

# Cole Orthotic Pediatric Center

## Scoliosis- An In Depth Review

### Clinical

Clinical evaluation focuses on history and physical examination findings. Consideration is given to circumstances surrounding the patient's birth, delivery and development histories. Was the pregnancy full term? What was the child's birth weight? When did the child begin to walk?--are some of the important guide posts which are sought. Abnormalities in these areas may lead one to consider neuromuscular or congenital etiologies. With congenital anomalies, if one congenital anomaly is found, others are sought, e.g., kidney abnormalities are often associated with congenital scoliosis. Intermittent backache may occur with idiopathic scoliosis, but complaints of pain radiating into the legs, night pain, or systemic complaints (for example changes in bowel or bladder habits) are highly abnormal and are not common complaints in patients with idiopathic scoliosis and usually require further study. A family history of spinal deformity is looked for since certain types of spinal deformity are more prevalent within families.

Physical examination centers on assessment of trunk symmetry. The Adam's forward bend test is done with the patient bending forward with arms extended and knees straight. Asymmetry of the trunk when viewed from the front or the back as well as abnormal increases or decreases in lordosis or kyphosis when viewed from the side are assessed (Fig.3). This test is used during school screening for scoliosis. The test is sensitive to detect trunk asymmetry but it is not specific for spinal deformity. A common finding that is often misinterpreted as spinal deformity is truncal asymmetry from unequal trunk muscle development on the patient's dominant hand side.



Figure 3a Adam's Bend Test - clinical (Frontal view)

Further physical findings depend on the patient's deformity location and magnitude. Shoulder heights may be uneven and there may be an increased space between the elbow and trunk because of trunk deviation (Fig.4). Prominence of a "hip", pelvis or breast may be seen. Examination of the skin overlying the spine assesses the presence of dimples, sinuses, hairy patches and skin pigmentation changes.

The effect of any limb length inequality is tested with the patient standing on blocks to level the pelvis or seated on a flat surface. Neurological examination includes evaluation of the function of the muscles and nerves of the upper and lower limbs.

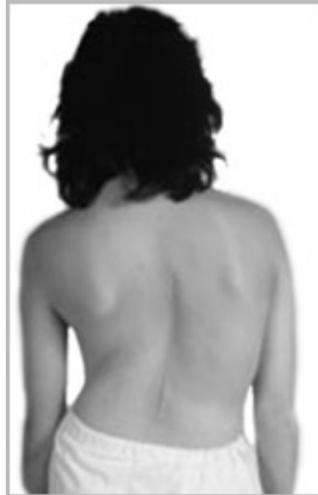


Figure 4 Scoliosis - clinical (Posterior view)

When one views a normal spine from behind, the back appears straight and the trunk symmetrical. When the normal spine is viewed from the side, curves are seen in the neck, upper trunk and lower trunk. The upper trunk has a gentle rounded contour called kyphosis and the lower trunk has a reverse direction of the rounded contour called lordosis. Certain amounts of cervical (neck) lordosis, thoracic (upper back) kyphosis and lumbar (lower back) lordosis are normally present and are needed to maintain appropriate trunk balance over the pelvis (Fig. 1a&b). Deviations from this normal alignment may reflect abnormal kyphosis or lordosis or, more commonly, scoliosis.

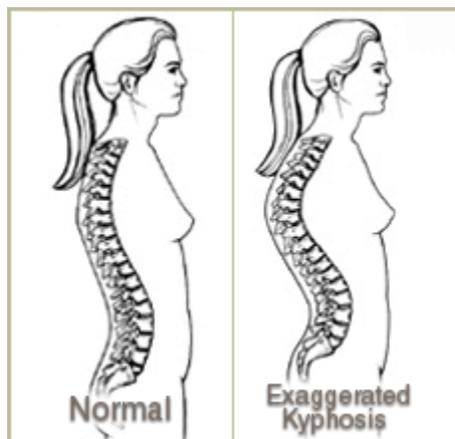
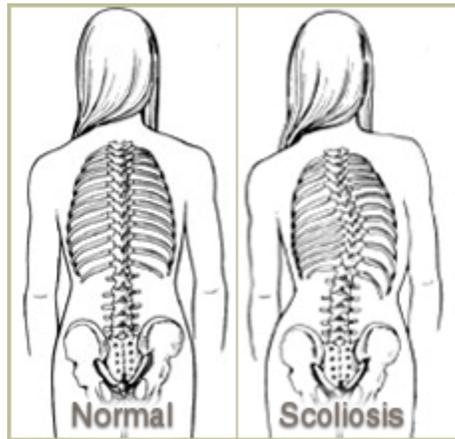


Figure 1a&b

Scoliosis is defined as a side-to-side deviation from the normal frontal axis of the body (Fig. 2a&b). Although traditional, this definition is limited since the deformity occurs in varying degrees in all three planes: back-front; side-to-side; top-to-bottom. Scoliosis is a descriptive term and not a diagnosis. As such, a search is made for the cause. In more than 80% of the cases, a specific cause is not found and such cases are termed idiopathic, i.e., of undetermined cause. This is particularly so among the type of scoliosis seen in adolescent girls. Conditions known to cause spinal deformity are congenital spinal column abnormalities, neurological disorders, genetic conditions and a multitude of other causes. Scoliosis does not come from carrying heavy things, athletic involvement, sleeping/standing postures, or minor lower limb length inequality.



