



# ADULT SCOLIOSIS

*Information About Adult Scoliosis, Symptoms, and Treatment Options*



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# ADULT SCOLIOSIS

## Patient Information

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This brochure will help you understand more about:

- Anatomy of the spine
- Information about scoliosis
- What to expect from surgery

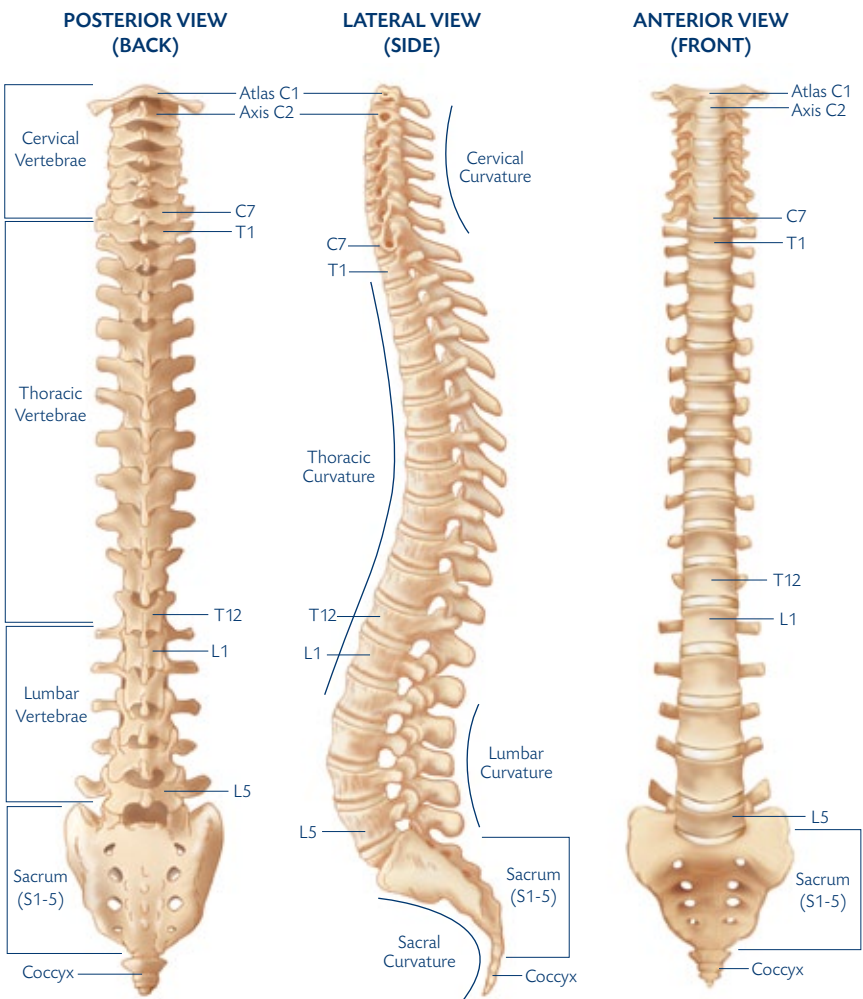
*The decision to receive medical treatment is individualized to the patient and the patient's symptoms. The information presented within this brochure may not apply to your condition, treatment or outcome, as surgical techniques vary and complications can occur. It is important to discuss the viability of treatment with your physician to decide which treatment option is right for you.*

*This brochure is intended to be an education resource only and is not meant to be a warranty or to replace a conversation between a patient and their physician or member of their health care team. Please consult your physician for a complete list of indications, precautions, clinical results and other important medical information that pertains to surgical treatment.*

# Anatomy of the Spine

The spine is one of the most important structures in the human body. It supports much of the body's weight and protects the spinal cord, which carries information from the brain to the rest of the body. The spine is strong yet flexible, allowing for a wide range of movements.

To understand scoliosis, you must first understand what a healthy spine looks like.



