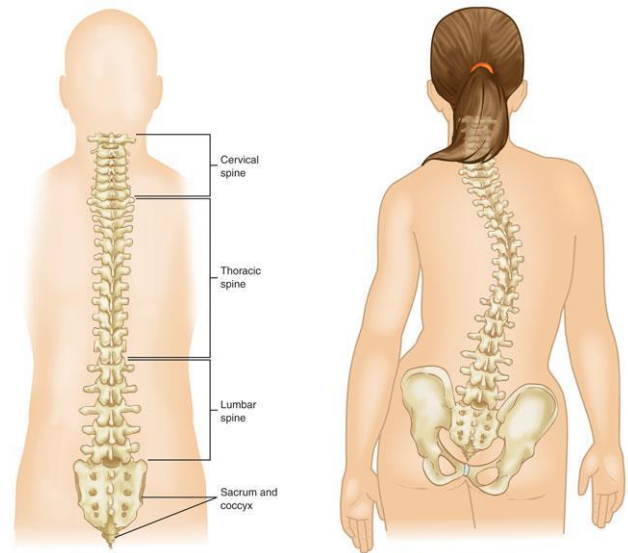


**Division of Orthopaedic Surgery**  
**Scoliosis**

The spine is made up of several bones called vertebrae, stacked one on top of the other. The spine provides the main support for your body, allowing you to stand, bend, and twist while protecting you from injury. When looking at a spine from the back it typically looks straight. When viewed from the side, a normal spine has a slight curve in the cervical (neck), thoracic (mid-back) and lumbar (low-back) areas. Scoliosis is a condition that creates an abnormal curving of the spine. With scoliosis, the spine is curved, and it is usually rotated or twisted. Early detection of scoliosis is important for successful diagnosis, treatment, and outcomes. Routine monitoring by a specialist is recommended.



**What causes scoliosis?**

A child may be born with scoliosis or they may develop it later in life. The most common type of scoliosis is idiopathic, which means we do not know the cause. It usually is found in teenagers. It is more common in girls than boys.

There are different types of scoliosis. Congenital scoliosis results from mis-shaped vertebrae during development. Neuromuscular scoliosis is caused by underlying conditions where patients do not have good control of their muscles and posture. Syndromic scoliosis is related to specific syndromes. Your doctor will explain which type you may have.

Research shows that 30% of children with scoliosis have a family history of scoliosis. There is nothing you or your child could have done to cause scoliosis. It is not caused by wearing a heavy backpack, poor posture, or sports activities.

**Signs and Symptoms:**

Scoliosis often goes unnoticed and does not cause symptoms. Parents sometimes may notice a slight difference in the shape of a child's back when they are bending over. Mild and moderate scoliosis is not painful.

Depending on the child's age and severity of the curvature, signs and symptoms can include:

- Uneven shoulder heights
- Head slightly tilted or off-center

- Uneven waist creases or hip height
- Difference in shoulder blade height or position
- When bending forward, the sides of the back or rib cage differ in height
- Asymmetric chest

### **Testing and Diagnosis:**

Your orthopaedic spine specialist will complete a physical examination of your child's spine as well as recommend imaging to look more closely at the spine and to measure the degree of curve.

Diagnostic tests may include:

- X-rays
- Magnetic Resonance Imaging (MRI)
- Computed Tomography Scan (CT)

### **What is the treatment of scoliosis?**

Treatment is dependent on your child's needs. When discussing treatment options, our spine specialists consider the severity and location of the curve, your child's age, amount of growth remaining and other medical conditions. Curves can get worse dependent on how old your child is and their remaining growth potential. Therefore, children are the most at risk during their growth spurt. Once children are done growing the risk of their curve worsening is decreased. For girls, growth typically stops 18-24 months after the start of their first menstrual period, usually around 14 years. For males they typically reach skeletal maturity around 16 years. The goal of all treatments is to try and stop the curve from getting worse.

### **Nonsurgical Interventions:**

#### *Routine Monitoring*

For children with curves under 25 degrees, your orthopaedic provider may suggest regular follow up appointments, x-rays, and spine exams. These may be done with your Primary Care Provider depending on degree of curvature.

#### *Bracing*

For children with curves 25 degrees or greater and with a lot of growth left, your orthopaedic provider may suggest a brace. A custom thoraco-lumbo-sacral-orthosis (TLSO) brace is a firm brace that pushes against the curve and is worn for approximately 16-20 hours a day until your child is done growing. Bracing has been shown to be about 75% effective in stopping the curve progression if the curve is flexible, the brace fits well, and the patient follows the schedule. The brace does not work well if the patient is done growing, does not wear the brace as they should, or the curve has already progressed too far. If bracing is successful, it may delay or prevent the need for spine surgery. Recent studies have proven that daytime bracing is more effective than nighttime bracing and that wearing the brace for more than 13 hours a day is more effective than wearing it for less.

#### *Other Treatments*

Various treatments may claim to be able to stop or reverse scoliosis. At this time, there is no scientific evidence to prove that physical therapy, chiropractic care, acupuncture, massage, Pilates, or yoga can improve or correct scoliosis. However, these methods may be of benefit for your child's overall health by improving back pain, increasing core strengthening and giving your child something to focus on that is within their control.

