Scoliosis

OVERVIEW

Scoliosis is a condition that causes the spine to curve to the side. While the cause of scoliosis is unknown, it usually runs in families and typically affects girls and young women more often and severely than boys and young men. Mild cases that do not cause pain or discomfort require no treatment. However, cases that are moderate to severe and with or without pain or discomfort require treatment which is determined on a case by case basis.

DESCRIPTION

When viewed on an x-ray from the front or rear, a normal spine appears to be straight but a spine affected by scoliosis appears to have an S- or C-shaped curve.

SYMPTOMS

Children with mild cases of scoliosis may not exhibit any symptoms. Moderate to severe scoliosis may cause parts of the torso and/or pelvic area to become uneven. For example, one shoulder may be higher than the other or the waist may be uneven.

CAUSE

The exact cause of scoliosis is unknown but given that the condition runs in families, the cause is most likely genetic.

- **Combination of Bars and Hemivertebra**
  In some cases, a spine may develop with an un-segmented bar on one side and a hemivertebra on the other resulting in an increased curvature of the spine.

- **Compensatory Curves**
  A spine with a scoliosis curve will sometimes develop other curves in the opposite direction above or below the affected area to compensate for and balance out the scoliosis curve.

- **Failure of Separation of Vertebrae**
  During development, the spine initially forms as a single tissue which later divides into segments that develop into the vertebrae. If the segments fail to separate it results in partial or complete fusion of two or more vertebrae. The un-segmented bar prevents the spine from growing straight and results in a spinal curve.

- **Hemivertebra**
  A section of a vertebra fails to develop typically resulting in a wedge shape. The wedge shaped hemivertebra creates a sharp angle in the spine which causes the spine to curve as the child grows.

- **Neuromuscular Issues**
  Disorders that affect the nerves and muscles (ex: cerebral palsy, muscular dystrophy, spinal bifida, etc) and cause muscle weakness, poor muscle control, or paralysis can result in or occur in association with scoliosis.

DIAGNOSIS METHODS

The first step in checking for scoliosis is taking a family history to see if other family members have had scoliosis. Next questions are asked to determine if the scoliosis causes pain, numbness, or tingling. Finally, the child is observed and physically examined. As a part of the exam, children may be made to perform the Adam's forward bend test where they are asked to stand and bend forward while the doctor observes the evenness / unevenness of the shoulders, shoulder blades, and rib cage. An MRI and / or x-ray may be requested if a noticeable amount of unevenness is noted.

The severity of the scoliosis curve is measured in degrees and based on the angle of the curve in the spine shown on X-rays.

- 20 degrees or less is a mild curve
- 20-40 degrees is a moderate curve
- 40 degrees or more is a severe curve

There is also a genetic test that utilizes the saliva of a young patient to determine if a mild to moderate case of scoliosis will progress further. While the test has limited use and application it is sometimes performed to aid in determining a treatment plan.

NON-SURGICAL TREATMENTS

External Bracing

Bracing has been used for generations to prevent mild to moderate cases of scoliosis from progressing. A brace is only effective in young patients with significant growth remaining. The amount of growth remaining can be determined by x-rays of the hands or the top of the pelvis. Once bracing begins, the brace often needs to be worn until growth is completed which is usually around age 14 in females and 16 in males.

- The Milwaukee Brace which comes over the neck or under the chin was widely used in the past but is now almost never used.
- The 23 hour custom made (Boston-like) scoliosis brace is very effective but must be worn for 18 hours or more and can be physically and psychologically challenging for patients.
- I often use other effective braces such as the Providence Brace which incorporates straps, are less bulky, and/or can be worn at night.

Exercise/ Physical Therapy

It is vitally important for individuals who have scoliosis and / or wear a brace to keep their core strong. While no one method of exercise or manipulation has been proven to help prevent the progression of scoliosis, I still recommend back exercises for my patients. Physical therapy regimens such as the Schroth method have been found to be effective in maintaining core strength and increasing comfort.

SURGICAL TREATMENTS

Spinal Fusion

This is the most common type of surgery for scoliosis. Rods and screws are attached to vertebrae to fuse the bones together helping to straighten the spine. This procedure is only utilized for severe

curves where all other treatment methods have failed. There is often no need for bracing after this surgery and patients may return to their activities in as little as one to two months.

Fusionless Surgery
Devices such as Vertical Expandable Prosthetic Titanium Rib (VEPTR) and growing rods are used to straighten the spine without fusing vertebrae. This surgery is less commonly performed and is usually utilized for very young patients with progressive scoliosis who have a great deal of growth remaining. There is currently a great deal of interest and research into these techniques as they would allow for the avoidance of fusion.

Thoracoplasty
A cosmetic procedure that involves the removal of a protruding rib and is at times combined with other procedures.

CONCLUSION

The treatment options for scoliosis are continuously evolving and constantly improving. The non-surgical and surgical methods used today are very different from what they used to be. Choosing the right intervention at the optimal time remains a crucial step in achieving the best possible outcome.