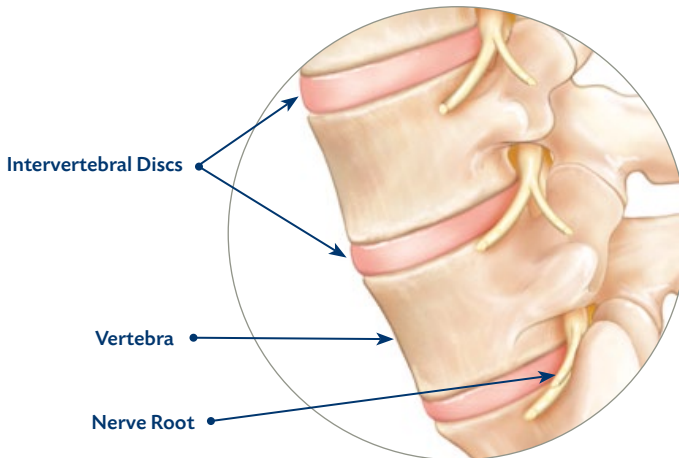
## Anatomy of the Spine

The spine is made up of vertebrae and is divided into four distinct regions:

- **Cervical Spine:** The cervical spine is your neck. It starts at the base of your skull and contains seven vertebrae.
- **Thoracic Spine:** The thoracic spine is your mid-back. It contains 12 vertebrae that connect to the ribs and sternum, making this portion very stable.
- **Lumbar Spine:** The lumbar spine is your lower back. It contains five vertebrae which are the largest and strongest, and carries most of your body weight.
- **Sacrum and Coccyx:** The sacrum consists of five fused vertebrae; the end of the spine is the coccyx, or the tailbone.

From behind, the healthy spine appears to be straight. However, when viewed from the side, the spine is naturally curved inward and outward which allows the spine to support more weight.

The vertebrae bear the weight of the upper body and provide points of attachment for muscles and ligaments. They also protect the spinal canal and provide exit points for spinal nerves. The individual vertebrae are separated by intervertebral discs, which act as cushions or shock absorbers between the vertebral bodies.



## What is Adult Scoliosis?

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Scoliosis is a sideways curvature of the spine. When the spine is viewed from the back, it appears to be straight. However, patients with scoliosis have curves that look like a “C” (one curve) or an “S” (two curves) when viewed on an x-ray.

Approximately six million people in the US are diagnosed with scoliosis.<sup>1</sup> Although scoliosis can occur at any age, it most frequently develops in children between 10 and 18 years old. Scoliosis that occurs or is diagnosed in adulthood is an entirely different condition, since the causes of scoliosis and the treatment goals are different.

The prevalence of adult scoliosis in the general population ranges from 2% to 32%, and can be as high as 68.6% in the elderly.<sup>2</sup> Because medical advances continue to extend life expectancy, the impact of adult scoliosis will continue to increase.<sup>2</sup>



## What are the Causes of Adult Scoliosis?

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There are many different causes of scoliosis in adults. The most common causes include:

### Adolescent Scoliosis of the Adult (ASA)

Scoliosis that was present during adolescence and then worsened during adulthood. This type of scoliosis is often idiopathic and is known as adolescent scoliosis of the adult (ASA).



### De Novo Degeneration Scoliosis (DDS)

Scoliosis that began in adulthood due to degenerative changes in the spine, causing a deformity to develop. This type of scoliosis is known as *de novo* degeneration scoliosis (DDS).



## What are the Symptoms of Adult Scoliosis?

Unlike adolescents with scoliosis who rarely complain of pain, adult patients with scoliosis present with a variety of symptoms including:

### Low back pain and stiffness



### Numbness, weakness, and cramping

due to pinched spinal nerves. These symptoms are caused by degeneration of the discs and joints leading to narrowing of openings in the spine (spinal stenosis).



**Loss of sagittal balance** which causes the patient to compensate by bending their hips and knees to try and maintain balance, which can cause muscle fatigue.





## How is Scoliosis Diagnosed?

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The diagnosis typically begins with a complete history followed by a thorough physical and neurologic examination. A healthcare professional will examine the spine and look for any signs of scoliosis.

X-rays may be taken in order to evaluate any tilt or rotation of the vertebrae causing a curvature. X-rays allow the doctor to confirm the diagnosis, monitor the degree and severity of the curve, and to assess the patient's skeletal maturity.



Posterior view  
(back)



Lateral view  
(side)

## General Treatment Options

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In most cases of adult scoliosis, non-operative treatment is preferred. This can include periodic observation, over-the-counter pain relievers and exercise.

