

joimax<sup>®</sup>



## PATIENT INFORMATION

### **Back on your feet quickly with the very best treatment**

Minimally invasive endoscopic procedure to treat a  
herniated disc, spinal stenosis, and facet joint syndrome

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### **Dear Patient,**

Your doctor has diagnosed you with a herniated disc, spinal stenosis, or facet joint syndrome. He has recommended a minimally invasive endoscopic operation as a possible form of treatment.

You are sure to have a lot of questions that you want be answered before deciding on your treatment. In this brochure you will find important information on your illness and the modern and particularly gentle, minimally invasive, microtherapeutic “keyhole procedures” TESSYS®, iLESSYS®, Multiuse RT, and CESSYS®.

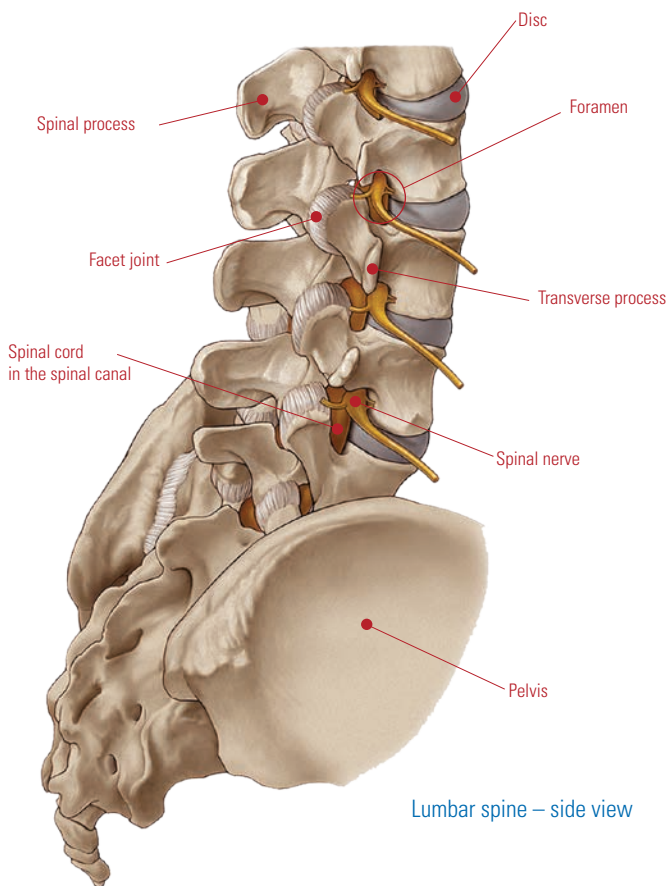
If you still have questions, please contact your doctor.

Your

**joimax® team**

#### **Important!**

All the information contained in this brochure is of a general nature and is not intended to replace a detailed informative discussion or an individual doctor's consultation.



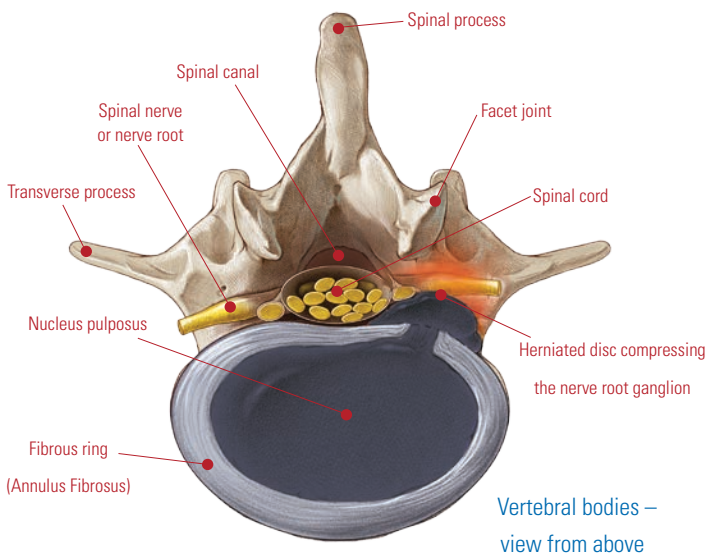
### What is a herniated disc?

Discs are shock absorbers for the spine. They feel soft and elastic. Externally they have a solid fibrous ring, called annulus fibrosus, while inside they are made up of a jelly or jelly-like, viscous mass – the nucleus pulposus.

