction**

- **Surgical Handle**, Fig. 3, length 12.5 cm, for Blades 208010 – 15, 208210 – 15
- **Retractor**, sharp, 3 prongs, length 17 cm
- **KOCHER-LANGENBECK Retractor**, size 55 x 11 mm, length 21.5 cm
- **MICCOLI Retractor**, double-ended, size 35 x 10 mm and 21 x 10 mm, length 16 cm (2 pcs. recommended)
- **MICCOLI Retractor**, size 45 x 10 mm and 21 x 10 mm
- **CASTROVIEJO Skin Measurement Caliper**, measurement range 0 – 150 mm, length 14 cm
Instrument Set for Auricular Reconstruction

533112  ADSON Tissue Forceps,  
         1 x 2 teeth, length 12 cm

533022  ADSON Dressing Forceps,  
         serrated, tungsten carbide inserts, length 12 cm

533214  ADSON-BROWN Tissue Forceps,  
         atraumatic, fine side grasping teeth,  
         tungsten carbide inserts, width 1.5 mm,  
         length 12 cm

511814  KILNER Scissors,  
         curved, flat end, length 14 cm

798718  HEGAR-MAYO Needle Holder,  
         robust, tungsten carbide inserts, length 18 cm

516012  HALSEY Needle Holder,  
         tungsten carbide inserts, length 12 cm
VITOM® NEW
Visualization System for Open Surgery with Minimal Access
VITOM® NEW
Visualization System for Open Surgery with Minimal Access

The KARL STORZ VITOM® system represents a revolutionary and innovative way of displaying open surgery with minimal access in a high quality and ergonomic manner.

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The VITOM® system offers:

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- Great depth of view
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- Ergonomic monitor work
- Compact design requiring minimal space in the OR
- Use of existing KARL STORZ FULL HD endoscopy system possible

Use of the VITOM® system in ENT surgery.

OR photographs courtesy of: Prof. Dr. Gero Strauss, Director of the International Reference and Development Center (IRDC), Leipzig, Germany.
VITOM® System Components

Exoscope and Illumination – 2nd Generation VITOM® Telescopes

Length 11 cm

VITOM® Telescope 0° with Integrated Illuminator,
VITOM® HOPKINS® Straight Forward Telescope 0°,
working distance 25 – 75 cm, length 11 cm,
autoclavable, with fiber optic light transmission
incorporated and condensor lenses,
color code: green

Fiber Optic Light Cables 495 TIP or 495 NVC recommended

495 TIP Fiber Optic Light Cable,
highly heat resistant,
diameter 4.8 mm, length 300 cm

495 NVC Fiber Optic Light Cable,
with 90° deflection to the instrument,
very narrow radius of curvature,
diameter 4.8 mm, length 300 cm
VITOM® NEW
System Components

Exoscope and Illumination – 2nd Generation VITOM® Telescopes
Length 11 cm

VITOM® Telescope 90° with Integrated Illuminator,
VITOM® HOPKINS® telescope 90°, working distance 25 – 75 cm, length 11 cm, autoclavable,
with fiber optic light transmission incorporated and condensor lenses,
color code: blue

Fiber Optic Light Cable 495 TIP recommended

Fiber Optic Light Cable, highly heat resistant,
diameter 4.8 mm, length 300 cm
VITOM® NEW
System Components

**20918020**

**20918020**  **VITOM® 25 Distance Rod,** length 25 cm

**39501 A2**

**39501 A2**  **Wire Tray for Cleaning, Sterilization and Storage**
of two rigid endoscopes and one light guide cable, including holder for light post adaptors, silicone telescope holders and lid, external dimensions (w x d x h): 352 x 125 x 54 mm, for rigid endoscopes up to diameter 10 mm and working length 20 cm
### VITOM® Specifications

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Technical specifications are subject to change.
VITOM® NEW

System Components

Cold Light Fountain XENON 300 SCB

Special Features:
- Extremely high light intensity due to 300 Watt Xenon lamp
- Built-in antifog pump
- With integrated KARL STORZ Communication Bus (KARL STORZ-SCB)

Specifications:

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201331 01-1 Cold Light Fountain XENON 300 SCB

Power supply 100 – 125/220 – 240 VAC, 50/60 Hz including:
- Mains Cord
- Silicone Tubing Set, length 250 cm
- SCB Connecting Cable, length 100 cm
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

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- 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

* 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:**

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<td>LINK video inputs</td>
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<td>Protection class I, CF-Defib</td>
</tr>
<tr>
<td>USB interface</td>
<td></td>
<td>Dimensions w x h x d 305 x 54 x 320 mm</td>
</tr>
<tr>
<td>SCB interface</td>
<td>4x USB, (2x front, 2x rear)</td>
<td>Weight 2.1 kg</td>
</tr>
<tr>
<td></td>
<td>2x 6-pin mini-DIN</td>
<td></td>
</tr>
</tbody>
</table>

**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>
<tbody>
<tr>
<td>Supported camera heads/video endoscopes</td>
<td>TH 100, TH 101, TH 102, TH 103, TH 104, TH 106 (fully compatible with IMAGE1 S) 22220055-3, 22220056-3, 22220053-3, 22220060-3, 22220061-3, 22220054-3, 22220065-3 (compatible without IMAGE1 S technologies CLARA, CHROMA, SPECTRA*)</td>
</tr>
<tr>
<td>LINK video outputs</td>
<td>1x</td>
</tr>
<tr>
<td>Power supply</td>
<td>100–120 VAC/200–240 VAC</td>
</tr>
<tr>
<td>Power frequency</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Protection class</td>
<td>I, CF-Defib</td>
</tr>
<tr>
<td>Dimensions w x h x d</td>
<td>305 x 54 x 320 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>1.86 kg</td>
</tr>
</tbody>
</table>

