

Apple Cart

a core concepts musculoskeletal group newsletter



Physiotherapy and Idiopathic Scoliosis: A new approach in the management of scoliosis

The non-surgical, conservative treatment and management of idiopathic scoliosis has been traditionally included the use of a rigid brace, physiotherapy treatment involving the release of tight muscles and core strengthening exercises and in some cases manipulation by chiropractors. Although these techniques have been used for many decades, the overall management lacks specificity. This article discusses some of the weaknesses in the current approach and compares to a newer approach in the conservative management of idiopathic scoliosis.

Bracing

The rigid brace currently used is made of thermoplastic, molded to the size and length of the patient's torso. The main purpose of the rigid brace is to hold the spine in its current curvature and to stop any further progression by limiting any movement of the trunk within the physical external splint. The limitations to the rigid brace include

1. Low compliance due to our tropical heat, as the thermoplastic material is not breathable. It is also bulky, so young aesthetically conscious teenage girls are less likely to be compliant.
2. Inability to play sport with the brace on. This reduces participation in sport which hence reduces muscle strength and spinal mobility.

3. Once the brace is no longer worn, there may be limited carry over effects. Without a physical external splint, the spine may resume its inclination to rotate.
4. Effectiveness – Up to 2004, the literature looking at effectiveness of orthosis for adolescent idiopathic scoliosis had varying inclusion criteria, making comparisons difficult. There has been little uniformity defining what represents a success or failure of an orthotic treatment. Due to the lack of consistency in the literature, it is nearly impossible to compare the results of the treatment (Richards et al, 2005). Since then, a standard criteria has been proposed by the Scoliosis research society committee on bracing and non operative management.

A new dynamic brace may reduce the limitations mentioned above. The brace is called SpineCor dynamic brace. The SpineCor brace is made from fabric, consisting of a bolero, a pelvic base similar to ones used for rock climbing and elastic straps connecting the both. Depending on the direction and the number of curves, a specific corrective movement is determined. The spine is positioned into the corrective movement and held in the corrected position by the straps attaching the bolero to the pelvic base. This brace allows freedom of movement of the trunk albeit held in the corrected position. This is a significant development as normal functional activities including sports

are performed in the corrected spinal position. This retrains the neuromuscular system, enabling the re-learning of true "normal" posture rather than the scoliotic posture. It is difficult to correct a scoliotic posture if the neuromuscular system perceives the scoliotic posture as "normal" posture. In essence, the SpineCor brace should

1. Increase compliance because it is made of fabric and is not bulky.
2. As it is a dynamic brace. The patient is able to perform functional activities including sports. This retrains the neuromuscular system enabling global postural re-education.
3. With time, as the neuromuscular system is retrained in the normal corrected posture, the carry over effects without the brace should be longer lasting
4. Effectiveness- Based on the new standardized criteria Coilard et al (2007), it was found that 59.4% of the subjects on the Spine Cor brace were successful, i.e. there was a correction of >than 5 degrees, or stabilization +/- 5 degrees a end of bracing. Out of this population, 40/47 maintained their Cobb angle 2 years after the end of bracing and 5 continued to improve from the time the brace was continued up to 2 years of follow up.

A drawback of the SpineCor brace is its cost. The SpineCor brace costs about S\$3500 including fitting whilst a rigid brace costs approximately S\$400.

