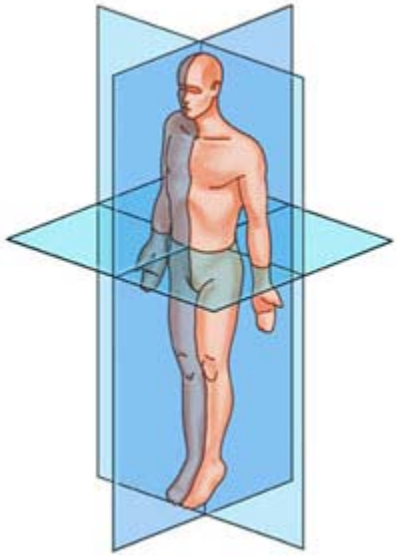
SCOLIOSIS

The Spine and Scoliosis

The spine has an important role. The spine supports our erect posture, stabilizes our limbs relative to our trunks, supports our abdominal and thoracic regions, and protects our neural elements. The spine is in balance when the head is aligned with the pelvis. Scoliosis is a condition in which the spine is curved in the coronal or frontal plane. The coronal plane is the view from the crown (corona) of the head down. The frontal plane is the view of the body from the front. Scoliosis encompasses curves of 10 degrees and greater.



Scoliosis may be caused by:

- abnormalities in the vertebra at birth.
- neuromuscular disorders, such as cerebral palsy, myelomeningocele, or paraplegia.
- connective tissue abnormalities, such as osteogenesis imperfecta, Marfan's syndrome, or Ehlers - Danlos syndrome.
- other injuries to the developing spine.

In the adolescent, the most common cause of spinal deformity is idiopathic which means unknown. While the cause of adolescent idiopathic scoliosis remains unknown, we are currently researching possible causes that may include genetic predisposition, vestibulobasilar or central nervous system causes, or growth pattern asymmetries. It appears most likely that adolescent idiopathic scoliosis is the result of multiple factors including genetic and environmental influences.

By age 16, the prevalence of Adolescent Idiopathic Scoliosis in:

- curves >10° affects 2-3%
- curves >20° affects 0.3-0.5%

That means, approximately 3 to 5 people in every large high school are affected. Screening for scoliosis is an attempt to identify the disorder at an early stage, but screening varies across communities. Often, family or friends first detect scoliosis in an adolescent by noticing an asymmetry in the shoulders, rib cage, waist, or pelvis. Screening is useful if early identification permits treatment that may halt the progression of the deformity. While scoliosis screening programs remain an entrenched policy in many school systems, there is little evidence that screening contributes to improving management or reducing surgical rates for scoliosis. Though, a physician should routinely screen siblings of a patient with scoliosis.

The Management of Scoliosis

When an adolescent is identified with scoliosis, management should be guided by informed choices by the patient, family members, and the health care provider. Management options are determined by the:

- degree of the deformity
- location of the deformity
- cause of the deformity
- age of the patient
- skeletal maturity of the patient
- individual preferences of the patient and family

For AIS, natural history studies provide important information regarding the prognosis of the curve types that affect adolescents. Despite this knowledge, individual curves behave quite differently and should be managed by experienced judgment and expectant observation rather than rules or strict guidelines.

Non-Operative Treatment:

Non-operative treatment of AIS focuses on preventing curve progression during the growing years. Brace treatment of scoliosis remains the only documented effective non-operative treatment of progressive idiopathic scoliosis. Brace treatment often accompanies exercises to maintain low back flexibility, mobility of the chest cavity, and overall cardiovascular fitness. Exercises alone have not demonstrated a benefit to stop or slow the curve progression. Bracing may be appropriate for patients with:

- bones still maturing
- premenarchal, or less than one year postmenarchal
- curves between 30-45 degrees

Curves less than 30 degrees should only be braced when they have demonstrated progression, while curves greater than 45 degrees may not be effectively managed with brace treatment.

Orthotists create brace options that may include a/an:

- superstructure encompassing the neck
- underarm orthoses
- nighttime bending brace
- derotational brace

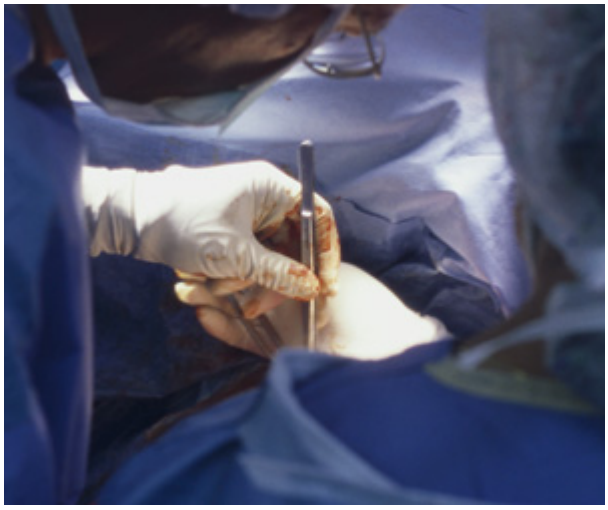
Patient, family, physician and orthotist can decide on the brace type. A cooperative decision may benefit the patient's overall experience

Surgical Management

Surgical management of scoliosis is generally intended to prevent future consequences of progressive deformity. Although most adolescents have little impairment or symptoms related to their deformity, future consequences include the possible:

- development of progressive pain
- pulmonary or cardiac compromise
- progressive deformity and unacceptable appearance
- neurological deterioration

Research from studying the progression of untreated AIS and the results of AIS treated surgically, allows us to make an informed prediction of the future consequences of spinal deformities. However, individual cases differ and future consequences of the deformity are best managed by open discussion between informed patients, families, and care providers.



Progressive Back Pain

The future possibility of disabling back pain is an important concern for patients and families when considering management options for progressive deformity. Back pain is the most common complaint for adults seeking treatment for scoliosis. However, there is little data that persons with AIS are at significantly greater risk of experiencing back complaints than the general population. Specifically, the magnitude of deformity, or size of the curve, has a very poor correlation with the severity of symptoms.

Cardiac and Pulmonary Compromise

Spinal deformity measuring greater than 60 degrees can effect pulmonary function and cardiac dynamics as detected by echocardiography. Patients with severe upper-chest curvatures may develop restrictive pulmonary disease. However, significant pulmonary or cardiac compromise is characteristic of congenital scoliosis and rare in AIS. Patients and families should discuss with the physician concerns about future pulmonary and cardiac compromise knowing the expected effect of deformity on vital structures.