TMJ Arthroscopy –
Solutions for the minimally invasive treatment of the temporomandibular joint
When the jaw joint hurts ...

The temporomandibular joint is one of the smallest joints in the human body. Often, even factors as common as stress can interfere with the interplay between this joint, the teeth, and the chewing muscles. Stress-related teeth grinding can damage teeth and cause excessive stress on the joint and the chewing muscles. This functional disorder, called craniomandibular dysfunction, can cause serious pain and inflammation in the TMJ region. It is typically accompanied by TMJ noise, which is the result of a displaced articular disc. In extreme cases, the patient may become unable to open the mouth. Chronic untreated TMJ inflammation can even cause osteoarthritis of the TMJ. The principal functional disorders are chewing and speaking impairments.
Treatment concept for TMJ disorders

When treating TMJ pain, conservative methods are used first. If these methods are unsuccessful, the pain can be treated using minimally invasive surgical techniques. This step should be taken at an early time – before the pain becomes chronic. Performing surgery early is necessary to prevent patients from developing a “pain memory.”
Minimally invasive surgical methods

Endoscopic procedures are indicated in disc displacement, TMJ osteoarthritis, condylar dislocation, and functional disorders resulting from periarticular fractures.

Endoscopic arthrocentesis and lavage

Aggressive protein compounds resulting from inflammatory effusion can be washed out under optical control. Endoscopes supply magnified and detailed images of changes in cartilage, bone, ligaments, and the synovial membrane. In addition to affording patients the positive effects of arthrocentesis and lavage, this endoscopic procedure allows removing minor adhesions under view.

Arthroscopic microsurgery

In cases where endoscopic arthrocentesis and lavage are insufficient and the patient continues to experience pain and jaw lock, micro-instruments can be inserted through a working channel for further TMJ treatment. These instruments can remove further adhesions and loose bodies, open cysts, contour bones, smoothen cartilage, and treat the synovial membrane. Pain is eliminated and joint function restored.
Solutions for the minimally invasive treatment of the temporomandibular joint

Solution 1: The Modular TMJ Arthroscope

With an outer diameter of 1.3 mm, the modular TMJ arthroscope allows particularly atraumatic treatment. This makes it an important instrument for performing TMJ lavage under view, even for surgeons in private practice.

The arthroscope sheath is inserted in the joint space as gently as possible using custom-fit sharp and blunt obturators. Then the 0° miniature straight forward telescope is inserted in the sheath and connected via the LUER lock connector. The endoscope can be safely stored, cleaned, and sterilized in the associated tray. All associated components are reusable, which eliminates any direct costs for single-use materials.
Solution 2: The ALL-IN-ONE TMJ Arthroscope

The ALL-IN-ONE TMJ Arthroscope has an outer diameter of 2.2 mm and an integrated 1.4 mm working channel. It combines a telescope, irrigation channel, and working channel and thereby allows arthroscopic lavage as well as arthroscopic microsurgery. Again, the arthroscope sheath is first inserted in the temporomandibular joint and then connected with the ALL-IN-ONE TMJ Arthroscope via the existing Luer lock connector. The arthroscope sheath features a scale that enables surgeons to track the insertion depth of the employed instruments. The palpation hook, scissors, and biopsy forceps can be directly inserted into the joint through the endoscope’s integrated working channel. The custom-fit tray ensures optimal endoscope storage and reprocessing. All required components, including the endoscope, are autoclavable.
The first TMJ arthroscope with integrated working channel offers the following advantages:

- Significant time savings since no triangulation is required
- Single access, only one skin incision required
- Sufficient stability for TMJ puncture and for the functional requirements of TMJ arthroscopy
- Simple, improved handling of the endoscope
- Integrated lavage fluid channel for joint lavage
- Easy instrument guidance (hook, scissors, forceps, laser, and water-jet scalpel) in the integrated working channel of the TMJ arthroscope
- More gentle on the joint and better protection against joint injury since the working instrument can be introduced through the integrated working channel. The result is even less invasive TMJ arthroscopy
- Additional surgical options are conceivable, such as simultaneously placing two ALL-IN-ONE TMJ Arthroscopes into the joint space, for instance for advancing existing suture techniques

