Scoliosis

X-ray of patient with scoliosis

The spine is made from 24 vertebrae which are all connected through ligaments, normally the spine will arch inwards at the cervical spine (neck) and at the lumbar spine (lower back) causing a natural curve. This arching allows the spine to absorb shocks of walking and jumping as well as holding the head in the correct position. To further absorb the shock of walking and jumping each vertebrae have a disc between them which allow the spine to be flexible and absorb movement. However for a variety of reasons the spinal curve can be altered with new curves developing to the side (Scoliosis), or the natural curve of the spine increasing to more than 50 degrees sometimes resulting in a hunchback look (kyphosis). Finally the inwards curve at the lumbar spine could increase to more than normal causing the appearance of leaning back (lordosis).

What is Scoliosis?

Scoliosis is abnormal curvature of the spine to the side, it affects around 3% of the population, although women are 7 times more likely to be affected than men, it causes a C or S shaped curve. The level of curvature differs from one person to another, less than 20 degrees is mild, between 25 degrees and 40 degrees is moderate and above 50 degrees is severe. The angle of curvature is measured using the Cobb angel this is done by the patient having an X-ray which shows the deepest part of the curve (the apex), the X-ray also shows the most tilted vertebrae above the apex and the most tilted vertebrae below the apex. A perpendicular line is drawn from the top most tilted vertebrae and the lower most tilted vertebrae, where these two lines meet is the Cobb angle. This method is the most accurate at the moment however there is often debate among doctors as to which vertebrae is the most tilted therefore producing different results.

What causes Scoliosis?

In 80% of the cases of Scoliosis the cause is unknown, this is known as idiopathic scoliosis, although the genes for this could run in the family, idiopathic scoliosis cannot be prevented as there is no known cause. The other 20% of cases of Scoliosis cases are made up of congenital Scoliosis this is when the spine does not form properly in the womb. Neuromuscular Scoliosis which is as a result of a nerve or muscle condition such as cerebral palsy and degenerative scoliosis which is caused by the wear on the spine over time. Scoliosis can begin at any age however is usually diagnosed between the age of 10-15. This is why many schools introduced a Scoliosis test called the Adam's test, it involves the patient bending forwards at the waist and the examiner will asses to see if there is symmetry, if there is a hump on one side of the spine this could indicate Scoliosis. This test is very important as it is non invasive and getting treatment early is very beneficial.

Adam's test for scoliosis

Treatment for Scoliosis

Back brace for scoliosis

The treatment of Scoliosis is dependent on a lot of variables including age, severity of curve, health and where the curve is located on the spine. Treatment is usually split into three categories, observation, bracing and surgery. If a doctor is concerned about a patient, they will have regular x-rays to determine if the curve is getting worse or staying the same. The next step if the patient is still growing is bracing this is often offered if the curve is more than 25 degrees or if it has increase by at least 5 degrees in 6 months. Bracing is designed to prevent the curve from growing anymore to limit chance of needing surgery, it is not designed to correct the curve. The brace will need to be worn 23 hours a day however this is challenging for many patients as it causes significant discomfort. A recent study by Scoliosis Research Society they found that 72% of patients who wore their brace where able to control there curve and prevent surgery however only 53% of patients who did not wear a brace controlled their curve to prevent surgery.

In the most sever cases spinal surgery is required to prevent the curve from getting worse and correct it. The traditional Scoliosis surgery is fusion, this is usually performed by making a large incision along the spine, the muscles will be moved to the side to show the spine, joints between the vertebrae are removed and the the vertebrae are roughened up. This is so that the body responds by producing new bone to cover the gaps between the vertebrae fusing them together. Implants such as rods, screws, hooks or wires are put in to hold the spine in place while the new bone grows. In some cases bone grafts are needed to strengthen the new bone, these can be taken from the persons pelvic bone and are then placed over the spine. This surgery takes between 4-6 hours but can take longer depending on the individual patients.

X-ray of Scoliosis patient post fusion surgery

However a new surgery Vertebral Body Tethering (VBT) is an alternative Scoliosis treatment, as it is such a new treatment there are only a handful of surgeons across the world who can perform it. The aim of VBT is to preserve mobility and growth. The surgery involves titanium screws being inserted on the convex side of the curve, then a flexible cord will be threaded through each screw and pulled tight. This increase the pressure in the convex side of the curve so it will become denser and therefore grow more slowly, on the concave side of the curve the spine will continue to grow normally therefore minimising the curve. This surgery provides the best outcome for patients who have a skeletal maturity of 0-2 on the Risser scale, this scale measures how developed the hip bone is to determine the level of skeletal maturity.

VBT is only used on patients who have a curve between 35-70 degrees. There are many unknowns about VBT which is why this option is not currently available on the NHS although there are regular reviews of the progress.