



Scoliosis

About idiopathic scoliosis and its treatment

This handout covers the most common type of scoliosis, adolescent idiopathic scoliosis. Other types of scoliosis may be treated differently.



Scoliosis

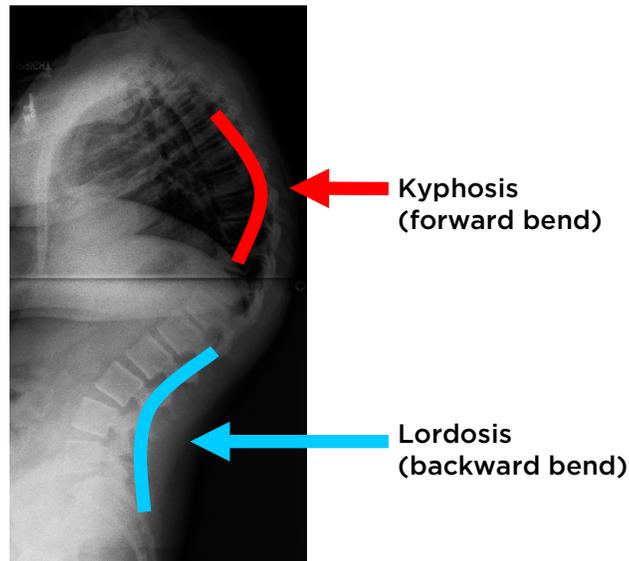
Scoliosis is a sideways curve of the spine. The spines of children with scoliosis curve to the side, like the shape of the letters S or C. On an X-ray, most children's spines look straight. A small curve to the side is common. Curves less than 10 degrees are not considered scoliosis and will not cause back problems unless they get worse.

What types of scoliosis are there?

- **Idiopathic:** There is no known problem with the bones, nerves or muscles in the spine causing the curve. This is the most common form of scoliosis in adolescents. Idiopathic scoliosis is less common in infants and young children.
- **Congenital:** Some bones that make up the spinal column (vertebrae) are shaped incorrectly from birth. During growth these can cause scoliosis.
- **Degenerative:** Caused by the wearing down of the discs and joints in the spine. Usually affects older adults.
- **Neuromuscular:** Caused by problems with the muscles or nervous system, such as cerebral palsy, muscular dystrophy, or spinal cord cysts (syrinx) or tumors.
- **Reactive or functional:** Sometimes children who have back pain will bend their backs to the side in response to the pain. It goes away when the pain stops. In some cases it is a sign of a significant spinal problem.
- **Scoliosis associated with other syndromes:** Some children with musculoskeletal syndromes like Marfan syndrome, neurofibromatosis, or Prader-Willi syndrome also have scoliosis.
- **Traumatic:** Caused by a fracture of the spine.

There are other normal curves in the spine which are seen on a side-view of the spine. Where the spine bends forward it is called kyphosis. Most people have 20 to 50 degrees of kyphosis between the bottom of the neck and rib cage (thoracic spine). There is also some normal backward bend (lordosis) in the neck (cervical spine) and lower back (lumbar spine). If you see exceptional forward or backward bend to your child's spine, it may be increased kyphosis or lordosis rather than scoliosis.

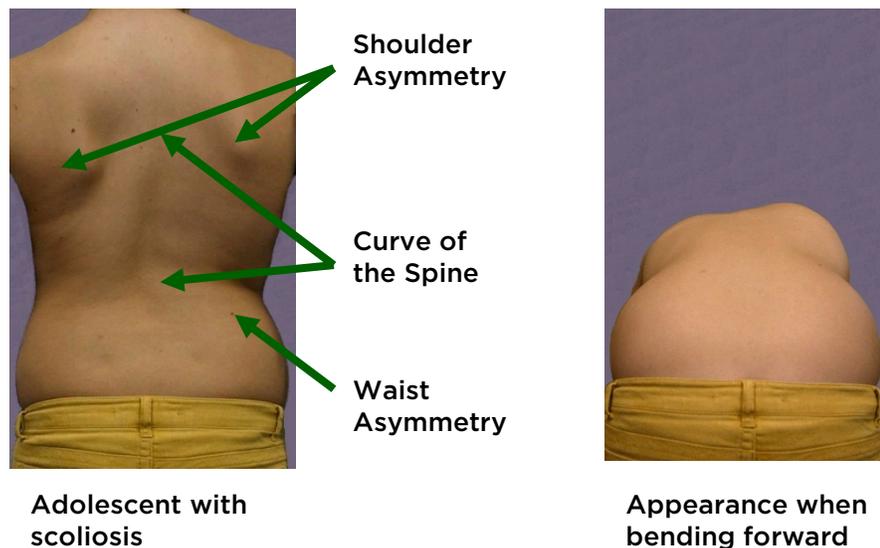
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The following information is about **idiopathic scoliosis**. Other forms of scoliosis may be treated and evaluated differently.