The aging processes or overstraining can cause tears in the fibrous ring. Parts of the nucleus pulposus can then be pressed out through the fibrous ring and compress the spinal cord or a nerve root in the spinal canal. In these cases, doctors talk about a herniated disc or a prolapsed disc.

### How does a herniated disc occur?

Turning the body in a jerking motion or heavy lifting can trigger a herniated disc. It can also be the consequence of a poor sitting posture, minimal movement, or an unbalanced diet. Lack of fluid dries out the discs and they then lose their elasticity and height. Other causes may include obesity, pregnancy, or general weaknesses in the connective tissue.



### What does a herniated disc mean for me?

If tissue from the nucleus of the disc enters the spinal canal, it doesn't always lead to symptoms. Only if the surrounding nerves become trapped does it cause serious radiating pain, sensory disturbances or even signs of paralysis.

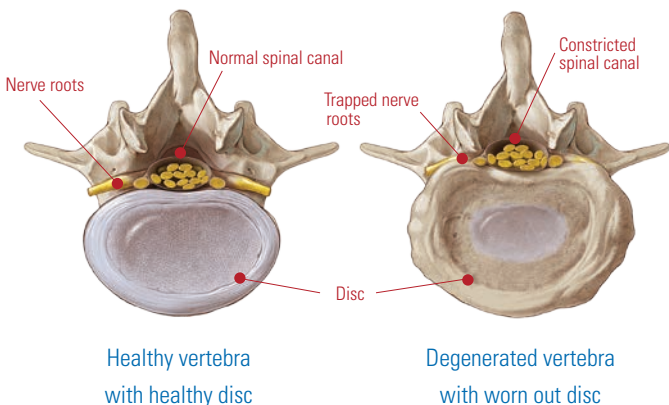
### What is spinal stenosis?

Spinal stenosis (stenosis = narrowing) involves a narrowing of the spinal canal which is located inside the spine. This structure made from surrounding muscles and bone ligaments structures protects the soft spinal cord and the nerve fibers which stretch into the arms, torso, and legs.

If the spinal canal is constricted, the nerves are compressed and this causes pain in arms and/or legs. As well as causing pain, the pressure on the nerves can also result in sensory disturbances (e.g. numbness, prickling) or a loss of strength in the arms and/or legs. The lumbar spine is the most frequently affected area of the spine.

### How does spinal stenosis occur?

It is generally a combination of several factors that causes spinal stenosis to express symptoms. The most common causes of a constricted spinal canal are wear on dorsal vertebrae after many years of strain and the aging of discs. This leads to growth of vertebral bone spurs, or osteophytes, which cause a narrowing of the spinal canal. However it is also possible to be born with spinal stenosis.



### What does spinal stenosis mean for me?

Symptomatic spinal stenosis generally means a considerable restriction to your quality of life. People affected often experience intense pain in their legs which is elevated when they stand and walk. Generally this pain goes hand in hand

with sensory disturbances and, in severe cases, even with loss of strength, which often considerably limits the ability to walk. Sitting tends to quickly relieve symptoms, as does a bent posture. Cycling is therefore often still possible, or activities where you can lean forward – for example mowing the lawn.

## TESSYS® & iLESSYS® – free from pain in three steps

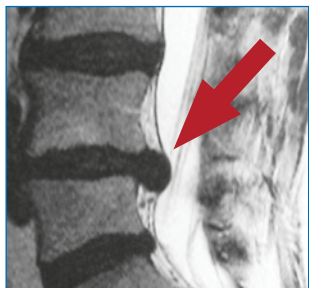
1. Creating access to the area affected – the “keyhole”
2. Completely removing tissue which is trapping the nerves in a controlled, endoscopic way
3. Checking whether the nerve has been freed, removing instruments, and closing up the wound

These are the basic steps for the TESSYS®/iLESSYS® procedures. The two procedures differ slightly in the way that they access the affected area.

The name of each procedure represents the access path. The T in TESSYS® stands for transforaminal, which means “through the foramen,” the foramen being the natural side opening for the nerve roots. The iL in iLESSYS® stands for interlaminar, which literally means “between the discs.” Here the opening to the spinal canal is created from the rear through the back muscles (coming from dorsal). In both cases “ESSYS” is the abbreviation for “endoscopic surgery system.”