Surgical treatment is reserved for patients who have failed all conservative (non-operative) management. The indications for surgery may be based on the following criteria:<sup>3</sup>

- **Back pain that has failed conservative treatment**
- **Progressive leg pain or neurologic deficit**
- **Muscle fatigue secondary to spinal imbalance**
- **Curve progression**
- **Progressive pulmonary compromise secondary to deformity**
- **Severe deformity**

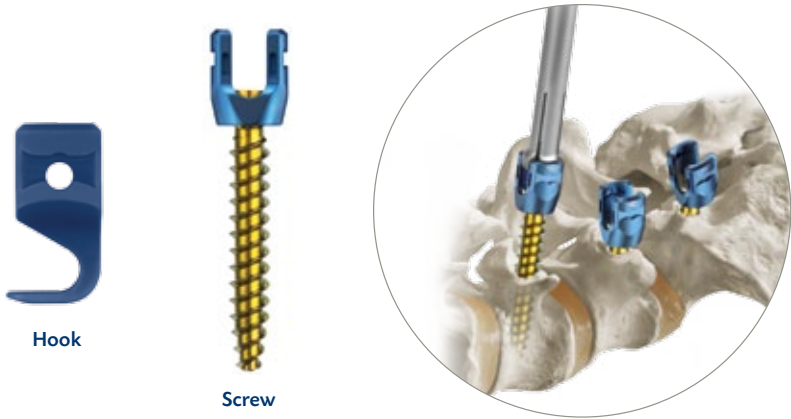
The goals of surgery are to restore spinal balance, reduce pain and discomfort, and maintain corrected alignment by fusing and stabilizing the spinal segments.



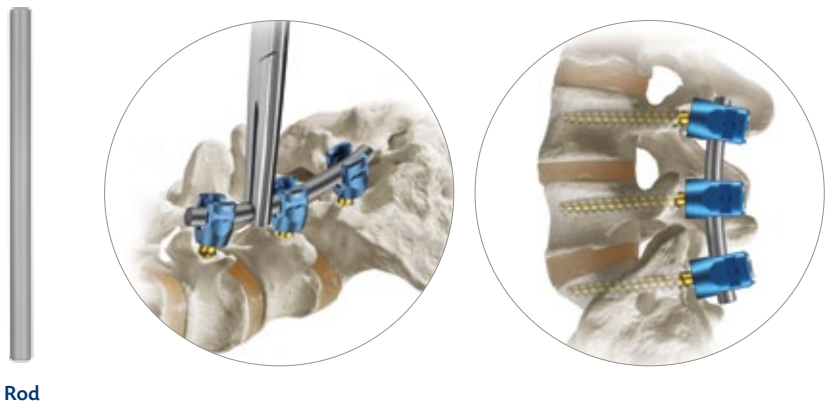
# Surgical Treatment

## How is the Procedure Performed?

To help stabilize the spine, screws are placed on each side of the vertebrae in the part of the bone called the pedicle. Hooks may also be used in conjunction with screws, and are placed around the pedicle or around the part of the bone called the lamina.



Rods are then placed and secured in the screw heads, connecting adjacent vertebrae. The rods are shaped to match the desired corrected curvature of the spine and are attached to the screws and/or hooks.



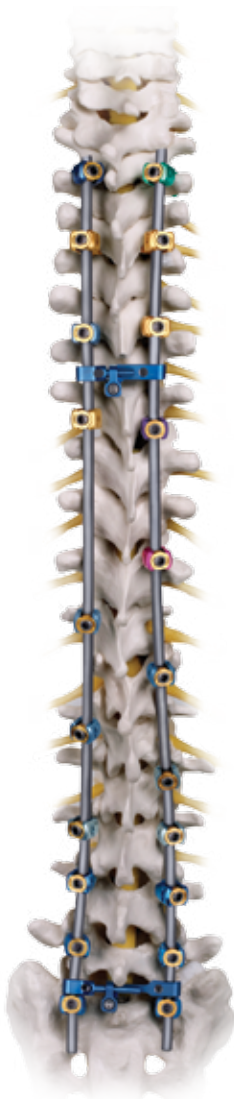
## Surgical Treatment (cont'd)

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### How is the Procedure Performed? (cont'd)

Bone graft material is placed around the final assembly and as the spine heals, spinal fusion is accomplished by bone growth between the vertebrae. This bone growth permanently fixes the spine in the desired position.

The implants hold the spine in the corrected position while the spine fuses.





## Surgical Treatment (cont'd)

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### **What Should I Expect with my Recovery?**

Surgical treatment for scoliosis may help you return to normal activities. Many patients are in the hospital for 1-2 weeks; and may return to activities as soon as 3 months after surgery, or up to 9 months following the procedure. Recovery time varies between patients.