What are the signs and symptoms of scoliosis?

Until scoliosis is over 30 degrees it can be hard to detect when your child is standing. Because of the rotation of the spine and rib cage that usually occur with significant scoliosis, small curves are easier to see when bending forward. (See additional photos on page 3)



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Here are a few other signs of scoliosis:

- One shoulder is higher than the other. (A slight difference in shoulder height is common in people who do not have scoliosis.)
- The shoulder blade sticks out on one side of the back when standing up.
- Waist looks higher on one side. This is called waist asymmetry. It can lead some people, even some doctors, to think that the legs are different lengths when they are not. It may also make clothes fit awkwardly.
- The chest wall looks larger on one side than the other. Older girls may notice that one breast looks larger than the other.
- In some children, the entire trunk may shift to the right or left. They may look like they are leaning to one side.
- Many children have mild back pain. Scoliosis does not usually cause this pain, but some things that cause back pain may cause scoliosis.

Many of these physical changes are the signs that bring families to the doctor. Most families don't notice these signs until the scoliosis is over 30 degrees on an X-ray.

Why is scoliosis a concern?

- We are concerned about small curves in children because they can progress quickly during growth. When children have a larger curve and still have a lot of growth left, there is a good chance that the curve will get much bigger. If the curve is small, and there is not much growth left, the chance of the curve getting bigger is much less.
- Activity and breathing are not usually affected until curves are over 80 degrees on an X-ray.
- Severe scoliosis can also cause pain, arthritis or nerve irritation in mid- to late adult years. These symptoms do not usually occur in children.

How is scoliosis diagnosed?

Most scoliosis is diagnosed by a physical exam. It is most easily seen during a forward bend test.



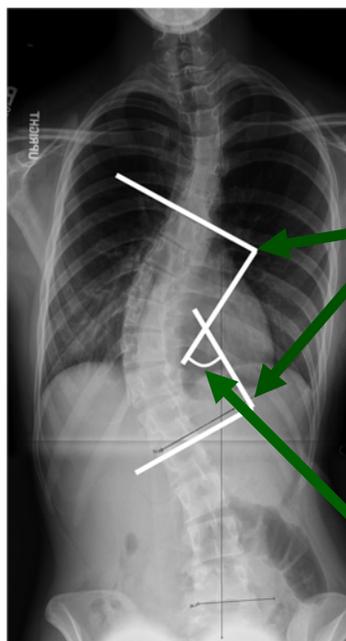
Standing



Forward bend test

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The measurement taken from an X-ray of your child's spine will determine the severity of their scoliosis. We use the Cobb Method to measure the amount of the sideways curve of the spine as seen on the X-ray.



Cobb Method

Line parallel to the most tilted vertebrae

Angle indicator: This is the "Cobb angle"

The Cobb Method is used to measure scoliosis. The endplate of the most tilted vertebrae is marked and a right angle line drawn. The angle created by the intersecting lines indicates the degree of the curve.

In order to diagnose and decide the best treatment plan for your child we may order the following tests: X-rays, Magnetic Resonance Imaging (MRI), Computed Tomographic Scans (CT Scan), Myelography or Bone Scan.

We will need an X-ray that includes the entire spine. It is best if the X-ray is taken while standing because gravity has a big impact on the degree of the curve. If your child cannot stand, the X-ray will be taken sitting or lying down.

At your first visit we usually take one X-ray from the back (PA) and one from the side (lateral). This helps us to assess the overall structure and alignment of the spine. It also allows us to make sure there are no bone defects causing the scoliosis. The risk of these tests to your child is lower than the risk of not monitoring the scoliosis.