Before the operation, your doctor will first examine you thoroughly, ask you about your pain level and arrange for an imaging diagnosis. Generally this will be with Magnetic Resonance Tomography (MRT) and sometimes also Computer Tomography (CT). One major benefit of the microtherapeutic, endoscopic

TESSYS®/iLESSYS® method is that, unlike other procedures, it can principally be carried out under local anesthetic and simultaneous analgosedation.

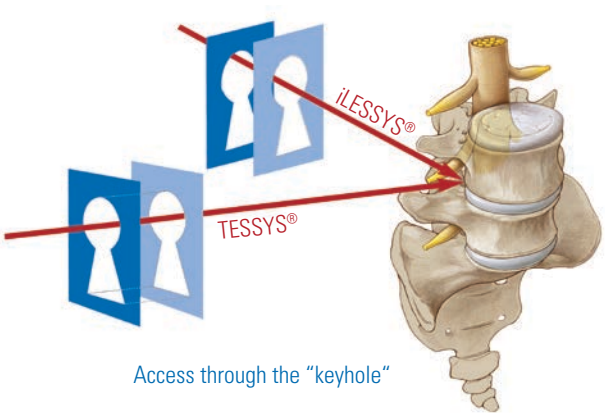


MRT lateral view (side): Herniated disc (arrow) in the lumbar spine at discs L4 – L5

In each case your selected spine specialist will discuss the suitable anesthetic procedure with you. A routine operation takes approx. 45 minutes.

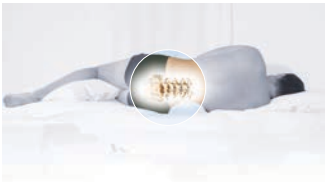
**1<sup>st</sup> Step – Access**

For TESSYS® and iLESSYS® procedures you will lie on your side or on your stomach during the operation. Your doctor will make a small incision, no more than a couple of millimeters, in the skin on your back and create a channel to the herniated disc. The “keyhole” is designed in such a way that damage to ligaments and vertebral bone structure is minimized. Muscle and surrounding tissue is not dissected through, instead it is carefully spread aside.

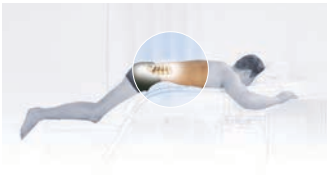


Access through the “keyhole”

With TESSYS®, a natural side opening – the intervertebral foramen – is used to access the spinal canal. In contrast, an opening on the back of the spine is created and used for the iLESSYS® procedure.



Patient on his side

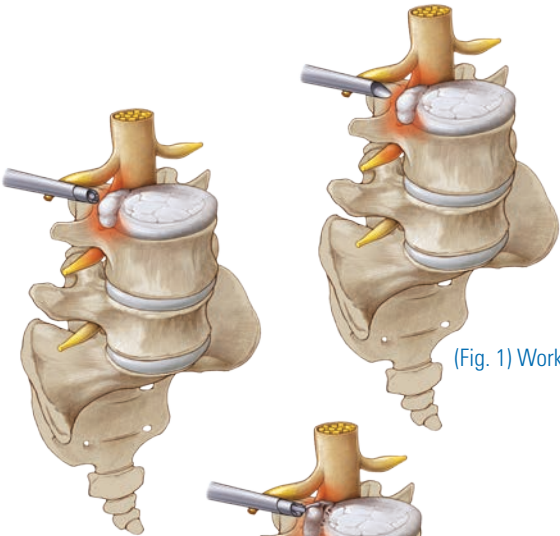


Patient on his front

## 2<sup>nd</sup> Step – The trapping tissue is removed

Through this created “keyhole” from the back to the affected area, the tissue that is compressing the nerve fibers can now be removed via a working tube (Fig. 1). It can be either the herniated disc material or the osteophytes of the vertebral bodies. Your doctor will then move a special endoscope into the operating area (Fig. 2). In addition to optical fibers, the endoscope contains a mini camera, giving the surgeon a fully illuminated, detailed view of all the structures in the spinal canal. Using very fine forceps and other special instruments, the surgeon gently removes just the excess tissue, often including bone spurs too (Fig. 3).

A radio-frequency probe is also often used to shrink and vaporize residual tissue.