Idiopathic scoliosis is considered in three age groups: Infantile--from birth to three years of age, juvenile--from greater than three years of age through nine years of age and, adolescent from 10-18 years of age. The adolescent type is the most common and represents about 80% of this type of scoliosis. In addition to the amount of spinal deformity, the patient's physiological age is assessed, i.e., is growth completed or is there more potential spinal growth (Fig.12).

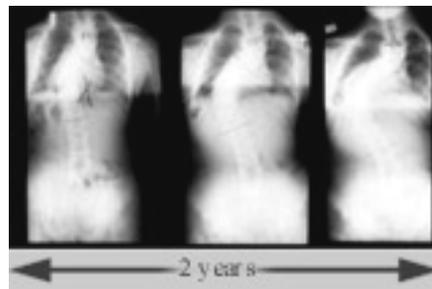


Figure 12 Adolescent idiopathic scoliosis with significant progression over two years

In the latter case, potential curve progression is related to the time remaining until maturity. Curve progression is often associated with degenerative intervertebral disc disease and degenerative joint disease of the spine in middle-aged or older patients or may be due to significant previously present undiagnosed or untreated scoliosis.

Idiopathic scoliosis treatment is patient-age dependent. In patients with infantile scoliosis (0-3 years) left-sided curves are commonly seen, particularly in boys and may resolve spontaneously with growth (Fig.13).



Figure 13a Infantile Idiopathic Scoliosis of 20 month-old boy (clinical photo)



Figure 13b Infantile Idiopathic Scoliosis of 20 month-old boy (radiograph)

Observation treatment is done with repeat evaluation every four to six months. Use of orthoses (braces) and surgery is uncommon. Juvenile idiopathic scoliosis (3-9 year olds) may rapidly progress especially in children over the age of five and may require orthotic (brace) management (Fig.14).



Figure 14 7yr old boy with juvenile idiopathic scoliosis

Surgery is indicated if the curve is unable to be controlled by orthotic means. Although surgery in a significantly skeletally immature spine will produce some decrease in ultimate spine height, it is better to have a shorter spine with more normal alignment than a progressive curve where height is lost because of deformity.

The most common of all types of scoliosis is adolescent idiopathic and is seen with equal frequency in boys and girls at low curve magnitudes. Girls, for unknown reasons, have a significantly higher risk for development of curve progression than boys. Pulmonary and cardiac function are not impeded with lumbar curves and significant changes of pulmonary function are not seen in patients with thoracic curves until the curve reaches a level greater than  $70^\circ$ , i.e., a severe curve. This amount of curve and subsequent cardiac and pulmonary changes are often seen later in life in untreated idiopathic infantile and juvenile scoliosis patients and present a threat to life. Patients with adolescent onset idiopathic scoliosis do not usually have such compromise unless severe curves develop. The time of highest risk for curve progression in adolescent idiopathic scoliosis occurs around puberty, i.e., when the growth rate is the fastest. Pulmonary and cardiac function tests which require patient cooperation may be required to assess lung and heart function in some cases of severe scoliosis, especially pre-operatively.

# Frequently asked questions

## **What is the best treatment for Scoliosis?**

The treatment prescribed for scoliosis, kyphosis or lordosis varies with the individual patient. Severity and location of the curve, age, potential for further growth and general health of the patient all must be taken into account. A mild curvature (up to 20 degrees) generally needs only periodic observation to watch for signs of further progression. Bracing is the usual treatment for children and adolescent with curves of 25-40 degrees, and in other special circumstances.

## **My child has a mild scoliosis curvature. Should I be concerned?**

Four out of five people with scoliosis have curves of less than 20 degrees. Such curves are usually unnoticeable to the untrained eye and are no cause for concern, provided they show no sign of further progression. However, in growing children and adolescents, mild curvatures can worsen quite rapidly (10 degrees or more in a few months ). Therefore, for this age group, frequent checkups by a primary care physician or orthopedist is well advised.

## **Will performing specific exercises help my child's scoliosis?**

Orthopedists tell us that exercise alone will not prevent a curvature from progressing. Exercises are prescribed in conjunction with brace treatment to maintain muscle tone while the torso is immobilized by the brace. These exercises are prescribed individually according to the age of the patient and the location and degree of the curvature.

## **Do you think a chiropractor could help my child's scoliosis?**

For moderate to major curvatures: We do not know of any long-term study which shows that chiropractic treatment can stop a moderate (over 25 degrees) or major curve (over 40 degrees) from progressing in the bone growing years. It has been our experience that chiropractors who are knowledgeable about the development of idiopathic scoliosis in children will refer young patients with such curvatures to an orthopedist for a second opinion.

**How can I get in touch others who are dealing with spinal curvatures?**

Below is a list of some excellent online scoliosis forums:

<http://www.scoliosis.org/forum>

<http://www.scoliosis-support.org/>

<http://groups.msn.com/ScoliosisForum>

<http://www.spinekids.com>