Adult Scoliosis

A Patient's Guide to Adult Scoliosis

Introduction

All spines have curves, but occasionally the spine twists and develops curves in the wrong direction - sideways. It is natural for the spine to curve forward and backward to a certain degree; this is what gives the spine its "S"-like shape. However, when a person's spine twists and develops an "S"-shaped side-to-side curve, it is a condition known as scoliosis.

A scoliosis curve can occur in a variety of areas throughout the spine. The abnormal curve can occur in the thoracic spine, the lumbar spine, or both areas at the same time. The curves can range in size from as minor as 10 degrees to severe cases of more than 100 degrees. The measurement of the degrees of curvature from the normal is a measure of how severe the scoliosis is. It also helps your surgeon decide what treatment to suggest. Usually, curves of less than 40 degrees will be treated without surgery (also known as conservative treatment), while curves over this amount might be recommended for surgery.

Generally, the only cases where surgery is considered are severe cases that lead to: continual physical pain, difficulty in breathing, significant disfigurement, or continued progression of the curve. Curves above 100 degrees are rare, but they can be life-threatening if the spine twists the body so much that the heart and lungs do not function properly.

The most common types of scoliosis are first discovered and treated in childhood or adolescence. Probably the most common type is what is called Idiopathic Adolescent Scoliosis (IAP). This type of scoliosis occurs in teenagers just at the growth spurt of puberty. Idiopathic adult scoliosis is generally treated with a brace, or in severe cases, surgery at the end of the teenager's growth spurt.

For more information on idiopathic adolescent scoliosis, you may wish to review the document, entitled:

- Adolescent Idiopathic Scoliosis

When scoliosis occurs (or is discovered) after puberty, the condition is called "adult scoliosis" to distinguish it from the curves caused during growth. Adult scoliosis can be the result of untreated or unrecognized childhood scoliosis, or it can actually arise during adulthood. The causes of scoliosis that begins in adulthood are usually very different from the childhood types.

The purpose of this information is to help you understand:

- The causes of adult scoliosis
- How a diagnosis is made
• Treatment for adult scoliosis
• Possible complications/problems from surgery

Anatomy

In order to understand your symptoms and treatment choices, you should start with some basic understanding of the anatomy of your spine. This includes becoming familiar with the various parts that make up the spine and how they work together.

Please review the document, entitled:

• Anatomy and Function of the Spine

Causes

Most cases of adult scoliosis are idiopathic, which means we do not know their cause. Sometimes adult scoliosis is the result of changes in the spine due to aging and degeneration of the spine.

There are several types of scoliosis in adults:

• Idiopathic Curve - This is the most common type. Usually there is no clear-cut reason why the spine is curved.

• Congenital Curve - The term "congenital" means that you were born with the problem. A congenital scoliosis is present at birth. Many different problems in growth and development can lead to spine problems. Fortunately, most of these are rare. Congenital scoliosis may not be recognized, or may not be severe enough to require treatment during childhood. The scoliosis may get worse later in life due to wear and tear around the abnormal area of the spine.

• Paralytic Curve - "Paralytic" means that muscles do not work. When muscles do not work around the spine, the spine itself may be thrown out of balance. Over several years, this can result in a curvature of the spine developing. This type of scoliosis is often caused by spinal cord injuries that lead to paralysis.

• Myopathic Deformity - "Myopathic" means muscle that does not work properly. Like paralytic curves described above, this curve results from a muscular or neuromuscular disease, such as muscular dystrophy, cerebral palsy, or polio.

• Secondary - Scoliosis developed in adulthood can be a "secondary" cause of another spinal condition that affects the vertebrae, such as degeneration, osteoporosis (loss of bone mass), or osteomalacia (softening of the bones). Scoliosis can also appear following spinal surgery. The surgery may cause an imbalance in the spine that leads to scoliosis.

To learn more about degenerative adult scoliosis, you may wish to review the document, entitled:
Degenerative Adult Scoliosis

Symptoms

Many patients with scoliosis visit a spine specialist because they notice a problem with how the back looks. Many cases of scoliosis are painless. Patients with scoliosis may notice some of the following things about their body:

- One shoulder or hip may be higher than the other
- One shoulder blade may be higher than the other and sticks out further
- These deformities are more noticeable when bending over
- A "rib hump" may occur when scoliosis causes the chest to twist; it causes a hump on the back as the ribs on one side stick out further when bending
- One arm hangs longer than the other because of a tilt in your upper body

As the condition progresses, back pain can develop. The deformity may cause pressure on nerves and possibly even the entire spinal cord. This can lead to weakness, numbness, and pain in the lower extremities. In severe cases, pressure on the spinal cord itself may cause loss of coordination in the muscles of the legs making it difficult to walk normally. Finally, if the chest is deformed due to the scoliosis, the lungs and heart may be affected leading to breathing problems, fatigue, and even heart failure. Fortunately, these severe symptoms are rarely the case.