(Fig. 1) Working tube

(Fig. 2) Working tube and endoscope

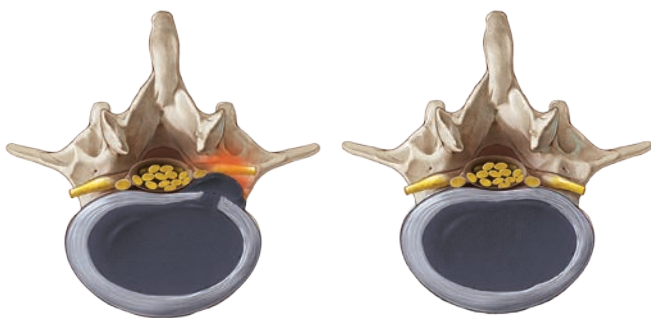


(Fig. 3) Working tube, endoscope, and gripping instrument

### 3<sup>rd</sup> Step – Testing and completion

Finally the surgeon checks whether the affected nerve fibers are free from the constricting material again. Then they remove all instruments and close up the micro opening with a stitch and an adhesive bandage.

Generally you will be pain free immediately after this microtherapeutic operation. After around two hours you will be able to stand and walk again. Your doctor will tell you how soon you can go home and get back to your day-to-day activities.



Disc before (left) and after (right) a TESSYS®/iLESSYS® operation

### Why choose TESSYS®/iLESSYS®?

TESSYS® and iLESSYS® are cutting edge, minimally invasive, endoscopic surgical procedures. They were developed in Germany and are used regularly in 40 countries around the world already. TESSYS® was introduced first in Germany in May 2004.

### The main benefits

- > The endoscopic access makes it possible to preserve all stabilizing structures – ligaments, muscles, and vertebrae
- > Because the operation is so gentle, normally only a light anesthetic is required
- > Patients can get back to their day-to-day activities considerably quicker



## Who in particular is **TESSYS®/iLESSYS®** suited for?

Almost all kinds of herniated discs and spinal canal constrictions can be treated using TESSYS® and iLESSYS® endoscopically therapy, even those that are difficult to operate on using other procedures.

TESSYS® is particularly suitable for patients who have already had previous surgery using another procedure. Even patients with limited cardiovascular function and overweight patients can be successfully operated on endoscopically.

## You can count on it!

- > Scientific studies confirm a success rate of over 93%\*
- > The renowned U.S. research clinic "Cleveland Clinic" certifies that endoscopic procedures resulted in a healing process that is several weeks to months faster than traditional procedures.

### Take a glance in the OR!

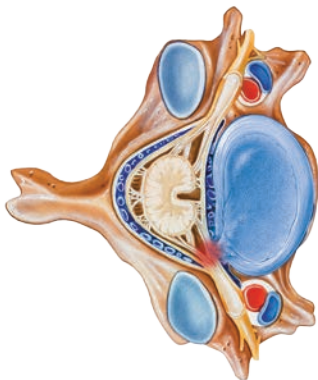
At the joimax® media library you can watch the complete TESSYS® operation either as a 3D animation or directly as a film recorded in the operating room.

[www.joimax.com](http://www.joimax.com)

\* See bibliography

## Herniated disc on the cervical spine

Herniated discs and spinal canal restrictions can also occur on the cervical spine, but this is much less common than on the lumbar spine. The causes and impacts are similar: pain radiates into the neck and arms, and loss of strength and numbness in the arms can also be signs of nerve constrictions.



Herniated disc on  
the cervical spine

As with the lumbar spine, conservative therapy is also the first choice of treatment with the cervical spine. Only when that fails and no improvements are recognizable the decision will be made to proceed with an operation.

### **CESSYS® – Free from pain in three steps**

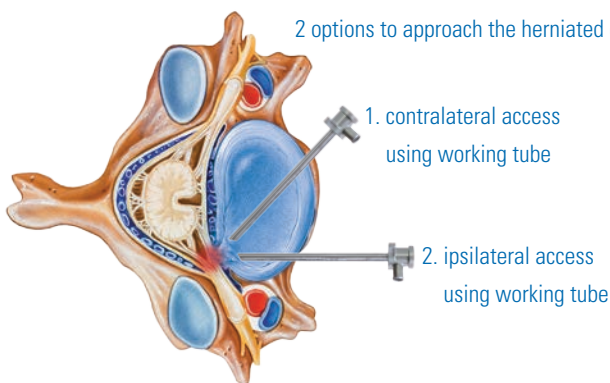
1. Creating access to the area affected – the “keyhole”
2. Completely removing tissue that is compressing the nerves in a controlled, endoscopic way
3. Checking whether the nerve has been freed, removing instruments, and closing up the wound

These are the basic steps for the CESSYS® procedure, just as for the methods described on the lumbar spine (see p7).