In some cases the exam may show that the curve is not large enough to need an X-ray. If this is the case, a follow-up exam in 6 to 12 months may be needed.

What are the treatment options?

The goal of treatment for your child is to reach the end of their growth with a curve of less than 50 degrees. Curves less than 50 degrees at the end of growth do not usually require surgery.

The 3 most common treatment options recommended by a scoliosis specialist are observation, bracing and surgery.

Observation

Observation usually involves an exam and X-ray of the spine every 6 months. If your child is growing rapidly or the curve is getting worse it may be more often. Scoliosis is more likely to progress during periods of rapid growth, like just before puberty.

Keeping a record of your child's height can be helpful in determining the rate of growth. Once your child has stopped growing, monitoring will be done less frequently: yearly for 1 to 2 years, and then every 5 years or so.

Bracing

A brace is a common treatment for children with curves between 25 and 45 degrees who are still growing. Bracing is not used for children who have finished or nearly finished growing.

The brace is used to prevent the curve from getting worse. It will not make it go away. The most common brace is the custom-fit TLSO (thoraco-lumbo-sacral orthosis). This brace may also be called the Boston brace. There are many varieties of TLSO braces, however the Boston-type brace has the most objective, detailed and documented record of effectiveness.



TLSO Custom Brace

When children have curves of 25 to 45 degrees, the chances of the curve getting worse over time is hard to predict.

Wearing a brace can be hard for some children and adolescents. If bracing is an option for your child, discuss the pros and cons with your doctor.

What are other non-surgical treatment options?

Many people use physical therapy, chiropractic, electrical stimulation, massage, herbal therapy, acupuncture, rolfing, yoga or pilates for scoliosis. These treatments may be helpful for back pain, but we are uncertain if they are effective in preventing the progression of scoliosis. If you wish to use these methods on your own, we do not think that it will harm your child. It is important that you also have regular follow-up with your child's medical doctor.

To Learn More

- Orthopedics
206-987-2109
- Ask your child's
healthcare provider
- www.seattlechildrens.org

Free Interpreter Services

- In the hospital, ask your child's nurse.
- From outside the hospital, call the toll-free Family Interpreting Line 1-866-583-1527. Tell the interpreter the name or extension you need.

A scoliosis-specific, exercise-based physical therapy called Schroth therapy may be offered to you by your doctor. In some studies, when used together with a TLSO, Schroth may help decrease the progression of a curve. More studies are underway to determine how helpful this involved and time-intensive therapy is.

Diet, supplements and exercise

Children who have scoliosis may have a higher chance of developing weak bones (osteoporosis) later in life. We suggest that your child take 1500 mg a day of calcium. If your child does not get enough in their diet, then you should discuss with your doctor the option of adding a calcium supplement.

The following are foods rich in calcium. Five total serving portions combined from these foods provides the recommended daily intake.

Serving	Calcium Rich Foods
8 ounces	milk, yogurt, calcium-fortified orange juice, soy milk, rice milk
2 ounces	cheese
½ cup	leafy greens (spinach, kale, bok choy, collard greens)

Vitamin D3 has been shown to decrease the odds of idiopathic scoliosis curves worsening. Supplementation of 800 to 2000 iu/day should be considered. This is easily obtainable over the counter. The dosage should be discussed with your doctor as recommendations change from time to time. There is not strong evidence that other supplements are helpful. Check with your healthcare provider first before giving any type of medicine, vitamin or supplement to your child.

We also suggest that your child get regular weight-bearing exercise, like walking or running. Regular play and exercise are important for your child's health. It is also helpful in preventing back pain. Physical education classes are good for children with scoliosis.

When is surgery for scoliosis needed?

Surgery may be recommended if the curve becomes more than 50 degrees. In some cases, when a child has a lot of growth remaining, surgery may be recommended sooner (40 to 50 degrees). The goal of surgery is to prevent the scoliosis from getting worse and if possible to correct the deformity. Scoliosis surgery may also be called Spinal Instrumentation and Fusion. Another type of spine surgery, done in younger children, places metal rods into the back that have to be lengthened as they grow. These are not used for children who have only a few years of growth remaining.