

# SPONDYLODESIS



PATIENT INFORMATION



**PETER BREHM**  
Die Präzision in Titan  
für den Menschen

# Patient information

Dear patient,

this patient information brochure provides you with general information about spinal disorders and their treatment, including stabilization surgery to fuse segments of the spine.

The patient information brochure is intended to supplement your personal consultation with your doctor and to help you get answers to your questions.

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## 1. Anatomy of the spine

The spine consists of 7 cervical vertebrae, 12 thoracic vertebrae, and 5 lumbar vertebrae as well as the sacrum and coccyx (Fig. 1). The vertebral body forms the anterior portion of each vertebra; it is connected to the adjacent vertebrae by the intervertebral disks (Fig. 2).

The posterior portion of the vertebra consists of bony projections known as the transverse processes, articular processes, and spinous process. The articular processes form the small facet joints, which comprise the posterior connection between the vertebrae. The transverse and spinous processes enclose the spinal canal, which lies posterior to the vertebral bodies. This space contains the spinal cord, which gives off the spinal nerves that supply the muscles and skin.

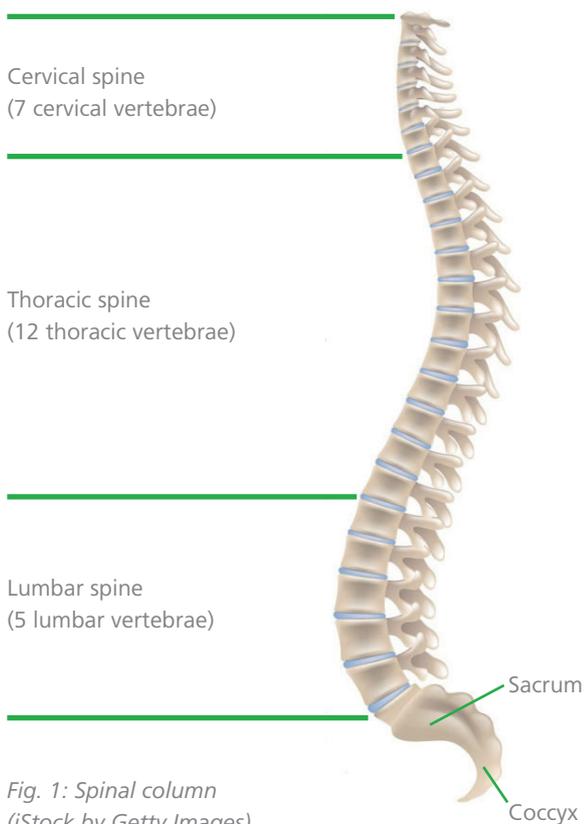


Fig. 1: Spinal column  
(iStock by Getty Images)

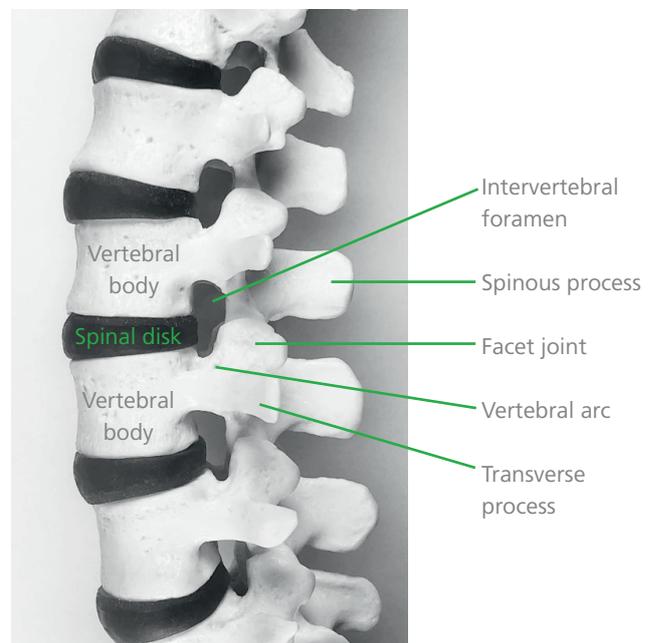


Fig. 2: Lumbar spine with details  
(PETER BREHM GmbH)

## 2. What symptoms occur in spinal disorders?

The most common spinal disorders occur as a result of the wear and tear (degeneration) associated with the natural aging process. This initially involves the intervertebral disks and later progresses to the vertebral bodies themselves.

This age-related wear and tear is usually the cause of chronic back pain. This pain can occur with exercise or even at rest. Some people with the disorder complain of a "sensation of breaking through."

Where the disorder leads to constriction of the spinal nerves or spinal cord (spinal stenosis), it can cause pain radiating into the legs (from the lumbar spine), the arms (cervical spine) as well as increasing pain while walking (spinal claudication) that can progress to paralysis and sensory deficits.

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### 3. What disorders can necessitate spinal fusion?

#### Disk prolapse

Our upright posture places particularly high loads on our intervertebral disks. In many cases this leads to development of degenerative disk disease in the spine.

