

A GENTLE NON-INVASIVE APPROACH TO SCOLIOSIS

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COMMON HEALTH ISSUES RELATED TO SCOLIOSIS

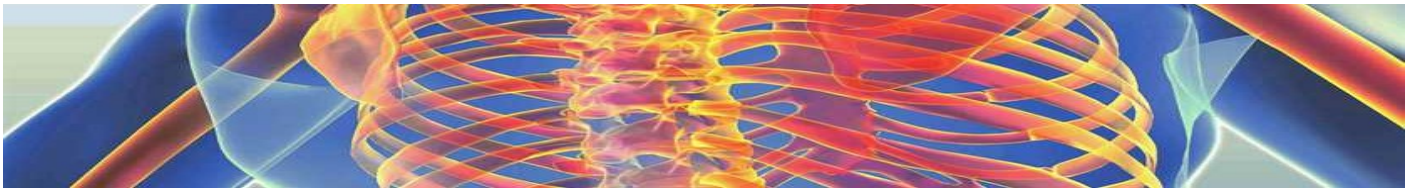
The normal spine is made up of three curves that exist in the front to back plane. There are two inward bending curves (lordosis) in the neck and lower back and one outward bending (kyphosis) in the middle and upper part of the back. The spine has evolved in this fashion to act as a spring and hence protect the spinal cord from the day to day forces acting upon it.

A scoliosis is defined as a lateral curvature of the spine and is considered abnormal beyond 10 degrees ($^{\circ}$). Most people have a slight scoliosis because no one is perfectly symmetrical, however it does not affect their health and is barely noticeable. A scoliosis can be C-shaped or S-shaped

and can occur anywhere in the spine but is more common in the thoracic and lumbar regions. Scoliosis affects around 1-3 people in every 100. There are a variety of causes of scoliosis; unfortunately 80% of them are termed idiopathic meaning no known cause, however there is thought to be a familial trait. Most scolioses develop in adolescents between the ages of 10-15, but infantile scoliosis can occur too. Another cause is attributed to neuromuscular defects that cause poor spinal bone formation such as in cerebral palsy, or poor muscular development of spinal muscles as in muscular dystrophy. Direct trauma or a cancer of the spine may also result in the formation of a scoliosis.

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Older adults are generally afflicted by degenerative scoliosis. Arthritis of the spine can lead to a weakening of the ligaments and postural muscles that support the spine. The vertebrae can develop bony spurs which can add to an abnormal curvature.

The degree of symptoms experienced by someone suffering from scoliosis very much depends on their age, whether adolescent or adult, the cause and the severity of the curve. The degree of scoliosis is measured using the Cobb method which requires x-rays of the spine and measurements of various angles along the curve. A measurement up to 10° is considered normal, beyond 10° is abnormal and up to 20° is mild. Diagnosis of a mild curve in an adolescent would lead to continued monitoring via regular x-rays to measure the extent of the development of the curve over time. If the curve develops slowly and does not exceed 20° by the time of reaching full skeletal maturity (around 17-18 years old for boys, and 2 years after the first menstrual cycle for girls) the curve development will slow and is unlikely to progress much further. For curves that develop quickly and/or exceed 20° then referral to an orthopaedic specialist for further evaluation would be required. Treatment for curves over 30° and up to 45° is likely in the form of corrective exercise and bracing. Beyond 45° surgery is usually required and involves metal rods being screwed into the vertebrae to correct the lateral curvature.

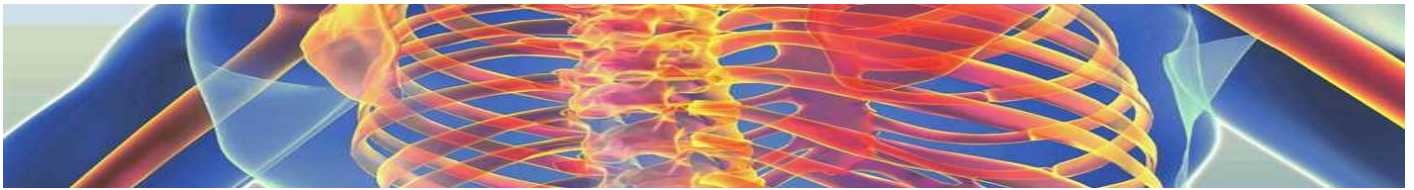
The location (thoracic, lumbar, thoraco-lumbar), pattern (single or double curve) and direction (left or right) of the curve are important considerations when determining the most suitable form of treatment for the individual. Double curves are more likely to progress than single curves, and single thoracic curves are more likely to develop than single lumbar curves.

Scoliosis rarely produces symptoms until it is well established, and when symptoms do occur they generally appear as backache, fatigue and sometimes a shortness of breath. It is however aesthetically deforming and that is usually the first sign of scoliosis. It can cause a hump back with one shoulder blade more apparent and the rib cage more prominent on one side, especially when bending forward. The pelvis, ears and shoulders may not be level and one leg maybe longer than the other. If the pelvis is not level it can lead to an imbalance in the trunk and the person may tilt to one side. A leg length difference can lead to an altered walking pattern, and the development of lower limb muscular imbalances. Pain and discomfort on sitting or standing, stiffness and spinal rigidity are commonly linked symptoms to scoliosis. It is rare for a scoliosis to be so severe it can adversely affect heart and lung function, however a thoracic curve can reduce the ability of the chest to fully expand on respiration thereby reducing overall lung capacity.

A degenerative scoliosis is much more likely to produce pain than an adolescent idiopathic scoliosis. The cause of the degeneration can be due to osteoporosis, disc disease or compression fractures of the vertebrae. These can all lead to structural changes to the vertebrae which irritate the soft tissues around the spine such as the ligaments, muscles and nerves resulting in pain.

As a C shaped curve progresses muscles and ligaments will adapt and shorten on the inside of the curve, and they will lengthen on the outside of it. Osteopathic treatment of a scoliosis would be directed at lengthening the shortened tissues on the inside of the curve by manually stretching them. Exercise can be prescribed to support this process.





In order to maintain changes brought about by treatment the outside of the curve must also be focused on. Due to the lengthened nature of these tissues they are inherently weak and can not support the spine. Rather like a tent and its guy lines as one side is slackened off the other side must be tightened up to maintain the overall integrity of the structure. It is not only the tissues that directly lie over the spine on the back which require treatment, but also the abdominal muscles, chest muscles and muscles of respiration that need attention. They would have all adapted to accommodate the scoliotic changes to the spine. If they are not addressed they could potentially undo the hard work directed at changing the spinal tissues. Examination and treatment of the pelvis for dysfunctional mechanics, and dealing with any compensatory scolioses of the head and neck are also important for overall recovery. The number of treatments and speed of resolution depend very much on the individual patient and their goals. Complete resolution is unlikely and the age of the patient, the extent of the initial scoliosis, and the compliance of the patient in doing their exercises are all important factors in the final result.

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