Introduction

Structural scoliosis is a pathologic condition that produces lateral curvature of the spine and is accompanied by rotation of the vertebrae and ribs in a horizontal plane. The Greeks used the word *scoliosis*, which means crookedness, to describe this condition. The curves are officially named according to the direction of the convexity of the curve. A curve that is side-bent to the left is called a right scoliosis because the convexity of the curve is toward the right. The most common situation is a double major scoliosis with a thoracic and lumbar combination. The disease often affects adolescents at the time of their pubertal growth spurt and slows at the end of skeletal growth. The effects are both physiologic and cosmetic. The more significant physical side effects are pain and cardiopulmonary complications. Back pain is not common in most children with scoliosis but pain in adults is a significant problem. Measurable changes in cardiopulmonary function are usually not found in curves of less than 60 degrees. The prevalence in the United States is variably reported as 0.3 percent to 15.3 percent, depending on the school-age screening study used. Boys and girls are equally affected, but the curvatures in girls are three to five times more likely to progress and produce subjective symptoms. Studies have demonstrated that scoliotic girls were significantly taller than matched normals.

Many classifications of this disease exist. Scoliosis can be divided into structural and functional groups. A structural curve does not correct on lateral bending of the trunk and is relatively fixed and inflexible. Functional curves can be partially or completely straightened by lateral bending in the opposite direction. If the trunk is centered squarely over the pelvis it is said to be compensated; whereas, if the trunk is off-centered it is decompensated. Three degrees of severity exist – mild scoliosis (thoracic curve 5-15 degrees), moderate (20-45 degrees), and severe (more than 50 degrees). Juvenile scoliosis occurs from 4 to 10 years of age. Adolescent idiopathic scoliosis occurs from age 10 until skeletal maturity and is the most significant and prevalent form. The remaining 20 percent of structural scolioses occur secondary to congenital anomalies, neuromuscular diseases, tumors, trauma, infections, and iatrogenic causes.

The etiology of adolescent idiopathic scoliosis in the allopathic realm is generally regarded as multifactorial, including genetic factors. Defects in connective tissue have also been implicated in the etiology of scoliosis. School-based screening often refers students to their doctors for further evaluation. This screening is usually done with the adolescent flexing from the waist as if to “touch their toes.” This positioning is excellent for finding asymmetric paravertebral musculature or thoracic “rib humps” which occur when ribs on the convex side of the curve are forced posteriorly on one side. Many patients also complain that pant hems and sleeves do not hang symmetrically. The standard radiologic evaluation consists of a posteroanterior radiograph of the spine. The Cobb method is used to measure the degree of scoliosis and the numerical value is called the Cobb angle.

Many allopathic treatments are available for scoliosis. In general, treatment should be considered in physiologically immature patients with scoliosis between 20 to 30 degrees, especially if progression is present. Curves between 30-40 degrees require immediate bracing. Surgery is considered for curves over 40 to 45 degrees in patients with remaining growth. However, bracing is only used to prevent the curve magnitude from increasing to the point that progression into adulthood is likely but this is not always successful. TLSO
braces are now available that fit from under the arms to the upper pelvis and are much less conspicuous. However, they are often still noticeable and can adversely affect an adolescent's self-esteem. Another treatment called transcutaneous electrical nerve stimulation can be used at night to involuntarily contract the paraspinal musculature on the convex side but the effectiveness of this treatment is inconclusive. Surgical intervention with Harrington rods may improve the curve. Instrumentation is thought to help correct curvature and balance and solid bone fusion maintains the spine in the corrected position. Postoperative bracing or casting is no longer necessary and most patients are discharged from the hospital in fewer than seven days following surgery. Fusion of the spine usually becomes solid about six months. at surgery. Fusion of the spine usually becomes solid about six months. Family history includes a grandmother with scoliosis and an aunt with childhood asthma.

Objective findings on initial visit reveals genu valgum when standing, prominent feet, and minimal pes planus bilaterally. She also seems to have a short left leg, visually approximated at a half inch. She is a mouth and chest breather with a tight rib cage. A prominent T4/5 was noted (rib hump). Thoracolumbar is the apex of the lumbar curve with overall SrRl positioning present. A full left occipito-atlantal area was palpated and there was very tight motion of the right half of the skull. Initial assessment was therefore scoliosis, pelvic obliquity in the left leg, and somatic dysfunction of cervical, thoracic, lumbar spine, and pelvis. Initial OMT consisted of release of the diaphragm and pelvis with various direct myofascial procedures. Decompression of the sacrum as well as some gentle springing of the thoracic spine was also performed. She was also given some deep breathing exercises to see if she could "open up" and soften the scoliotic curve and if that might help with night bracing. She was then scheduled for regular monthly appointments.