Aside from a loss of height, this condition can lead to protrusion of the disk or prolapse of the disk in which disk material is extruded. Where this process impinges nerves, the patient feels pain radiating along the course of the affected nerve (for example the sciatic nerve).

Here, conservative pain therapy or specific injection therapy can often successfully alleviate symptoms. Particularly persistent pain and paralysis can be treated by partial removal of the intervertebral disk. Spinal fusion is not the preferred treatment for this clinical picture although it can become necessary where there is associated instability or complete removal of the disk planned.



#### Spinal degeneration (osteocondrosis)

The height of the intervertebral disks decreases as a result of degeneration, leading to instability that increases the stresses acting on the affected and adjacent segments of the spine.

This increased loading wears out the cartilage on the articular surfaces of the facet joints and osteoarthritis develops in this region (spondylarthritis).

This in turn leads to the development of bony outgrowths known as osteophytes with which the body attempts to compensate for the increased stresses. These osteophytes can also form on the vertebral bodies themselves.

The instability described here can also lead to a condition known as spondylolisthesis in which one or more vertebrae slide forward relative to the lower vertebra, which maintains its position (Fig. 3).

*Fig. 3: Spondylolisthesis with displacement of the 5th lumbar vertebral body  
(Courtesy of Y. Rommelspacher, MD, Hospital of the Augustinerinnen, Cologne, Germany)*

### 4. Are there any alternate treatment options?

Conservative measures such as physical therapy, injection treatments, or pain medications can alleviate pain but do not eliminate the underlying cause.

Where pain persists despite conservative therapy, stabilizing surgery is often an effective long-term solution for maintaining quality of life.

Where there are symptoms of rapidly progressive impairment of the nerves of spinal cord, such as paralysis or involuntary urination, prompt surgical intervention is recommended to prevent lasting damage.

## 5. The principle of stabilization

The spine is stabilized by connecting the adjacent vertebrae by means of a system of screws, connecting rods, and what are known as cages (spacers that replace intervertebral disks or entire vertebrae).

The required implants are usually made of titanium.

The screws are hollow (cannulated) and are inserted through the bony processes into the vertebral bodies from behind (two in each vertebra). The heads of the screws have a recess into which titanium rods that connect two adjacent vertebrae are inserted. The rods are then secured to the heads of the screws with nuts.

Cemented screws can be used where the bone is particularly soft. After being inserted, these screws are filled with cement that flows out through little windows in the body of the screw, providing an additional means of anchoring the screw in the bone.

Often the degenerative disks must be replaced with a spacer (cage), which is filled with bone.

Two smaller rectangular cages (PLIF) can be inserted between the vertebrae from behind, one single (Oblique) cage can be inserted diagonally from behind, or one large banana-shaped cage (TLIF) can be inserted from the side (Fig. 4).

The screws and rods stabilize the spine as well as immobilizing the segment until the bone in the spacers grows together with the vertebrae to create a continuous segment (bony fusion) (Fig. 5-9).

