Idiopathic Scoliosis in Children and Adolescents

Description

• Scoliosis is a sideways curvature of the spine that makes the spine look more like an "S" or "C" than a straight "I".
• Scoliosis can cause the bones of the spine to turn (rotate) so that one shoulder, scapula (shoulder blade), or hip appears higher than the other.
• The term "idiopathic" means that the cause of this disorder is not known (in most cases).

Understanding the spine can help you better understand scoliosis.

Left, Clinical photograph of an adolescent girl with right thoracic idiopathic scoliosis. Middle, Her rib prominence is most obvious when bending forward. Right, X-ray clearly demonstrates right thoracic scoliosis. Courtesy of Texas Scottish Rite Hospital for Children

Statistics

• Frequency of scoliosis:
  - Scoliosis curves measuring at least 10° occur in 1.5% to 3.0% of the population
  - Curves exceeding 20° occur in 0.3% to 0.5% of the population
  - Curves exceeding 30° occur in 0.2% to 0.3% of the population
• Small spinal curves occur with similar frequency in boys and girls, but girls are more likely to have a progressively larger scoliotic curve that will require treatment.
Cause
• In most cases of scoliosis, the exact cause is not known (idiopathic). However, scoliosis can occur in several people within a family. When it does, there is probably a genetic component to its cause.

Classification
• Scoliosis can occur at any age.
  Adolescent idiopathic scoliosis occurs after the age of 10 years. It is the most common type.
  Infantile scoliosis occurs in children less than 3 years old. It may result from abnormally shaped vertebrae at birth (congenital), various syndromes, neurologic disorders, or unknown reasons (idiopathic).
  Juvenile scoliosis occurs in children between the ages of 3 and 10 years. It is not common

Symptoms
• Scoliosis does not usually cause any pain, neurological dysfunction, or respiratory problems. The concern over the cosmetic appearance of the back often is the primary concern of the patient and parents.

Examination, Signs
• The doctor will ask your child to bend forward, which will show any deformities (see the image above). This is called the "Adam's forward bend test." He or she will also check for any limb-length discrepancies, abnormal neurological findings, or other potential causes.

Investigations, Tests
Many schools regularly conduct scoliosis screenings of students. These screenings usually occur during the middle school years. Your child may receive a referral for scoliosis to a doctor based on the results of a school screening.

Scoliosis is confirmed with an x-ray of the spine. Your doctor will measure the degree of the curve, as shown in the accompanying x-ray.
This x-ray of a patient's scoliosis measures 82° in the upper curve, and 75° in the lower curve. 

_Courtesy of Texas Scottish Rite Hospital for Children_

**Natural History**

If left untreated, curves exceeding 50° can lead to problems in the long term. Progressive deterioration of the scoliotic curve can occur, which in some patients can lead to diminished lung capacity and the development of restrictive lung disease. Cosmetic concerns are significant to many patients. The incidence of back pain among patients with scoliosis is similar to that of the general population.

**Treatment - Indications**

- The type of treatment required depends on the kind and degree of the curve, the child's age, and the number of remaining growth years until the child reaches skeletal maturity.

**Nonsurgical Treatment**

*Observation*

This option is appropriate when the curve is mild (less than 20°) or if the child is near skeletal maturity. However, the doctor will want to recheck the curve on a regular basis to see that it is not progressively getting worse. You may be asked to return every 3 to 6 months for re-examination. Most instances of scoliosis identified by school screening will fall into this category.

*Bracing*

The goal of bracing is to prevent scoliotic curves from getting worse. Bracing can be effective if the child is still growing and has a spinal curvature between 25° and 45°. There are several types of braces, most being the underarm type.
This underarm brace is intended to prevent a scoliotic curve from worsening to the point of needing surgery.  
*Courtesy of Texas Scottish Rite Hospital for Children*

Your orthopaedist will recommend a brace and tell you how long it should be worn each day. Wearing a brace does not affect participation in sporting activities. Time out of the brace is allowed for these activities.

**Surgical Treatment**

If the curve is more than 45° and the child is still growing, the doctor may recommend surgery. If the patient has reached skeletal maturity, surgery may still be recommended for scoliotic curves that exceed 50° to 55°.

**Procedure**

Before surgery, your child may be asked to donate blood (which will be used during the surgery, if needed).

An implant made up of rods, hooks, screws, and/or wires is used to straighten the spine (Figure C). Bone graft from the bone bank, or from the patient’s hip region, is also used to help the operated portion of the spine heal solid.

*This is an x-ray of the same patient shown in the x-ray above, but with the implant used to correct the scoliosis.*  
*Courtesy of Texas Scottish Rite Hospital for Children*
Following surgery, patients are usually walking by the second day without the need for a brace, are discharged from the hospital within 1 week, and can rapidly resume their daily activities.

**Long-Term Outcome Following Surgery**

Patients usually don't experience much pain once they have recovered from surgery. A return to most sporting activities is possible in 6 to 9 months after surgery. However, due to permanent limitation of some spine movement following surgery, participation in contact sports, such as football or rugby, is discouraged.

The spine fusion should not interfere with girls' future pregnancies or deliveries.