Minimally invasive arthroscopic treatment of TMJ disc displacement and ligament elongation in conjunction with diagnostic arthroscopy

The most difficult and time-consuming step in TMJ arthroscopy is the so-called triangulation, which involves finding the working channel with the endoscope and navigating the working channel and arthroscope simultaneously through the joint space. The goal is to perform certain surgical steps in the joint space under endoscopic view. These include taking biopsies, removing loose bodies from the joint, and performing endoscopic water-jet surgery, laser applications, endoscopic suturing techniques, and other bimanual arthroscopic procedures within the TMJ.

The new TMJ arthroscope from KARL STORZ solves the problem of triangulation by combining the endoscope and the working channel in a single device, thereby eliminating the often laborious search for the working channel in a series of applications.

In practice, this means that users can simultaneously view the joint through the arthroscope and use the instruments through the working channel under the very same arthroscopic view. The known anatomic dimensions of the TMJ had to be taken into account in the design of the new endoscope.

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Solution 3: HOPKINS® TMJ Arthroscopes

The HOPKINS® arthroscopes for TMJ arthroscopy are available in the diameters 1.9 mm and 2.4 mm and directions of view of 0° and 30°. The rod lens technology of HOPKINS® arthroscopes ensures particularly high image quality and hence the best possible view. This is particularly helpful in complex arthroscopic microsurgery since the technique requires detailed viewing of internal joint structures. Again, custom-fit obturators allow insertion of the arthroscopy sheaths into the joint space as atraumatically as possible. Additional trocars are positioned to allow insertion of instruments into the joint. A series of instruments, such as grasping forceps, scissors, palpation hooks, sickle knives, and probes, can be used in the joint via trocars. HOPKINS® telescopes are autoclavable and can be stored, cleaned, and sterilized in purpose-designed trays.
Solutions for the minimally invasive treatment of the temporomandibular joint

Modular TMJ Arthroscope Set

11508  **Miniature Straight Forward Telescope 0°**, diameter 1 mm, length 6 cm, fiber optic light transmission incorporated, eyepiece and light connection separate from the instrument

58717 R  **Arthroscope Sheath**, outer diameter 1.3 mm, working length 4 cm, with lateral Luer-lock adaptor, for use with Miniature Straight Forward Telescope 11508

58717 RB  **Obturator**, blunt, for use with Arthroscope Sheath 58717 R
58717 RS  **Obturator**, sharp, for use with Arthroscope Sheath 58717 R

58717 RR  **Obturator**, sharp, with eccentric tip, for use with Arthroscope Sheath 58717 R

39502 Z  **Wire Tray for Cleaning, Sterilization and Storage** of instruments, stackable, including hole plate walls and foldaway handles, external dimensions (w x d x h): 480 x 250 x 66 mm

39100 S  **Silicone Grid Insert “Large Diamond Grid”**, blue, extra wide meshed, for the storage of instruments in standard wire trays, plastic and sterilization containers, external dimensions: (w x d): 470 x 240 mm
39100 PS  **Fixation Pin**, including screw and washer, to screw instruments into position in wire trays, height 38 mm, package of 12, for use with Silicone Tie-Downs 39360 AS

39360 AS  **Silicone Tie-Downs**, package of 12, for use with Fixation Pins 39100 PS and 39360 AP
ALL-IN-ONE TMJ Arthroscope Set

11578 A  **ALL-IN-ONE TMJ Arthroscope**, miniature straight forward telescope 0°, diameter 2.2 mm, working length 65 mm, **autoclavable**, working channel 1.4 mm, irrigation channel 0.25 mm, with remote eyepiece and fiber optic light transmission incorporated, for use with:
- Trocar 11578 KA
- Palpation Hook 11578 S
- Scissors 11578 EO
- Biopsy Forceps 11578 PZ