### Surgical Interventions:

Surgery is recommended for curves that are too large to brace or have worsened even with bracing. Surgical treatments for scoliosis include spinal fusion, growing rods, and fusionless spine surgery. Surgery is recommended for thoracic curves over 50 degrees and lumbar curves over 45 degrees, although some procedures may be recommended for younger patient with a smaller curve.

#### *Spinal Fusion*

After your child has stopped growing, spinal fusion surgery may be recommended to permanently fuse or stabilize the spine. During a spinal fusion surgery, metal rods are placed alongside of the spine and held into place with screws and bone graft is used on the spine to encourage new bone to grow and fuse the spine together into a solid block. Spinal fusion stops the curve progression and corrects the curvature approximately 50% or more.

#### *Growing Rods*

For young children with scoliosis, surgery to insert traditional growing rods or magnetically adjustable growing rods allows correction of the curve and continued growth of the spine. The rods are placed under the skin and attached to the spine or ribs above and below the curve. The growing rods help guide spinal growth and drive the spine straight. Every couple of months, the child returns to the operating room or the clinic to have the traditional growing rods lengthened to increase the growth and continue straightening the spine. Magnetic rods are lengthened in clinic.

#### *Fusionless Spine Surgery*

Vertebral Body Tether or VBT is a growth modulation procedure for scoliosis. It has the potential to treat scoliosis while maintaining a flexible spine. While the indications for VBT are evolving, it is well suited for a prepubescent patient with a moderate curve. VBT is a screw and cable system that when placed prior to growth acceleration on the convex side of the spine (which is growing more rapidly) has the capability of reducing the curve magnitude.

#### *Halo Gravity Traction*

Halo gravity traction is used to gradually straighten the spine prior to a spinal surgery for patients with severe scoliosis, kyphosis, and other spinal deformities. Severe curves can cause problems with the lungs by limiting the amount that the lungs can expand. Using halo gravity traction improves lung expansion and reduces the risk of damaging the nerves or soft tissues that surround and support the spine during surgery. It improves the safety and amount of correction of the next surgery, reduces pain medication usage, and decreases the days in the hospital after surgery. During traction, the halo (metal ring) is attached to the child's skull using pins. Weights are added to a pulley system to gradually lengthen the spine. Children will be in the hospital for 2-8 weeks in traction before returning to the operating room for the spine stabilizing surgery.

## **Follow Up Care:**

Regular follow up appointments to monitor your child's back are recommended as your child grows to make sure that the scoliosis is not worsening. During rapid growth periods, your child will be seen approximately every 4-6 months for a physical exam and x-ray. If your child is wearing a brace, they will also need follow up every 4-6 months to confirm the brace is fitting well and holding the curve. You will also work closely with an orthotist who will make the brace and adjust as needed. If your child has spine surgery, they will require frequent follow up during the post-surgery period to monitor healing. After a spinal fusion surgery, annual follow ups into adulthood are recommended.

## **Psychosocial Effects:**

Being diagnosed with scoliosis can be a life-changing event to a child or adolescent. For some patients with scoliosis, the emotional effects of treatment are as real or worse than the physical ones and can include low self-esteem, feeling excluded from peers, anxiety, and fear. Patients can have anxiety as they worry about their curve worsening. As scoliosis worsens, it can cause more noticeable changes and your child may become self-conscious about their appearance. Bracing or surgery can make the already difficult teenage years harder. Our team will help set realistic goals with you and your child and adapt treatment plans as necessary to promote the emotional well-being of your child. While scoliosis can cause stress, there are several ways to cope with these feelings. Please do not hesitate to discuss issues or concerns with our team. We want to partner with you to creatively devise a plan that provides balance and helps your child regain a sense of control. We have treated thousands of patients with scoliosis and can share coping mechanisms that have worked for others. We also have current and previous patients who have volunteered to speak to you or your child about their experiences living with scoliosis. If you are interested in speaking to a mentor, please let your orthopaedic provider know.

## **Outcomes:**

Scoliosis does not change who you are or what you can become. Patients who have scoliosis live happy, successful lives. We will follow your child until young adulthood and help you transition to an adult orthopaedist, if necessary. We look forward to partnering with you on your scoliosis journey: our spine team has your back.

## **Additional Resources**

Ortho Kids:

<https://orthokids.org/Condition/Scoliosis>

American Association of Orthopaedic Surgery:

<https://orthoinfo.aaos.org/en/diseases--conditions/introduction-to-scoliosis/>

The Scoliosis Research Society

<https://www.srs.org/patients-and-families/conditions-and-treatments/parents/scoliosis>

## **Contact Numbers:**

If you have a question or concern about your child, please call us:

- Weekdays (8-4:30pm): 510-428-3238 and ask to speak to your surgeon's nurse
- After 4:30pm or Weekend/Holiday: 510-428-3000 (main hospital number) and ask to speak to the orthopedic resident on-call