Diagnosis

If scoliosis is suspected in an adult, a diagnosis must be made before an appropriate treatment plan can be developed.

History

In order to make a proper diagnosis and rule out other possible conditions, the first step is to take a history. The provider may ask about the following:

- Family History - Scoliosis tends to run in families, so it may have a genetic cause. Your provider will want to know if anyone else in your family has the problem.
- Date of Onset - When did you first notice the appearance of your spinal condition?
- Measured Curve Progression - If X-rays have been taken of your spine in the past, the doctor will want to see if the curve is getting worse. This can be measured comparing new X-rays with old ones, measuring the size of the rib hump, or measuring changes in your height.
- Presence or Absence of Pain - Not all cases of scoliosis produce pain. However, if there is pain, your doctor needs to know where it is, what brings on or intensifies the pain, and if there is any radicular pain - pain that radiates away from the spine itself. This usually comes from irritation of the nerves as they leave the spine.
• Bowel or Bladder Dysfunction - Are you having problems knowing when you have to urinate or have a bowel movement? This is extremely important because it could signal the presence of serious nerve damage.

• Motor Function - Has there been a change in how your muscles work? This may be the result of pressure on the nerves or spinal cord itself.

• Previous surgery - If you have had any surgery on your spine, it may have caused some degenerative scoliosis due to weakened muscles. In order to evaluate your condition properly, it is important that your physician knows about any spinal surgery you have had in the past.

**Physical Exam**

The spine specialist will then perform a physical examination. During the exam, the provider will try get an understanding of the curve in your back and how it is affecting you. This means first trying to get a "mental picture" of how the spine is curved from examining your back and watching you move about. The provider will measure the size of the rib hump deformity and the flexibility you have bending in certain directions. Finally, your nerves will be tested by: checking your sensation, your reflexes, and the strength of your muscles.

**Additional Tests**

Usually, after the examination, X-rays will be ordered that allow the provider to see the structure of the spine and measure the curve. During the X-rays, you will be asked to hold certain positions while standing or lying on a table. You will need to hold very still while pictures are taken of your spine. With scoliosis the following images may be taken:

• Front view - These are X-rays of the entire spine taken from the front.
• Lateral view - These are X-rays of the entire spine taken from the side.
• Lateral bend - These are X-rays taken while you are bending sideways.
• Traction films - Traction is when your spine is pulled and held in a particular position to take X-rays. These films are only occasionally taken.

Depending on the outcome of your history, physical examination, and initial X-rays, other tests may be ordered to look at specific aspects of the spine. The most common tests that are ordered are: the MRI scan - to look at the nerves and spinal cord; the CAT scan - to get a better picture of the vertebral bones; and special nerve tests - to determine if any nerves are being irritated or pinched.

To learn more about these tests, you may wish to review the document, entitled:

• **Diagnostic Tests for Spine Problems**
Treatment for Adult Scoliosis

Adult scoliosis has a variety of treatment options. Whenever possible, the first choice of treatment for adult scoliosis is always going to be conservative. Spinal surgery will always be the last choice of treatment due to the risks involved. Conservative treatment that is commonly recommended includes: medications, exercise, and certain types of braces to support the spine.

If osteoporosis is present, then treatment of the osteoporosis may slow the progression of the scoliosis as well. This can be accomplished in several ways. The current recommendations include: increasing your calcium and vitamin D intake, hormone replacement therapy, and weight-bearing exercises.

For more information on osteoporosis, you may wish to review the document, entitled:

- Osteoporosis

The use of a spinal brace may provide some pain relief. However, in adults, it will not cause the spine to straighten. Once you have reached skeletal maturity, bracing is used for pain relief rather than prevention. If there is a difference in the length of your legs (or if the scoliosis causes you to walk somewhat crooked), special shoe inserts, called orthotics, or a simple shoe lift may reduce your back pain.

To learn more about the different types of braces available for the spine you may wish to visit the document entitled:

- Back and Neck Braces

Physical Therapy

Physical therapy and exercise is an important part of treating adult scoliosis. A well-designed exercise program can also provide pain relief in many patients. A physical therapist will develop an appropriate exercise routine for your case. It is essential that you stick to the plan.