Over the last year, treatments have been aimed at keeping her tissues soft and maintaining flexibility. The primary manipulative medicine doctor responsible for her case states a subjective report of lessening spinal curves, especially in the thoracic region.

Curves remain reversible. However, OA remains SrRl and cranial bones remain tight on the right. Lately treatments consist of direct therapy with the percussion vibrator at the thoracic and lumbar levels in addition to direct HVLA to these levels. Sacrum and occiput unwinding are also employed along with periodic realignment of the pelvis. The patient does not appear to practice her breathing exercises regularly. Posteroanterior radiographs of the spine have recently been obtained which were ordered by the patient's orthopedic surgeon. In November of 1995, the thoracic curve was 22 degrees and lumbar curve from T11-L4 was 26 degrees. In September of 1996, these same curves were measured at 17 and 18 degrees respectively: a 5-8 degrees change! The most recent radiographs were measured with a 26 degree thoracic curve and 27 degree curve from T11-L3. However, the x-ray measurements appear rather subjective. Some x-rays were taken closer to the patient than others and it is not clear that the patient was indeed standing for the last x-ray. Also, the Cobb angles on the last radiograph were measured from different vertebral levels than the initial spinal x-rays.

A psychological component may also be present with this patient. She was reportedly pleasant, though rather quiet, on the first five visits. Since, however, she has become belligerent and outspoken at times. After observing the interaction between the patient and her mother it is evident that there may be abnormal bonding issues present between them.

Review of the Literature

Research by Harold Magoun, DO® suggests that the etiology of idiopathic adolescent spinal scoliosis may rest with birth trauma. Slight abnormality of the maternal pelvis can produce excessive molding in the infant cranium. Abnormal presentation is a well-known source of trouble after-
ward, bringing undue forces on the delicate cranial structure. Compression all focuses on the presenting part - usually the condylar. Precipitous or prolonged labor can add to the trauma. Some specialists in cranial osteopathy have been critical, especially in the use of forceps. The stretching and tearing strain on the falx cerebri and tentorium cerebelli has been observed and photographed. Orthopedic specialists are becoming aware of the fact that plagiocephaly is a common finding with scoliosis. Risser stated that more than half have malocclusion of the teeth and commonly the heads of these patients were deformed and flattened posterolaterally. The persistent malposition is that of the occiput, which remains tipped up on one side and down on the other. This malposition usually goes unnoticed. The unleveling of the occiput affects the concomitant positioning of the sacrum, which together dictate the contours of the spine. As Pope wrote, "Just as the Twig is bent, the Tree's inclined." Rotation, extension of the neck, and restitution of normal relations usually follow but the warping that causes scoliosis may have already occurred. Molding incidental to delivery should be overcome shortly afterward by two factors. The explosive cry of an infant following birth, which can be adversely affected by sedation or anesthesia of the mother, and the exertion of considerable pressure by the infant's nursing tongue upward in the roof of the mouth and thence the base of the skull. Idiopathic adolescent scoliosis is more common in firstborn babies because primiparas usually have more difficult labor than multiparas. In the many years of practice Magoun consistently found malpositioning of the occiput and sacrum in almost all cases of adolescent scoliosis. Removing them immediately after birth would be preventive medicine of the first order.

In "Manipulation for the Control of Back Pain and Curve Progression in Patients with Skeletally Mature Idiopathic Scoliosis: Two Cases," Tarola documents the effect of chiropractic manipulative therapy on back pain and curve progression in the at-risk, skeletally mature patient with adolescent idiopathic scoliosis. Diversified type therapy including HVLA was used palliatively for back pain relief in one case and routinely 1-2 times per month in the other case. No attempt was made to "straighten the curve" by thrusting into the convex side. Gentle manual intersegmental mobilization, stretching and muscle massage techniques were also applied. The case treated palliatively had curve progression consistent with the literature. The case treated routinely did not. The procedure was effective in both cases for subjective relief of back pain. The second case was a young female with severe lumbars and thoracic curvatures of 63 and 36 degrees respectively. During her six years of treatment, she had two full-term pregnancies. Over this time period, her lumbar curvature increased 2 degrees and her thoracic curvature increased 4 degrees. Based on literature, it would have been reasonable to anticipate progression of 16-28 degrees when factoring 1-2 degrees (per year average progression in curves over 30 degrees) plus 5-8 degrees per pregnancy.