* SPECTRA A: Not for sale in the U.S.
** SPECTRA B: Not for sale in the U.S.
Cartilage Grafts and Preassembled Autografts for Rhinoplasty and Auricular Reconstruction

**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

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**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 ¼&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>

---

**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 ¼&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

<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>Wall-mounted with VESA 100 adaption</td>
<td>9619 NB</td>
<td>9826 NB</td>
</tr>
</tbody>
</table>

**Inputs:**
- DVI-D: ● ●
- Fibre Optic: – –
- 3G-SDI: – ●
- RGBS (VGA): ● ●
- S-Video: ● ●
- Composite/FBAS: ● ●

**Outputs:**
- DVI-D: ● ●
- S-Video: ● –
- Composite/FBAS: ● ●
- RGBS (VGA): ● –
- 3G-SDI: – ●

**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>
VITOM® NEW

System Components

Mechanical Holding System

28272 HC  **Articulated Stand**, L-shaped, long, reinforced version, only, especially large swivel range, with one mechanical central clamp for all five joint functions, height 48 cm, swivel range 66 cm, with quick release coupling KSLOCK (female)

28172 HR  **Rotation Socket**, to clamp to the operating table, with one mounted Butterfly Nut 28172 HRS, for European and US standard rails, with lateral clamp for height and angle adjustment of the articulated stand

28172 HM  **Extension Rod**, 50 cm, with lateral clamp for height adjustment of the articulated stand, for use with articulated stands 28272 HA, 28272 HB or 28272 HC and socket 28172 HK or 28172 HR

28272 UGN  **Clamping Jaw**, metal, clamping range 16.5 up to 23 mm, with quick release coupling KSLOCK (male), for use with all square-headed KARL STORZ HOPKINS® telescopes

28272 UGK  **Clamping Jaw**, with ball joint, large, clamping range 16.5 to 23 mm, with quick release coupling KSLOCK (male), for use with all square-headed KARL STORZ HOPKINS® telescopes

28272 CN  **Clamping Cylinder**, folding, for flexible mounting of 10 mm telescopes on the telescope sheath, **autoclavable**. The clamping cylinder allows vertical movement and rotation of the telescope.
VITOM® NEW

System Components

KARL STORZ AIDA® compact NEO advanced

Brilliance in documentation

Data Acquisition

Still images, video sequences and audio comments can easily be recorded during an examination or intervention by pressing the on-screen button, activating the footswitch, or pressing the camera head button.

All captured data are displayed on the right-hand side as a thumbnail preview to ensure the data have been generated. Patient data can be entered via an onscreen or standard keyboard. The system also offers the possibility to transfer all relevant patient data via a DICOM worklist or a link to the hospital information system (HIS) without requiring manual entry in the patient entry screen.

Flexible Review, Data Storage and Efficient Data Export

Captured still images or video files can easily be viewed, edited, or deleted on-screen before final storage. KARL STORZ AIDA® compact NEO efficiently stores all recorded data on DVD, CD, USB stick, external/internal drive, the relevant network and/or on a FTP server. It is also possible to save the data directly on the PACS and/or HIS servers via HL7/DICOM. Data that cannot be stored successfully remains in a cache until final archiving is possible.

Special Features:

- SD and HD signal support:
  - Y/C (S-Video)
  - Composite input
  - DVI-D input
- Picture-in-Picture function:
  Display of channel 2 (SD) in channel 1 (FULL HD)
- Resolution:
  - Still images 1920 x 1080 and SD
  - Videos 1080p, 720p and SD
- Interface package (DICOM/H7) included
- NEO Secure security software
- Recommended applications:
  - Universal (cart or OR1™ installation)

* Available in the following languages:
DE, ES, FR, IT, PT, PL, RU, DK, SE, JP, CN
**VITOM® NEW**

System Components

Documentation System

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>20090519</td>
<td><strong>19&quot; KARL STORZ Touch Screen</strong>, 24V, wall mounting, RS 232, VGA, resolution max. 1280 x 1024 (SXGA mode), including RS 232 cable, SVGA cable, mains cord and external power supply 24 VDC, power supply 100 – 240 VAC, 50/60 Hz</td>
</tr>
<tr>
<td>041265-20*</td>
<td><strong>Sterile Cover</strong>, for 19&quot; KARL STORZ touch screen</td>
</tr>
<tr>
<td>29005 MSK</td>
<td><strong>Monitor Holding Arm</strong>, height and side adjustable, tilting, can be mounted either on the left or on the right side, swivel range 190°, reach 300 mm, loading capacity max. 15 kg, with monitor holder VESA 75/100, for Equipment Carts 29005 xx</td>
</tr>
</tbody>
</table>

This product is marketed by mtp. For additional information, please apply to:

mtp medical technical promotion gmbh, Take-Off Gewerbepark 46, D-78579 Neuhausen ob Eck, Germany
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
WITH COMPLIMENTS OF KARL STORZ—ENDOSKOPE