Unwarranted Fears in Scoliosis

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Potential spinal deformity occurring spontaneously in an otherwise perfectly healthy adolescent girl in or around the time of puberty causes significant alarm in both the child and her parents. Fortunately in most cases this fear is unwarranted.

First, it is necessary to define what one is talking about. There are many different forms of scoliosis which in itself is only one form of spinal deformity. By far and away the commonest form of scoliosis this adolescent idiopathic scoliosis. Medically this is probably the easiest form to manage.

The commonest forms of scoliosis that are currently treated are, idiopathic, it is further subdivided by age of presentation to infantile(0-4yo), juvenile(4-10yo) and adolescent (10yo - end of growth). This more recently is simply divided into early-onset, those that present before the age of 10 and late onset those that present after 10 which are currently referred to as adolescent. It is important to remember that idiopathic scoliosis is an abnormality of growth. The deformity occurs as a result of asymmetric growth of the vertebrae in a three-dimensional way which causes the spine to bend and rotate. The rotation of the vertebrae particularly in the thoracic area means that the attached ribs become more prominent on one side and less prominent in the contralateral side.

The other 2 common forms of scoliosis are congenital and paralytic. Congenital comprises of wide variety bony malformations within the spine some of which can produce significant abnormality particularly if associated with rib cage abnormalities. Paralytic scoliosis can broadly be divided into neuropathic and myopathic depending on the major underlying condition for example muscular dystrophy or cerebral palsy. The treatment of these conditions is beyond the scope of this short article.

The most serious and life-threatening types of scoliosis are progressive infantile or spondylocostal dysplasia. The latter is a combination of bony spinal and rib cage abnormality which is associated with hypoplasia of the lung. Both of these conditions can give rise to serious respiratory compromise and the gradual onset of respiratory failure.

Fortunately 80% of Infantile idiopathic scoliosis resolves spontaneously. Of those that progress some do in a relatively benign fashion and others progress in a rapid or more malignant way. These latter present serious treatment problem. In the early stages casting is used until the child is big enough be braced which is usually around 4 years of age. Surgical techniques are used to try and halt progression severe cases. This can comprise of internal fixation devices which are attached to the proximal and distal parts of the curve and elongated. This can be achieved through staged elongation of extensible rods. More recently the system of magnetic lengthening can be applied. Unfortunately none of these methods are entirely successful.

Adolescent idiopathic scoliosis

When we started school screening in schools for scoliosis supported by the children's research Centre attached to the children's hospital in Crumlin we were able to identify the size of the problem in Ireland. 55,484 children were screened and it was seen that the incidence of scoliosis above 25° was 0.2% or 98 children and those with curvatures above 39° or 44 children was 0.079%. Of these 23 ended up being braced and 26 only came to surgery being 0.047% of the total group screened. So it was obvious that significant scoliosis was not a common problem.

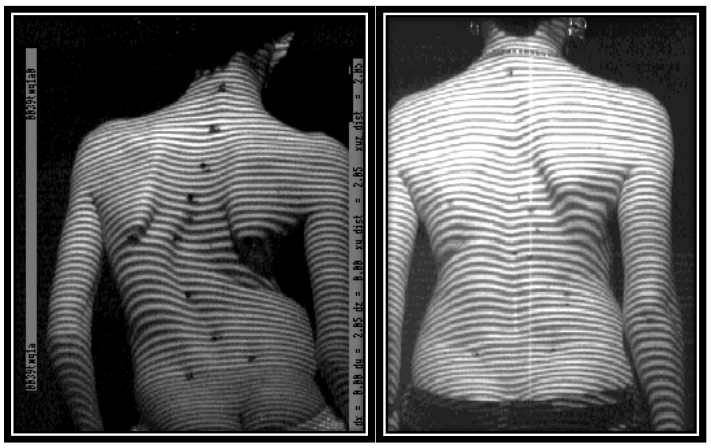
By definition this is scoliosis which is diagnosed after the age of 10 years. This represents 80% of scoliosis generally. The aetiology of this is unknown. There is a definite hereditary tendency with approximately 11 different genetic markers identified. However attempts to anticipate progression by DNA analysis alone has a not been universally successful. A lot of research is still going on in this area. Mild degrees of idiopathic scoliosis are quite common and do not progress and do not give rise to a significant long-term problems. Progression occurs 10 times more commonly in girls than boys. This progression is associated with the adolescent growth spurt and this occurs commonly earlier in girls than boys.

Treatment of adolescent idiopathic scoliosis is now quite common. However it is difficult to be dogmatic about prognosis. One of the problems in the past has been to assess the effectiveness of treatment. As the natural history adolescent idiopathic scoliosis is variable it is difficult to measure the effectiveness of treatment. Some cases of adolescent idiopathic scoliosis progress very slowly and generally do not require treatment as they do not give rise to significant morbidity. If these cases had been treated with a brace people draw the reasonable conclusion that the brace prevented progression. However it is also possible that 3 or 4 years of brace treatment was unnecessary. The research in this area has been dogged by an absence of good long-term studies which in themselves are difficult by virtue of the variation of the condition. The fact that the aetiology is unknown is a major contribution to this dilemma. It would seem that further genetic research will give us more certainty in predicting progression.

Adolescent idiopathic scoliosis itself is not fatal condition does not give rise to serious morbidity. Curvature needs to progress to beyond 90° before significant respiratory difficulties are experienced. This really only occurs in early onset scoliosis. Consequently the vast majority of these adolescent children have a cosmetic deformity. Usually bracing is prescribed until either serious progression or the end of growth spurt has occurred. It is possible that bracing will slow progression during the growth spurt which makes surgical correction at maturity more successful.

Surgical treatment for adolescent idiopathic scoliosis has evolved significantly over the last 30 years. With the advent of better imaging and spinal cord monitoring it has become significantly safer. Higher quality titanium implants are available. The best results today are achieved with multiple level fixation with screws and rods. These can produce very satisfactory cosmetic appearances externally. The cost is reduced intra segmental mobility which can cause problems in later life particularly in the lumbar spine.

The ideal answer to adolescent idiopathic scoliosis has not yet been identified. However significant strides in safely producing a more cosmetic appearance have been achieved.



Pre Operative **Post Operative**