The C in CESSYS® stands for cervical, which basically means “affecting the cervical spinal cord”. Here too, “ESSYS” is the abbreviation for “Endoscopic Surgery System”.

## 1<sup>st</sup> Step – Access

As with most operations on the cervical spine, you will lie on your back for the CESSYS® procedure. Your doctor will make a small incision, no more than a couple of millimeters, in the skin on the front of your neck and create a channel to the herniated disc through the disc. The “keyhole” is designed in such a way that damage to the disc, ligaments, and vertebrae is minimized. Muscle and connective tissue is not cut through, instead it is carefully spread aside.



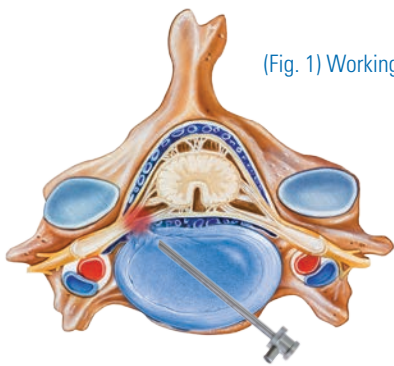
## 2<sup>nd</sup> Step – The compressing tissue is removed

Using the created “keyhole”, a working tube (Fig. 1, p14) can now be inserted into the operating area. Your doctor will then move a special endoscope through the working tube (Fig. 2, p14). In addition to optical fibers, the endoscope is also equipped with a mini camera, giving the surgeon a fully illuminated, detailed view of all the structures in the spinal canal. Using very fine forceps and other special instruments, the surgeon removes the tissue that is compressing the nerve fibers – either the herniated disc, osteophytes, or bone spurs of the vertebral bodies (Fig. 3, p14). A radio-frequency probe is also often used to shrink and vaporize residual tissue.

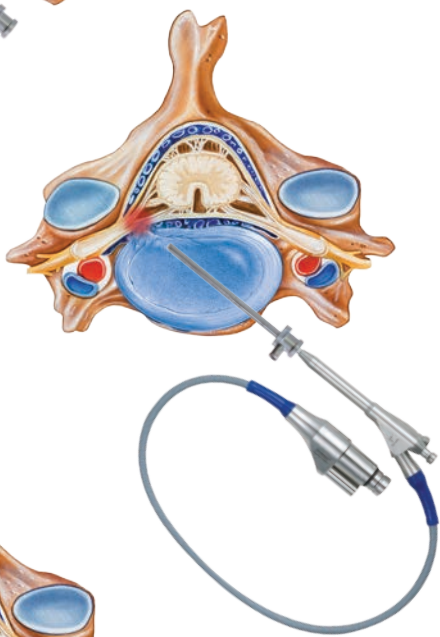
## 3<sup>rd</sup> Step – Testing and completion

Finally the surgeon checks whether the affected nerve fibers are free from the constricting material. Only then he removes all instruments and closes up the micro opening with a cutaneous suture and an adhesive bandage. Generally

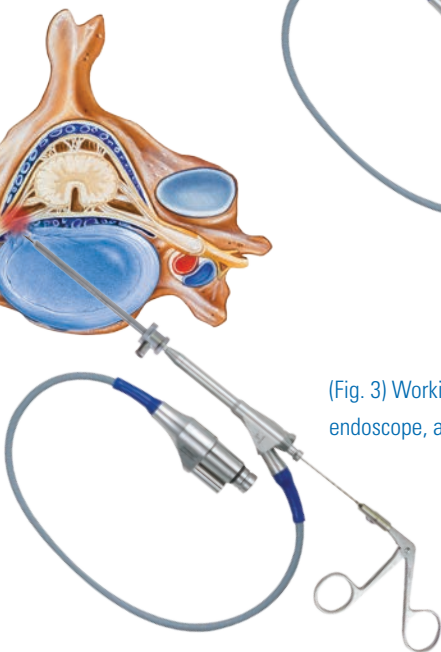
(Fig. 1) Working tube



(Fig. 2) Working tube and endoscope



(Fig. 3) Working tube, endoscope, and clamps



you will be pain free immediately after this endoscopic operation. After approximately two hours you will be able to stand and walk again. Your doctor will tell you how soon you can go home and get back to your day-to-day activity.

