Learning About Scoliosis
This booklet will help you understand spinal deformities and how they are managed. You will also learn about non-surgical and surgical treatments for these conditions.

When reviewing this information, write down your questions and talk them over with your orthopedic surgeon and nurse practitioner. They will able to address your questions and help you understand your particular spinal abnormality and treatment.
What is the spine?
The spine, also called vertebral column, consists of vertebrae, discs, muscles and ligaments. The vertebrae are individual bones joined together by the muscles and ligaments and separated by soft, flat intervertebral discs to cushion each vertebra. Since the vertebrae are separate, the spine is flexible and can bend. The vertebrae are grouped and named according to the region they occupy: cervical refers to the neck, thoracic to the chest, lumbar and sacral to the lower back.

Curves in your spine
Just as two individuals are not exactly alike, neither are their spines. The normal spine varies in size and shape and has front-to-back curves. It is only when these curves become too large that they present a problem.

The region of the spine affected determines the name of the curve. When the backward curve in the upper spine is too great, the condition is called thoracic hyperkyphosis, round back, Scheurmann's disease or simply kyphosis. Viewed from the side, abnormal kyphosis causes a hump like appearance. When there is not enough backward curve in the upper spine, the condition is called hypokyphosis. When the inward curve in the lower back is too great, the condition is called hyperlordosis, swayback or lordosis. Although the spine does curve from front to back, it should not curve from side to side. This curve is called scoliosis and may take the shape of an “S” (double curve) or a long “C” (single curve). Many people with scoliosis also have hypokyphosis.

The scoliotic spine is also rotated or twisted, like the stripes on a barber pole. As the spine twists it pulls the ribs with it and this causes one side of the chest and the hip to be higher than the other. This will give the appearance that one of your shoulders is higher than the other and that your clothes hang unevenly at the waist.

What causes abnormal spine curves?
There are many causes of abnormal spinal curves. Some children are born with spinal defects that cause the spine to grow unevenly, a condition called congenital scoliosis or congenital kyphosis. Some medical conditions that can cause spinal deformities are nerve or muscle diseases like cerebral palsy, myelomeningocele, or muscular dystrophy.

Most commonly, the back just doesn’t grow as straight as it should. This is called “idiopathic” scoliosis. There is no known cause or prevention. Therefore, you could not have done anything to cause or prevent this from happening. Scoliosis affects about one in every ten people. It tends to run in families, and girls are eight times more likely to have it than boys. Many people have mild scoliosis, but are unaware of it and do not need treatment.
Management

Idiopathic scoliosis gradually develops, over time. The years before and during adolescence are a time of rapid growth and the curve can worsen. If it continues into adulthood it can cause cosmetic disfigurement, back pain and difficulty breathing.

Management is more successful early in life rather than after the curve has become severe in adulthood. Treatment options include the three Os: Observation, Orthotic (or Brace) and Operation or Surgery.

Observation

School screening programs and pediatricians assist in the early detection of abnormal spinal curves. Once detected, it is important to see an orthopedic doctor to have the curve monitored. You will have a physical exam and X-rays taken to help decide on the treatment plan. Finding curves early should prevent them from becoming problems as an adult.

Orthotic (Exercises and Braces)

The management of scoliosis depends on the location and degree (severity) of curvature. Small curves (less than 25 or 30 degrees), usually require no treatment, but must be watched carefully during growth. If your curve is greater than 25 or 30 degrees, or continues to increase while you are still growing, your doctor may recommend a bracing program. Bracing may help avoid surgery.

Your doctor and orthotist, a specialist who makes braces, design the scoliosis brace especially for you and your particular curve. A brace is made of firm plastic, fitted closely over the hips and worn under clothes. It holds the spine in a straighter position and tries to prevent the curve from increasing while you are growing. The orthotist will make adjustments to the brace as needed.

The brace will need to be worn until the end of spinal growth. Children can participate in all athletic activities with the brace. Usually there are other adolescents in school who wear braces, but since you can't see their brace you may not know it.

