Maxillary Sinus Endoscopy for Implantologists

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1. Introduction to the Set for the Canine Fossa Approach before, during and after Sinus Lifting

The sinus lift procedure has now become part of the standard repertoire of the implantologist due to its high success rate. While there are many different access techniques, comprehensive diagnosis remains an essential component of pre-implant treatment planning. Consequently, Digital (dental) Volume Tomography (DVT) has become firmly established in dentistry. Following several thousand DVT evaluations, we know that approx. 35% of all examined patients present with pathological changes of the maxillary sinus. Although clinical signs are often absent, such findings should nevertheless be evaluated before a sinus lift is performed. Here endoscopy of the maxillary cavity proves useful for pre-, intra- as well as post-implantological diagnosis and therapy.

To remediate pathological findings in the maxillary sinus, particularly in the alveolar recess, access through one or two minitrocars via the canine fossa offers an optimal overview. No contact is made with the caudal one-third of the anterior maxillary sinus wall at this stage.

Hosemann et al. (2003) showed that the alveolar recess and the prelacrimal recess are out of sight during routine rhinological access to the maxillary cavity via a supraturbinal window. This led to a reappraisal of maxillary sinus endoscopy via the canine fossa, a tried and tested technique that had been performed less frequently in recent years. In the meantime, more refined and slender endoscopes have become available for this approach.

**Fig. 1a**
Marking the topographical anatomy of the maxillary sinus on a skull specimen
- red – nerve exit point N/V2 right
- black – trephination sites for endoscopy with two 3 mm trocars
- red hatched area – taboo zone of the protected area of the caudal one-third of the maxillary sinus, reserved for the sinus lift

**Fig. 1b**
Exposure of the canine fossa
2. Neo-Renaissance of Maxillary Sinus Endoscopy via the Canine Fossa

Access via the canine fossa provides an optically safe, atraumatic and short route to the alveolar recess – quasi a view behind the Schneiderian membrane. This approach also offers a surgical perspective for the repertoire of the implantologist. To acquire the technique, a training course with a surgical simulator is useful.

2.1. Evaluation of optical axes and angles of view with slender endoscopes in the maxillary sinuses on a skull preparation

Studies were carried out on an unfixed skull preparation at the Charité’s Institute for Anatomy. Four maxillary sinuses having various pneumatization were endoscopically examined with a 0° telescope, 2.7 mm and a 30° telescope, 2.7 mm (KARL STORZ, Tuttingen). The purpose of the study was to determine whether all maxillary recesses could be visualized endoscopically and accessed with instruments via two high punctures of the facial maxillary sinus. The study showed that all recesses could be accessed without the occurrence of blind niches. The alveolar recess and the prelacrimal recess were completely visible and could be accessed through the working channel.
4. Practical Example

The series of images Figs. 3a – h illustrates an endoscopically controlled sinus lift with simultaneous placement of an implant 26:

Fig. 3a OPG before planned implantation

Fig. 3b Section in the sagittal cutting plane through the maxillary sinus left in DVT

Fig. 3c Section in the axial cutting plane through the maxillary sinus left in DVT