## Why choose CESSYS®?

CESSYS® is one of the most cutting-edge and minimally invasive endoscopic procedures in the world.

## The main benefits

- > The endoscopic access makes it possible to preserve all stabilizing structures for example ligaments, muscles, and vertebrae
- > Normally only a light anesthetic or analgesedation is required because the operation is very gentle
- > Patients can get back to their day-to-day activities considerably quicker

## Who in particular is CESSYS® applicable for?

Young people in particular benefit from CESSYS® microtherapy, as the disc can be retained in most cases, avoiding disc replacement or fusion with implants in the affected spine section.

### Take a glance in the OR!

At the joimax® media library you can watch the complete CESSYS® operation either as a 3D animation or directly as a film recorded in the operating room.

[www.joimax.com](http://www.joimax.com)

## What is facet joint syndrome?

Facet joint syndrome is a common cause of back pain that can often radiate into the legs or arms. Facet joint syndrome does not present a clearly defined clinical picture, and is one of the spinal diseases that is due to wear (in other words “degenerative”). It describes a pain syndrome that is generally caused by chronic irritation of what is known as the facet joints (vertebral joints). Facet joint syndrome is often linked with facet joint arthritis, which causes considerable pain in the back. People affected often complain of intense pain when straining or moving the spine.

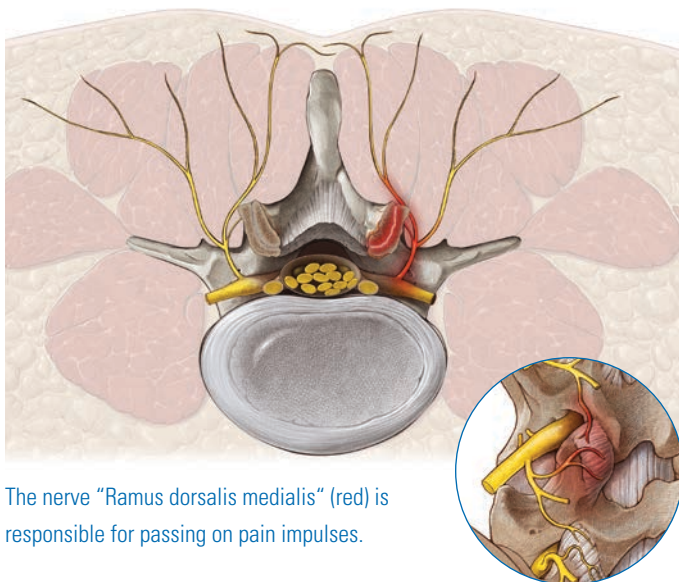
## What is a facet joint?

The facet joints or intervertebral joints are small joints that act as the connection between the articular processes of neighboring vertebrae and ensure the spine’s flexibility. They form a functional unit together with the discs and the ligaments of the spine. As we age and the discs shrink, the strain on these joints increases, which can lead to painful changes.

Like every joint in the human body, facet joints also have an articular capsule which ensures that the joint is supplied with nutrients and nerves, in addition to acting as the joint guide. An adjacent nerve known as “Ramus dorsalis medialis” is responsible for passing on pain impulses from the joint and the joint capsule. If the joint capsule is irritated or inflamed, the pains are transmitted via this nerve as back pains to the pain centers in the spinal marrow and to the brain. This is what is known as “facet joint syndrome”.

On top of wear and aging, the following factors can also cause painful facet joints:

- > Accident with whiplash
- > Overstressing and incorrect weight-bearing, for example through sport or heavy physical work
- > Obesity in combination with poor back musculature
- > General inactivity
- > Heredity within the family



The nerve “Ramus dorsalis medialis” (red) is responsible for passing on pain impulses.

### Who is affected?

Predominantly people over the age of 50 suffer from facet joint syndrome. Generally this clinical picture occurs in the lower lumbar spine, however it can also affect the vertebral joints (facets) in the cervical spine in the sacroiliac joint or, most rarely, the thoracic spine.

### How does facet joint syndrome occur?

The facet joints have to bear a certain proportion of the load on the spine, but are also heavily utilized during moving processes in particular, so when bending and turning. They are subject to the same wear processes as in other joints of the body, so that an osteoarthritis can develop. This is not necessarily caused by the natural aging process. The lower section of the spine has to bear the most weight, so that the vertebral bodies here are compressed onto each other and wear down faster.