It is the surgeon's goal for the patient to eventually return to his/her preoperative activities. A positive attitude, reasonable expectations and compliance with your doctor's post-surgical instructions may all contribute to a satisfactory outcome.

## Surgical Treatment (cont'd)

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### **Contraindications, Complications, Warnings, and Precautions**

You may be contraindicated for a device if you have an infection, a congenital abnormality, are obese, pregnant, mentally ill, diabetic, suffer from rheumatoid arthritis, osteoporosis, or cancer.

As with any surgical procedure, complications may occur following the placement of a device. These can include but are not limited to early or late implant bending, breakage, failure, loosening, movement/migration, bone fracture, and allergic reaction to implant material.

Other general complications associated with any spinal surgical procedure include non-union or delayed union, pseudarthrosis, pain, second surgery, bleeding, early or late infection, spinal cord and/or nerve damage, incisional complication, scar formation, blood vessel damage, cardiovascular system compromise, respiratory problems, complications due to bone grafting, reactions to anesthesia, impotence, sexual dysfunction, paralysis, and death.

*This list does not include all possible contraindications, complications, warnings, or precautions. Please consult with your surgeon for additional information on this topic and how it applies to your particular medical condition.*

## References

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1. National Scoliosis Foundation. Information and Support. Cited 28 Dec 2011. Available online at: <http://www.scoliosis.org/info.php>.
2. Smith, Justin S., et al. *Risk-Benefit Assessment of Surgery for Adult Scoliosis*. Spine 2011; 36(10): 817-824.
3. Herkowitz, Harry N. et al. *The Lumbar Spine*. Philadelphia: Lippincott Williams and Wilkins, 2004.

## Scoliosis Resources

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### AMERICAN ACADEMY OF ORTHOPAEDIC SURGEONS (AAOS)

Address: 6300 North River Road  
Rosemont, IL 60018  
Phone: (847) 823-7186  
Website: [www.aaos.org](http://www.aaos.org)

### AMERICAN ASSOCIATION OF NEUROLOGICAL SURGEONS (AANS)

Address: 5550 Meadowbrook Drive  
Rolling Meadows, IL 60008  
Phone: (847) 378-0500  
Website: [www.aans.org](http://www.aans.org)

### AMERICAN PHYSICAL THERAPY ASSOCIATION (APTA)

Address: 1111 North Fairfax Street  
Alexandria, VA 22314  
Phone: (703) 684-2782  
Website: [www.apta.org](http://www.apta.org)

### INTERNATIONAL RESEARCH SOCIETY FOR SPINAL DEFORMITIES (IRSSD)

Address: The University of Liverpool  
Sherrington Building  
Ashton Street  
Liverpool L69 3GE UK  
Phone: 44 151 794 5502  
Website: [www.liv.ac.uk/HumanAnatomy/phd/irssd](http://www.liv.ac.uk/HumanAnatomy/phd/irssd)

### NATIONAL INSTITUTE OF ARTHRITIS AND MUSCULOSKELETAL AND SKIN DISEASES (NIAMS)

Address: 1 AMS Circle  
Bethesda, MD 20892  
Phone: (301) 495-4484  
Website: [www.niams.nih.gov](http://www.niams.nih.gov)

### NATIONAL SCOLIOSIS FOUNDATION (NSF)

Address: 5 Cabot Place  
Stoughton, MA 02072  
Phone: (800) 673-6922  
Website: [www.scoliosis.org](http://www.scoliosis.org)

### NORTH AMERICAN SPINE SOCIETY (NASS)

Address: 22 Calendar Court, 2nd Floor  
LaGrange, IL 60525  
Phone: (877) 774-6337  
Website: [www.spine.org](http://www.spine.org)

### SOCIETY ON SPINAL ORTHOPEDIC AND REHABILITATION TREATMENT (SOSORT)

E-mail: [kotwicki@amp.edu.pl](mailto:kotwicki@amp.edu.pl)  
Website: [www.sosort.org](http://www.sosort.org)

### SCOLIOSIS RESEARCH SOCIETY (SRS)

Address: 555 East Wells Street, Suite 1100  
Milwaukee, WI 53202  
Phone: (414) 289-9107  
Website: [www.srs.org](http://www.srs.org)

### THE SCOLIOSIS ASSOCIATION, INC.

Address: P.O. Box 811705  
Boca Raton, FL 33481  
Phone: (561) 994-4435  
Website: [www.scoliosis-assoc.org5](http://www.scoliosis-assoc.org5)



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