Operation (Surgery)

Some curves do not respond to bracing despite everyone's best efforts, and some are just too large, greater than 45-50 degrees, when first noticed. Surgery is usually recommended for these types of curves.

The goal is to partially straighten the curve with instrumentation, metal rods, hooks, wires and screws, and to keep the curve from progressing with a fusion. Fusion is achieved by placing small pieces of bone or bone chips along the part of the spine to be fused. The vertebral bones and bone chips grow together and become a solid mass of bone, preventing further curvature.

Most of the surgeries for idiopathic scoliosis require no brace or cast postoperatively. In congenital scoliosis or spondylolisthesis the posterior fusion is sometimes done without instrumentation, and a cast or brace is needed postoperatively.

The purpose of the brace or cast is to hold the spine in place until your fusion has a chance to heal. Once the fusion has healed, usually in 3 to 12 months, the abnormal section of the spine no longer curves. The rods, hooks, wires, and screws can be left in your back without causing any problems.
Glossary of Terms

Adolescent Scoliosis: Lateral spinal curvature that appears before the onset of puberty and before skeletal maturity. This is most common in females.

Bone Age: The age of a patient based on the degree of skeletal maturation. The most common method is comparing an X-ray of the left hand and wrist to the average appearance of the bones at different ages.

Brace: A semi-rigid plastic device which pushes on the muscles and ribs adjacent to the spinal column. The brace, also called an orthosis, is designed to lessen the abnormal spinal curvature when used prior to surgery and to stabilize the spine after surgery. Individual braces are customized to fit a particular individual's body shape and spinal curvature. Two common braces that are used are Boston and Milwaukee.

Compensatory Curve: In spinal curvature, a secondary curve located above or below the major curve that develops in order to maintain normal body alignment.

Congenital Scoliosis: Abnormal development of the spine such as, failure of vertebral formation and/or failure of segmentation.

Disc: The intervertebral disc is a strong, rubbery and gelatin-like structure which normally separates the individual vertebral bodies and allows movement between them.

Hemivertebra: A congenital anomaly of the spine caused by incomplete development of one side of a vertebra resulting in a wedge shape.

Idiopathic Scoliosis: A structural spinal curvature for which cause has not been established.

Inclinometer: An instrument used to measure the angle of a thoracic inclination or rib hump.

Infantile Scoliosis: A curvature of the spine that develops during the first three years of life.

Juvenile Scoliosis: Scoliosis developing between the ages of three and ten years.

Kyphosis: Curvature of the spine with the convexity pointing toward the back. Sometimes there is too much kyphosis in the thoracic spine, called hyperkyphosis, Scheurmann's kyphosis, or round back. When there is not enough kyphosis in the thoracic spine it is called thoracic hypokyphosis.

Lordosis: Curvature of the spine with the convexity toward the front. It is normal to have lordosis in the cervical (neck) and lumbar (waist area) portions of the spine. When there is too much lordosis it is called hyperlordosis.

Neuromuscular Scoliosis: A form of scoliosis caused by a neurologic disorder of the central nervous system or muscle.

Pedicle: Bony process projecting backward from the body of a vertebra, which connects with the lamina on either side.

Risser Sign: A radiographic sign using the iliac crest as an indicator of the degree of skeletal maturity. The iliac crest matures in predictable stages referred to as Risser stages. The stages give some indication of growth remaining in the spine.

Scoliometer: An instrument used to measure the angle of a thoracic inclination or rib hump.

Scoliosis: Lateral deviation of the normal vertical line of the spine measuring greater than ten degrees.

Skeletal Maturity: When the bones and spine are finished growing, skeletal maturity has been reached.

Spinal Column: The spinal cord travels through the spinal column and consists of nerves which carry and receive signals to and from the arms, legs and many internal organs.

Vertebra: Individual bones, which make up the spinal column. In humans there are usually 33 segments: 7 cervical, 12 thoracic and 5 lumbar.

Vertebral Body: The front portion of the individual vertebra.

Vertebral Column: The flexible supporting column composed of vertebrae separated by discs and bound together by ligaments.
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