Robert E. Irvin, DO documented the efficacy of heel lift therapy in "Reduction of lumbar scoliosis by use of a heel lift to level the sacral base." Discussion

The parallels between the case report and Dr. Magoun's article are obvious. First of all, this child had a forceps delivery and only one month of breast-feeding. One might expect abnormalities in the cranium and these have been observed. In addition, she currently wears braces on her teeth due to malocclusion. She is also the first-born child which might account for a more traumatic birth. From these facts, one could easily draw a conclusion that the patient's cranial abnormalities may have indeed caused misalignment of the sacrum and the vertebral structures in between.

The spinal x-rays may not actually be objective enough to be considered as a true measure of this child's progress. If they are accurate, we must assume that the curves decreased considerably and then increased again which would be a rather positive finding in these circumstances. The manipulative treatments

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in six months time would have not only slowed the curves progression but allowed the tissues to decrease the curvature. As far as the last radiograph obtained is concerned, the child might have increased her angles on one particular day by one traumatic injury from gymnastics. If the last Cobb angles are correct, the increase in curvature would not be considered an amazing progression since the child seems to be in her adolescent growth spurt at this time.

No postural studies have been obtained for this patient but a leg length discrepancy is obvious by visual inspection alone. However, heel-lift therapy is not an option since the patient is still growing and will be for some time. If this short left leg is still present at adulthood, a heel lift will be a wonderful option for this patient. It is important to remember that though osteopathic physicians will now consider this patient to have an acquired or a postural scoliosis, her allopathic physicians will still classify her problem as idiopathic and treat her as such.

Much spiritual literature actually suggests that scoliotic curvatures may be due to unresolved psychological conflicts within a person as well as structural problems. These psychological problems could begin as early as infancy in unwanted or unloved children. Possibly, the psychological component could be due to decreased bonding with a child’s mother also. Though this possibility initially seems unlikely, consider the psychological/stress constituent in low back pain and fibromyalgia. After contemplating on these disorders, a psychological component to scoliotic curves seems more plausible. As if to back up this possibility, biofeedback has recently been found helpful for decreasing curvatures in scoliotic patients.

Summary

Scoliosis is a common but a potentially significant health problem. Magoun and Irvin’s research may have actually found two causes for “idiopathic adolescent scoliosis” that can be treated rather easily without any braces or invasive techniques. If the problem is cranial misalignment due to birth trauma, one could easily understand how preventive manipulative therapy on infants or therapy on adolescents and adults with existing curvatures might allow more motion of the cranial bones and restore normal functioning and structure to the vertebral column. Adjuvant soft tissue and myofascial techniques could provide enough flexibility to allow the body to reverse curves and other compensatory changes. Home stretching and postural exercises may also be of great benefit. In addition, osteopaths can help with pain relief and aid in realigning other anatomy as the spine straightens.

Unfortunately, no published research is currently available on the benefits of OMT on scoliotic curves. Many manipulative medicine physicians have treated scoliosis patients and most self-report remarkable results with therapy. These doctors state that it not only stops progression but actually decreases curvatures. Unfortunately, none of these results are documented and only subjective results are reported. Surely if chiropractic manipulative therapy is proven affective, osteopathic medicine can also make an improvement. Further research in this area is obviously necessary.

Adults with scoliosis definitely need to be examined for pelvic obliquity and treated with a heel lift if a leg length discrepancy is found. Many patients labeled with idiopathic disease may actually have a short leg which has not been identified. This therapy can help with the pain adult scoliosis patients experience as well as with decreasing their Cobb angle(s). Obviously, more research is necessary to document decreasing curvatures in moderate and severe scoliosis as well.

More studies than ever seem to be underway for osteopathic manipulative treatment than ever before. Hopefully new and exciting advances can be found in the near future for scoliosis patients to provide much needed, more suitable, documented treatment for these patients.

References


4. Irvin R; Reduction of lumbar scoliosis by use of a heel lift to level the sacral base. JAOA 1991; 91(1):36-44.