11578 KA  **Trocar**, outer diameter 2.6 mm, working length 6.5 cm, graduated, for use with Telescope 11578 A and Obturators 11578 BS/BT

11578 BS  **Obturator**, sharp, for use with Trocar 11578 KA

11578 BT  **Obturator**, blunt, for use with Trocar 11578 KA
11578 S  **Palpation Hook**, graduated, working length 21 cm, for use with ALL-IN-ONE TMJ Arthroscope 11578 A

11578 EO  **Scissors**, semirigid, diameter 1.3 mm, working length 20 cm, for use with ALL-IN-ONE TMJ Arthroscope 11578 A

11578 PZ  **Biopsy Forceps**, semirigid, diameter 1.3 mm, working length 20 cm, for use with ALL-IN-ONE TMJ Arthroscope 11578 A

11580 B  **Metal Tray**, for sterilization and storage of one Miniature Straight Forward Telescope 11575 A, 11581 A, 11582 A, 11583 A, 11578 A or 58001, perforated, lid with silicone bridges, with port for irrigation connector, external dimensions (w x d x h): 275 x 178 x 35 mm
HOPKINS® Arthroscopes and Accessories

58705 AA  **HOPKINS® Straight Forward Telescope 0°**, diameter 1.9 mm, length 6.5 cm, **autoclavable**, fiber optic light transmission incorporated, color code: green

58706 AN  **High-Flow Arthroscope Sheath**, outer diameter 2.8 mm, working length 4 cm, for use with HOPKINS® Telescope 58705 AA, color code: green

58705 BA  **HOPKINS® Forward-Oblique Telescope 30°**, diameter 1.9 mm, length 6.5 cm, **autoclavable**, fiber optic light transmission incorporated, color code: red

58706 BN  **High-Flow Arthroscope Sheath**, outer diameter 2.8 mm, working length 4 cm, for use with HOPKINS® Telescope 58705 BA, color code: red

58706 BS  **Obturator**, sharp, for use with High-Flow Arthroscope Sheaths 58706 AN/BN
58703 BH  **High Flow Arthroscope Sheath**, outer diameter 3.2 mm, working length 8.5 cm, for use with HOPKINS® Telescope 58700 BA, color code: red

58702 BU  **Obturator**, sharp, for use with Arthroscope Sheaths 58703 BH/CH

58702 BV  **Obturator**, blunt, for use with Arthroscope Sheaths 58703 BH/CH
HOPKINS® Arthroscopes and Accessories

58717 X  Trocar, outer diameter 1.8 mm, working length 4 cm, for use with Obturators 58717 XB/XS and Biopsy Forceps 58717 PZ

58717 XS  Obturator, sharp, for use with Trocar 58717 X

58717 XB  Obturator, blunt, for use with Trocar 58717 X

58702 X  Trocar, outer diameter 2.5 mm, working length 3.5 cm, for use with Obturators 58702 XS/XT and instruments 58702 DH/EK/EO/M/N/S/U

58702 XS  Obturator, sharp, for use with Trocar 58702 X

58702 XT  Obturator, blunt, for use with Trocar 58702 X
58717 PZ  **Biopsy Forceps**, single action jaws, diameter 1.3 mm, working length 6 cm, for use with Trocar 58717 X

58702 S  **Palpation Hook**, graduated, diameter 1.5 mm, length of hook 1 mm, working length 7.5 cm, for use with Trocar 58702 X

58702 M  **Sickle Knife**, straight, diameter 1.5 mm, blade 7.5 mm, working length 7.5 cm, for use with Trocar 58702 X

58702 N  **Sickle Knife**, straight, diameter 1.5 mm, blade 6 mm, working length 7.5 cm, for use with Trocar 58702 X
58702 EO  **Scissors**, single action jaws, upbiting, diameter 2.1 mm, working length 10 cm, for use with Trocar 58702 X

