



# ADOLESCENT IDIOPATHIC SCOLIOSIS

INFORMATION ABOUT SCOLIOSIS, ITS SYMPTOMS, AND TREATMENT OPTIONS

# Adolescent Idiopathic Scoliosis

## Patient Information

This brochure will help you understand more about:

- ▶ **Anatomy of the spine**
- ▶ **Scoliosis, its symptoms, and treatment options**
- ▶ **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.



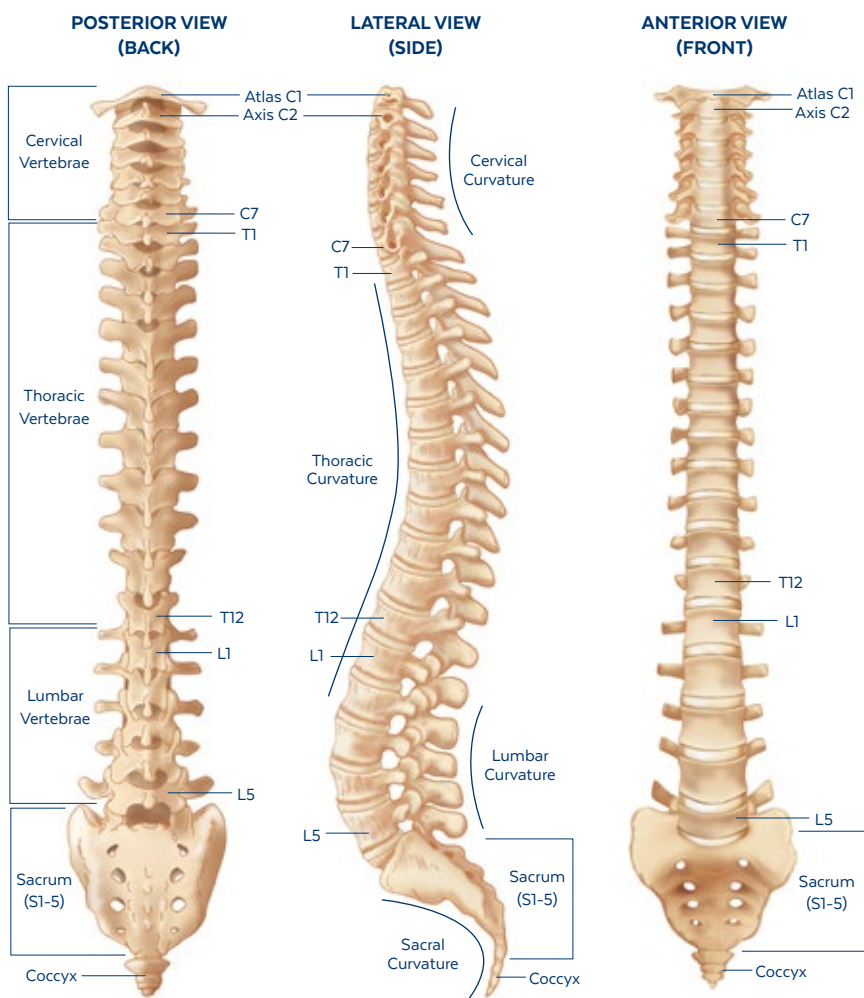
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# Anatomy of the Spine

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.

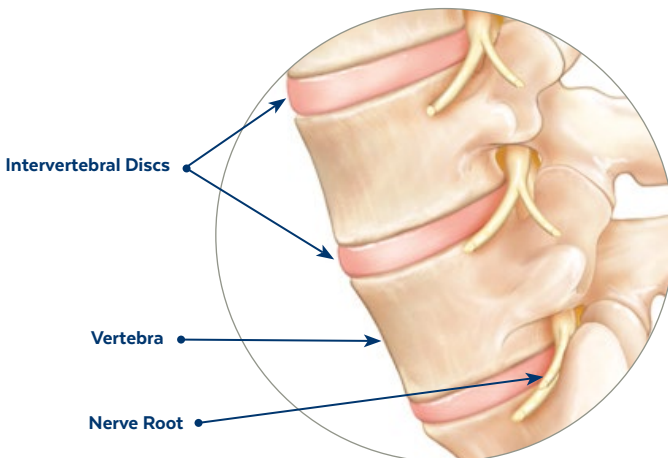


The spine is made up of vertebrae and is divided into four distinct regions:

- **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 5 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. Each individual vertebra is separated by intervertebral discs, which act as cushions or shock absorbers between the vertebral bodies.



## What is Scoliosis?

Approximately 2-3% of the population is diagnosed with scoliosis.<sup>1</sup> While scoliosis may occur at any age, Adolescent Idiopathic Scoliosis (AIS) is the most common type and typically occurs between the ages of 10 and 18 years old. The term “idiopathic” means the cause is unknown.