### What are the symptoms of facet joint syndrome?

- > Dull pains in the area of the lumbar spine which vary strongly in intensity, the cause of which can be difficult to locate
- > Radiations into the buttocks, legs, or even the groin

- > Increasing pain when lifting or over the course of the day
- > The pain increases when the upper body is bent back and when the legs are lifted in a lying down position; lying down improves the pain
- > Tension in the neck or lower back muscles
- > In rare cases: sensory disturbances such as numbness, tingling, or stiffness

## How is it treated?

### Conservative treatment

With a conservative treatment, painkillers are administered and an individual strengthening program is created and rigorously followed. Strengthening and building up the muscles in the abdomen and back help to stabilize and relieve the strain on the entire spine.

### Physical pain therapy

This includes ultrasound treatment and therapies with low-frequency current. Should this therapy prove unsuccessful, modern minimally invasive procedures (e.g. the joimax® OP method Multiuse RT) can be used to treat the pain.

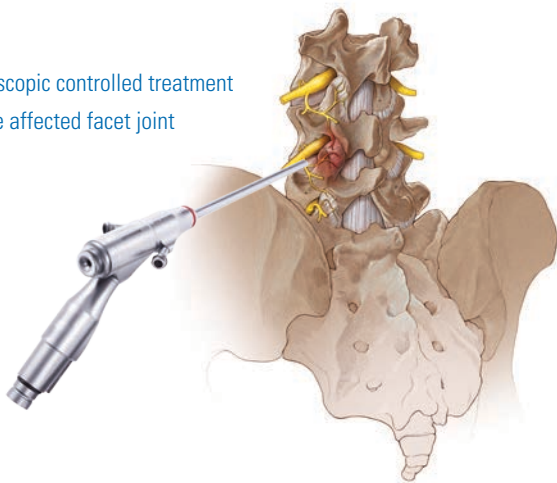
### Minimally invasive procedure

Here the pain-conducting nerve fibers are either washed with analgesic drugs or completely atrophied with radio frequency current. Since several joints are usually affected by these painful changes, treatment is also performed at multiple levels.



The radio-frequency treatment of the ramus dorsalis medialis under endoscopic control.

Endoscopic controlled treatment  
of the affected facet joint



### **Help through facet joint denervation and treatment of the Ramus dorsalis medialis**

“Denervation” means blocking the sensory nerve function. This ensures that the affected nerves can no longer transmit pain. During endoscopic facet denervation, an endoscope is inserted close to the facet joint or nerves through a small incision in the skin (“keyhole surgery”), and minimally invasive pain therapy is carried out under visual control. The “mini camera” on the endoscope provides your doctor with fully illuminated and detailed live pictures, directly from the location of the cause of pain. Using a radio-frequency probe, targeted nerve fibers that are responsible for pain generation are blocked.

### **Postoperatively**

Immediately after the surgery, patients generally feel a noticeable easing of the pain or are completely pain free. As the nerve fibers can grow back, it is sometimes necessary to carry out the treatment again months or years later. However, the minimally invasive endoscopic surgery is so gentle that it can be repeated without any preventive actions or measures.

## Publications of clinical studies on

### TESSYS® / iLESSYS® / CESSYS® / Multiuse RT

Jasper GP et al.: 2014: Clinical Benefits of Ultra-Minimally Invasive Spine Surgery in Awake Obese Patients in an Outpatient Setting: A Retrospective Evaluation of Transforaminal Endoscopic Discectomy with Foraminotomy. In: JSM Neurosurg and Spine 2(5): 1041.

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Brown G., Gibson A.: Early experience with cervical endoscopic spinal surgery (CESS): a potential adjunct to ACDF/disc arthroplasty; IN The Spine Journal p 50S-85S; DOI <http://dx.doi.org/10.1016/j.spinee.2014.12.105>

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Gibson JNA, Cowie JG, Ipreburg M.: 2012: Transforaminal endoscopic spinal surgery: The future „gold standard“ for discectomy? – A review. IN: The Surgeon. October 2012; 10(5):290–6.

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Fürstenberg C. et al.: 2010: Transforaminal endosc. discectomy (TESSYS®-technique) experience / learning curve. IN: International 28th course for percutaneous endoscopic spinal surgery and complementary minimal invasive techniques.

Alfen F.M. et al.: 2006: Developments in the Area of Endoscopic Spine Surgery. IN: European Musculoskeletal Review

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