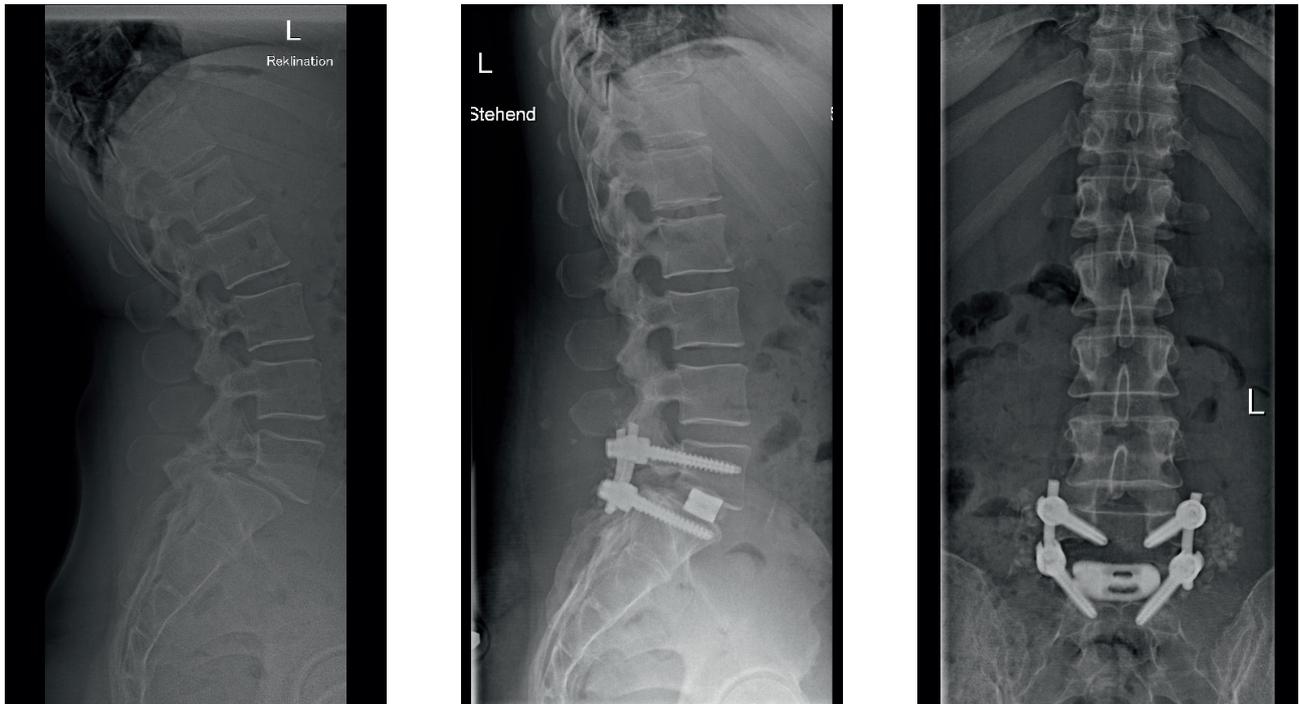


Fig. 4: Examples of different spacers (Cages, PETER BREHM GmbH)



Figs. 5 and 6: Stabilization of the lumbar spine with rod-screw system and cages (PETER BREHM GmbH)

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*Figs. 7, 8 and 9: X-rays of a patient with spondylolisthesis before and after surgery (Courtesy of Y. Rommelspacher, MD, Hospital of the Augustinerinnen, Cologne, Germany)*

Vertebral fractures or tumors can occasionally require the replacement of entire vertebrae. In this case, the affected vertebra is first stabilized from behind with screws; then in a second more complex intervention the vertebra is replaced from the side. Depending on the level of the affected vertebra, this may require opening the chest or abdominal cavity.

### 6. How does spinal stabilization surgery proceed?

The day before the operation you are admitted to the ward by the ward physician. You are informed about the operation and all your questions about the planned procedure are answered. If they are not already available, special radiographic images, a CT scan, or an MRI scan may have to be obtained for precise planning of the operation.

The operation is usually performed with the patient lying prone on special cushions. A skin incision is made on the back and the muscles are retracted to the side to expose the spine. Then the system of screws, connecting rods, and spacers (cages) is placed; this is often done with the aid of 3D navigation software to ensure the greatest possible precision.

If the spinal cord or spinal nerves are constricted, then they are decompressed.

If only stabilization with screws and connecting rods is indicated without placement of cages or decompression, then this can be done in a minimally invasive procedure through a small skin incision without exposing the spine.

The number of vertebrae to be connected together depends on the individual clinical picture; it also determines the duration of the procedure.

## 7. What are the risks of surgery?

As with any operation, impaired wound healing, bleeding, or infection may occur.

When constricted nerves are decompressed, they can be injured during the operation. In rare cases the implanted foreign material can lead to nerve irritation. Injury to the spinal cord occurs very rarely.

Should the vertebrae fail to fuse, the residual motion in the segment can cause the screws to loosen or even fracture, necessitating a second intervention.

Other factors that increase the risk of surgery include age, certain previous disorders (for example an increased risk of infection with diabetes), and other environmental factors (such as an increased risk of failed fusion in heavy smokers).

The particular risk of surgery must be discussed on an individual basis with the attending physician.

## 8. What must I bear in mind after the operation and how long will I be hospitalized?

Full weight bearing is normally permitted after stabilization surgery. However, for six weeks you should avoid sitting in low chairs as well as carrying and lifting more than 5 kg.

Patients get out of bed under the supervision of physical therapists on the day after surgery. The physical therapists will explain exercises and practices to you which you will then perform on your own and so help to speed your recovery.

The period of hospitalization is about 7-14 days in total.

An identification card is issued with every operation in which the patient receives an implant. This implant identification card (Fig. 10) includes personal data as well as the date of surgery, the operated segments of the spine, and the implants used. You can show this card at airport security checks with metal detectors. You should bring the identification card to every visit to a physician as it contains important information for the doctor.



Fig. 10: Example of an implant identification card (PETER BREHM GmbH)

## 9. Are there any restrictions in daily activities after stabilization surgery?

After the six weeks mentioned above you can gradually resume your usual daily activities.

Suitable sports include swimming, nordic walking, hiking, cross-country skiing, golf, and bicycling. Stresses from jumping and sudden impacts such as can occur in downhill skiing or ball sports (volleyball, football, basketball) tend to be bad for the spine.

*Text: With the kind support of Y. Rommelspacher, MD (Hospital of the Augustinerinnen, Cologne, Germany)*

## ! NOTE

The information about the products and/or procedures described in this brochure is of a general nature and does not represent the advice or recommendation of a physician. The information provided here does not in any way represent an opinion on the diagnosis or treatment of any specific medical case. The respective patient must be examined individually and advised accordingly. This brochure can neither completely nor partially substitute these measures.

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**PETER BREHM**  
Die Präzision in Titan  
für den Menschen

PETER BREHM GmbH  
Am Mühlberg 30  
91085 Weisendorf  
Germany

Telephone + 49 9135 71 03 - 0  
Facsimile + 49 9135 71 03 - 16  
info@peter-brehm.de

[www.peter-brehm.de](http://www.peter-brehm.de)

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