Typical advice includes:

- Learning correct body mechanics in order to maintain erect posture that counteracts the effects of the scoliosis
- Doing regular non-jarring exercises, such as swimming
- Maintaining high levels of activity
- Doing your daily stretching exercises and deep breathing (for lung expansion)

Surgery

Surgery for adult scoliosis carries with it relatively high risks. For this reason, surgery is only recommended when the risks are far outweighed by the expected benefits. Surgery will not be
recommended for most cases of scoliosis, particularly in curves of less than 40 degrees. Surgery may be recommended in the following situations:

- **Pain** - The most common reason for surgery is pain relief for increasing, chronic discomfort. About 85 percent of adult scoliosis surgeries are done to relieve severe pain. However, if the pain is manageable through conservative treatments, surgery will not usually be recommended.

- **Progression of Curve** - Progression of the scoliosis deformity is another reason for considering surgery. If the curvature continues to worsen, and it gets beyond 40 to 45 degrees, surgery may be suggested. Surgery is recommended in this situation to prevent the problems that come from severe scoliosis. Surgery will nearly always be recommended for curves above 60 degrees, as the twisting of the torso can lead to more serious lung and heart conditions.

- **Cosmetics** - In most cases of scoliosis, surgery will not be recommended simply for the sake of appearances. However, in some cases, the scoliosis causes physical deformity that is unbearable to the patient. In these cases, surgery is the only option for correcting the condition. Most cases of cosmetic scoliosis surgery are in young adults that have very noticeable, unbalanced curves.

### Surgical Procedures

When adult scoliosis requires surgery, many different procedures may be suggested. Each case of scoliosis is somewhat different and may require a very specialized approach for optimal results. Surgery is suggested to solve the problems brought on by the scoliosis - not just to straighten the spine. The goals of most surgical procedures for adult scoliosis are to:

- Reduce the deformity (straighten the spine as much as possible)
- Stop the progression of the deformity
- Remove any pressure from the nerves and spinal cord
- Protect the nerves and spinal cord from further damage

To succeed at doing these things, the spine surgeon may suggest an operation on the back of the spine, the front of the spine - or both. The goal is to first straighten the spine and then fuse the vertebrae together into one larger bone.

Nearly all surgeries will use some type of metal screws, plates, or rods in order to help straighten the spine and hold the vertebrae in place while the fusion heals and becomes solid. The screws are placed into the vertebra. The rods or plates then attach to the screws to connect everything together. When everything is tightened together, the "construct" forms a sort of internal brace to hold the vertebrae in alignment while the fusion heals.

To better understand the types of procedures that are used to treat adult scoliosis, please review the document, entitled:

- **Spinal Fusion Using Intervertebral Cages**
Possible Complications/Problems with Surgery

With any surgery, there is a risk of complications. When surgery is done near the spine and spinal cord these complications (if they occur) can be very serious. Complications could involve subsequent pain and impairment and the need for additional surgery. You should discuss the complications associated with surgery with your doctor before surgery. The list of complications provided here is not intended to be a complete list of complications and is not a substitute for discussing the risks of surgery with your doctor. Only your doctor can evaluate your condition and inform you of the risks of any medical treatment he or she may recommend.

Please review the document, entitled:

- Complications of Spine Surgery

In addition, the surgical treatment of adult scoliosis may result in two special complications:

Flat-back Deformity

The lumbar (lower) spine naturally has a "C"-shaped curve called lordosis. When the vertebrae in the lumbar spine are fused together, this lordosis curve may be lost, leaving the patient with a "flat-back" deformity. However, the loss of curve may not appear right after surgery. In fact, if the surgery it is done in a young person, the loss of lordosis may not appear until sometime between the ages of 30 to 50.

Pseudoarthrosis

The term "pseudo" means false and "arthrosis" refers to joint. The term "pseudoarthrosis" then means false joint. A surgeon uses this term to describe either a fractured bone that has not healed or an attempted fusion that has not been successful. A pseudoarthrosis usually means that there is motion between the two bones that should be healed, or fused, together. When the vertebrae involved in a surgical fusion do not heal and fuse together, there is usually continued pain. The pain may actually increase over time. The spinal motion can also stress the metal hardware used to hold the fusion. The screws and rods may break, leading to an increase in pain. A pseudoarthrosis may require more surgery to try to get the bones to heal. Your surgeon may add more bone graft, replace the metal hardware, or add an electrical stimulator to try to get the fusion to heal.