58702 EK  **Scissors**, single action jaws, downbiting, diameter 2.1 mm, working length 10 cm, for use with Trocar 58702 X

58702 DH  **Forceps**, single action jaws, through-cutting, diameter 2.1 mm, working length 10 cm, for use with Trocar 58702 X

58702 U  **Grasping Forceps**, single action jaws, diameter 2.1 mm, working length 10 cm, for use with Trocar 58702 X
58702 W  **Changing Rod**, double-ended pointed/blunt, diameter 2 mm, length 15 cm, for High Flow Arthroscope Sheath 58703 BH/CH and Trocar 58702 X

58702 HFS  **Bipolar Button Probe**, flexible, diameter 2 mm, working length 15 cm, for use with Handle 58702 HFH and Trocar 58702 X

58702 HFH  **Handle**, for Bipolar Button Probe 58702 HFS, for use with Trocar 58702 X
IMAGE1 S™ Camera System

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

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

* Also available in the following languages: DE, ES, FR, IT, PT, RU
IMAGE1 S™ Camera Head

TH 100

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

KARL STORZ Monitors

9826 NB

26" FULL HD Monitor, color systems PAL/NTSC, max. screen resolution 1920 x 1080, image format 16:9, video inputs: DVI, 3G-SDI, VGA, S-Video, Composite, video outputs: DVI, 3G-SDI, Composite, power supply 100-240 VAC, 50/60 Hz, 5 V DC output (1 A), wall mount with VESA 100 adaptor including:

- **External 24 VDC Power Supply**
- **Mains Cord**

9627 NB

27" FULL HD Monitor, color systems PAL/NTSC, max. screen resolution 1920 x 1080, image format 16:9, Interface: RS 232, power supply 85-264 VAC, 50/60 Hz, wall mount with VESA 100 adaptor including:

- **External 24 VDC Power Supply**
- **Mains Cord**

Optional Accessories:

9826 SF

**Monitor Stand**, basic monitor stand, tiltable, rotation +/-30, disinfectable, color white, VESA 100 adaptor, for use with 26" FULL HD Monitor 9826 NB, 26" 3D Monitor 9826 NB-3D and other monitors

9626 SF

**Monitor Stand**, with integrated cable channel, for use with Monitors 9619 NB, 9626 NB, 9626 NB-2, 9627 NB, 9627 NB-2
Light Sources

201614-01-1  **Cold Light Fountain Power LED 175 SCB**, with integrated KARL STORZ-SCB, high-performance LED and one KARL STORZ light outlet, power supply 110-240 VAC, 50/60 Hz
including:
Mains Cord
SCB Connecting Cable

201612-01  **Cold Light Fountain LED NOVA 150**, high-performance LED and one KARL STORZ light outlet, power supply 100-240 VAC, 50/60 Hz
including:
Mains Cord
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, 32 GB
SD Card, 32 GB
Mains Cord, length 300 cm

Accessories

20212030  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® II –
Economic solution for the private practice

20290301  **C-HUB® II Camera Control Unit**, for use with C-CAM® Camera Head

20290132, Electronic Module 8402 X, C-MAC® Connecting Cabble 8403 X or compatible KARL STORZ CMOS video endoscopes, Interfaces: USB 2.0, S-Video output (NTSC), HDMI output, power socket including:

- C-HUB® Power Supply
- S-Video (Y/C) Connecting Cable
- USB Connecting Cable
- Video Editor

20290132  **C-CAM® Camera Head, 8-pin**, one-chip CMOS camera head, resolution 640 x 480, focal length \( f = 20 \) mm, compatible 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, boost mode for temporary increase in brightness, burning time > 120 min, 110 lm / > 150 klx, weight approx. 150 g ready for use, suitable for wipe disinfection
It is recommended to check the suitability of the product for the intended procedure prior to use.