Scoliosis is a sideways curvature of the spine. When a healthy 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.

There is ongoing research into the potential causes of scoliosis including genetics, soft tissue disorders, and abnormalities in the central nervous system.

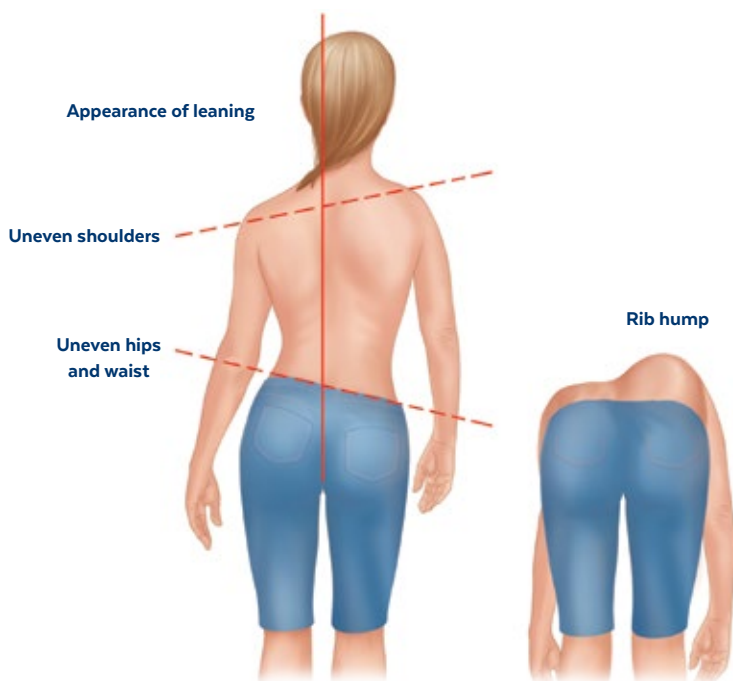


<sup>1</sup> National Scoliosis Foundation. Information and Support. Cited 28 Aug 2019. Available online at: <http://www.scoliosis.org/info.php>.

## What are the Symptoms of Scoliosis?

For many patients with Adolescent Idiopathic Scoliosis, it is a painless condition. However, there are several warning signs a healthcare professional uses to help determine if a patient has scoliosis. The most common signs of scoliosis include:

- Uneven shoulders and/or shoulder blades
- Uneven hips and waist
- Appearance of leaning
- Head is not centered over the body
- A “rib hump”, which is a hump on one side of the spine that is most noticeable when bending forward



## How is Scoliosis Diagnosed?

The diagnosis typically begins with a complete history followed by a thorough physical examination. A healthcare professional examines the spine and looks 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

Treating scoliosis must take into account the severity of the curve, the age and state of physical maturity, and the location of the curve. Treatment options range from observation, bracing and casting, to surgery.

## Observation

Observation is appropriate for mild size curves that have a low risk of progression when the patient is still growing, or for moderate size curves when growth is complete.<sup>2</sup> Your doctor will make recommendations regarding the need for X-rays and how often to be seen based on the progression of the curve.

## Bracing

Bracing is appropriate for moderate size curves in growing children to prevent further progression of the curve while growth of the spine remains. The goal of bracing is not to correct the curve, but to prevent further progression into more severe curves.<sup>2</sup> Your doctor will advise you on which brace is most effective in managing the curve. There are two types of bracing that are often recommended: the Wilmington Brace and the Boston Brace.



## Surgical Treatment

Surgical treatment is reserved for moderate to severe size curves. It may be recommended when the curve continues to progress and there is significant growth left in the spine, or brace treatment has failed. The goals of surgical treatment are to prevent curve progression and to obtain curve correction.<sup>2</sup>

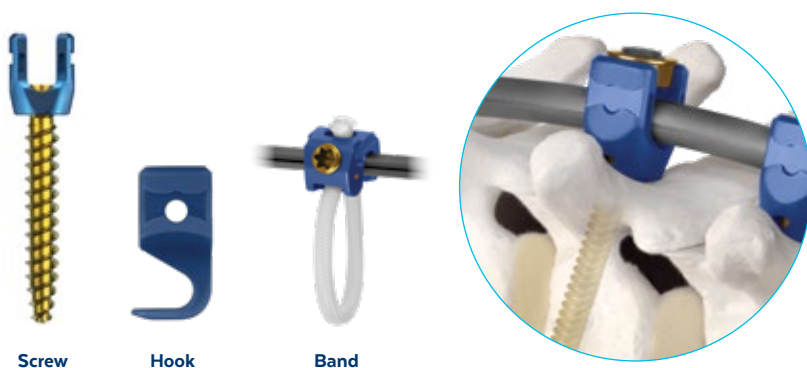
<sup>2</sup> Scoliosis Research Society 2019. Available online at: <http://www.srs.org>.