Fig. 3d Maxillary sinus ostium and suctioning the cyst

Fig. 3e Implant regio 24 and insertion implant 26 with sinus lift

Fig. 3f Implants in the final position

Fig. 3g Endoscopic image of the augmentation region

Fig. 3h Follow-up image, OPG
5. Instruments

**Basic set for maxillary sinus endoscopy via canine fossa**

<table>
<thead>
<tr>
<th>Code</th>
<th>Item Description</th>
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<tbody>
<tr>
<td>7207 AA</td>
<td><strong>HOPKINS® Straight Forward Telescope 0°</strong>, diameter 2.7 mm, length 11 cm, autoclavable, fiber optic light transmission incorporated, color code: green</td>
</tr>
<tr>
<td>7207 BA</td>
<td><strong>HOPKINS® Forward-Oblique Telescope 30°</strong>, diameter 2.7 mm, length 11 cm, autoclavable, fiber optic light transmission incorporated, color code: red</td>
</tr>
<tr>
<td>2x 723103 B</td>
<td><strong>Trocar for Sinoscopy</strong>, oblique beak, outer diameter 3.3 mm, length of the cannula 7.5 cm, for use with HOPKINS® telescopes ith diameter 2.7 mm</td>
</tr>
<tr>
<td>662100</td>
<td><strong>KERRISON Bone Punch</strong>, detachable, rigid, 90° upbiting, not through-cutting, size 0.5 mm, working length 17 cm</td>
</tr>
<tr>
<td>58702 U</td>
<td><strong>Grasping Forceps</strong>, single action jaws, diameter 2.1 mm, working length 10 cm, for use with Trocar 58702 X</td>
</tr>
<tr>
<td>460001</td>
<td><strong>STAMMBERGER Suction Punch</strong>, for biopsy and grasping, straight, with central suction channel, with Cleaning Stylet 460001 E, size 1, with cleaning connector, working length 10 cm</td>
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**Additonal accessories for interventional sinoscopy**

- **529307** FRAZIER Suction Tube, with mandrel and cut-off hole, with distance marking at 5-9 cm, 7 Fr., working length 10 cm

- **801701** KOCHER-LANGENBECK Retractor, size 25 x 6 mm, length 21.5 cm

- **801702** KOCHER-LANGENBECK Retractor, size 35 x 8 mm, length 21.5 cm

- **7229 BA** HOPKINS® Forward-Oblique Telescope 30°, enlarged view, diameter 2.7 mm, length 18 cm, **autoclavable**, fiber optic light transmission incorporated, color code: red

- **723005 A** Trocar for Sinoscopy, with beak, outer diameter 5 mm, length of the cannula 8.5 cm, for use with HOPKINS® telescopes with diameter 4 mm

- **723400** Optical Biopsy and Grasping Forceps, flexible, for use with HOPKINS® Telescope 7229 BA and Trocars 723005 A/B
Imaging Systems

Compact system with LED light source

TP 100EN  TELE PACK X LED, endoscopic video unit for use with all KARL STORZ TELECAM one-chip camera heads and video endoscopes, incl. LED light source similar to Xenon technology, with integrated digital Image Processing Module, 15" LCD TFT monitor with LED backlight, USB/SD memory module, color systems PAL/NTSC, power supply 100-240 VAC, 50/60 Hz
including:
USB Silicone Keyboard, with touchpad, US character set
USB Flash Drive, 8 GB
Mains Cord, length 300 cm

Accessories

2012030  TELECAM One-Chip Camera Head, color system PAL, soakable, gas-sterilizable, with integrated Parfocal Zoom Lens, f = 25-50 mm (2x), 2 freely programmable camera head buttons

495 NA  Fiber Optic Light Cable, with straight connector, diameter 3.5 mm, length 230 cm
KARL STORZ C-CAM® and C-HUB® – The Cost-effective Solution for the Private Practice

**20290101** C-HUB® Camera Control Unit, for use with C-CAM® 20290132, Electronic Module 8402 X or compatible CMOS video endoscopes, Interfaces: USB 2.0, S-Video output (NTSC), power socket

**20290132** C-CAM® Camera Head, 8-pin, one-chip CMOS camera head, resolution 640 x 480, focal length $f = 20$ mm, for use with C-HUB® 20290101 and C-HUB® II 20290301 as well as C-MAC® Monitors 8402 ZX/8403 ZX

**11301 D4** Battery Light Source LED for Endoscopes, with fast screw thread, brightness $> 110$ lm / $> 150$ klx, burning time $> 120$ min, weight approx. 150 g ready for use, with 2 Photo Batteries 121306 P
6. References

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It is recommended to check the suitability of the product for the intended procedure prior to use.