# Surgical Treatment

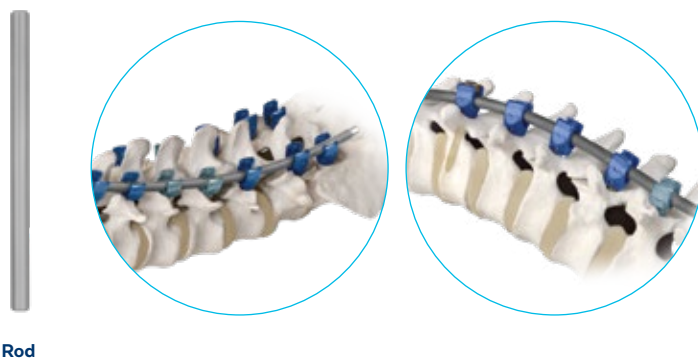
The most common surgical treatment for scoliosis is spinal fusion. In the procedure, implants such as screws, hooks, and polyester bands are attached to the spine in a corrected position until the vertebrae are fused.

## How is the Procedure Performed?

To help stabilize the spine in a posterior approach, screws are placed on each side of the vertebrae in the part of the bone called the pedicle. Hooks or polyester bands 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 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.



Bone graft material is placed around the final implant construct, 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)

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

Surgical treatment for scoliosis may help you return to normal activities. Although recovery time varies between patients, many are in the hospital for 1-2 weeks, out of school for 2-6 weeks, and may return to activities as soon as 2-6 months after surgery; or up to 9 months following the procedure.

It is the surgeon's goal for the patient to 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.

## 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, 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.*

# Scoliosis: Fast Facts

- Scoliosis is the most common deformity of the spine.<sup>1</sup>
- The condition causes the spine to abnormally curve sideways, into an “S” or “C” shape.<sup>1</sup>
- Scoliosis affects 2-3% of the population. In the U.S. an estimated seven million people of all ages have scoliosis.<sup>2</sup>
- The condition can affect people of any age, but the most common age of onset is between the ages of 10 and 18.<sup>2</sup>
- Adolescent idiopathic scoliosis affects approximately 8,000 patients in the U.S. each year.<sup>5</sup>
- In the U.S. an estimated 30,000 children are fitted into a brace for scoliosis each year.<sup>2</sup>
- Approximately 30% of adolescent idiopathic scoliosis (AIS) patients have a family history of scoliosis.<sup>1</sup>
- Although girls and boys are diagnosed with scoliosis in equal numbers, girls are eight times more likely to have a curve that progresses and requires treatment.<sup>2</sup>
- Common signs and symptoms include: uneven shoulders, ribs, hips or waist, one shoulder blade more prominent than the other, rib hump prominence, or one arm hanging lower than the other.<sup>1</sup>
- In 85 percent of cases, the cause of scoliosis is unknown; this is called idiopathic scoliosis.<sup>2</sup>
- In the U.S., fewer than half the states currently legislate school screening.<sup>4</sup> Medical societies recommend that females are screened at least twice at age 10 and 12 and males once at age 13 or 14.<sup>1</sup>

## Sources

1. Scoliosis Research Society 2019. Available online at: <http://www.srs.org>.
2. National Scoliosis Foundation. Information and support. Cited 4 Nov 2019. Available online at: <http://www.scoliosis.org/patient-support/>.
3. American Academy of Orthopaedic Surgeons. Available online at: <http://orthoinfo.aaos.org>.
4. Richards BS and Vitale MG. Screening for idiopathic scoliosis in adolescents: an information statement. *J Bone Joint Surg Am.* 2008; 90:195-198.
5. HCUPnet 2014. Available online at: <https://hcupnet.ahrq.gov>.

# Scoliosis Resources

## **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 ACADEMY OF PEDIATRICS (AAP)**

Address: 141 Northwest Point Boulevard  
Elk Grove Village, IL 60007  
Phone: (847) 434-4000  
Website: [www.aap.org](http://www.aap.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)

## **CURVY GIRLS SCOLIOSIS**

Website: [www.curvygirlsscoliosis.com](http://www.curvygirlsscoliosis.com)

## **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)

## **PEDIATRIC ORTHOPAEDIC SOCIETY OF NORTH AMERICA (POSNA)**

Address: 6300 North River Road, Suite 727  
Rosemont, IL 60018  
Phone: (847) 698-1692  
Website: [www.posna.org](http://www.posna.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.org](http://www.scoliosis-assoc.org)



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