Physiotherapy rehabilitation

Traditionally, physiotherapy rehabilita-

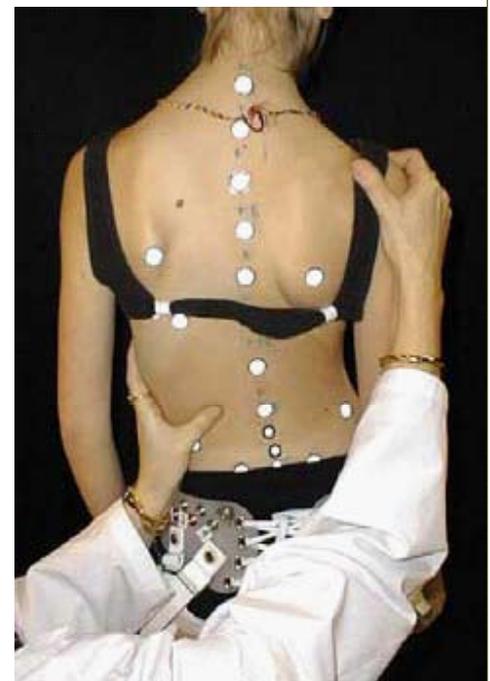
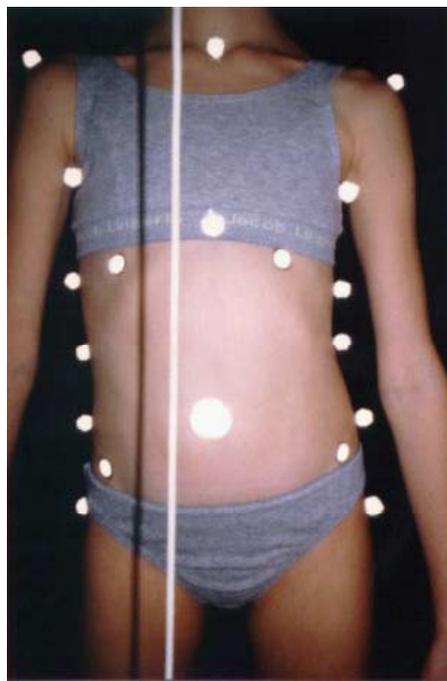
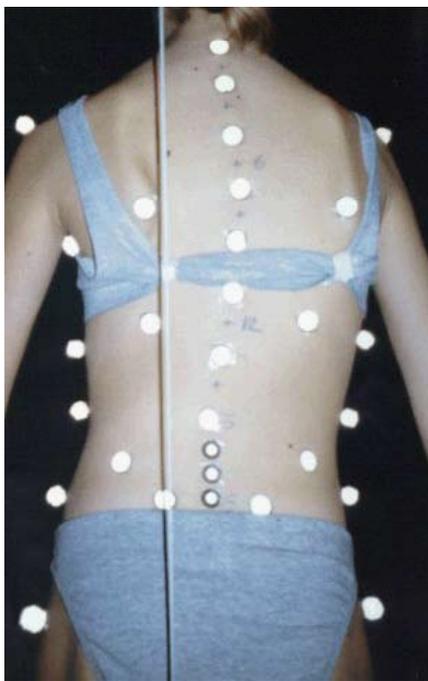


Figure 1: Posterior View of Spinal Curvature of Type 1 Right Thoracic Scoliosis (left), Frontal View of Spinal Curvature of Type 1 Right Thoracic Scoliosis (centre), Corrective Movement for Type 1 Right Thoracic Scoliosis (right)

tion for scoliosis involved the release of tight spinal muscles on the concave side of the curve, mobilized the spinal vertebrae to maintain spinal mobility and the prescription of exercises. These exercises ranged from core exercises to general fitness exercises like swimming. Any activity that required unilateral movement such as tennis or dragon boating was discouraged. The goal of physiotherapy was to ensure that the external environment was not facilitating any further rotation. However, this is a passive approach. Physiotherapy should not only prevent further rotation of the curvature, it must aim to reduce and correct the curvature as much as possible mechanically through neuromuscular control.

Currently, there is classification system for the various types of scoliosis. The classification is based on where the location of the primary insult, the direction of the scoliosis and the presence of secondary curves either in the lumbar or the thorax. This classification is predominantly for rehabilitation therapist as it indicates the direction of the rotation or tilt in the upper thoracic, thoracic or lumbar. This is useful information as physiotherapists can now prescribe specific exercises to counter the curvature by teaching exercises opposite to the rotation and tilt. By performing

these exercises, it ensures that the spinal levels affected have full range to the opposite direction. These movements are termed the corrective movements.

Once the client is able to perform the corrective movements, the muscles that are required for these movements are isolated and trained to increase both in strength and endurance. The goal of such exercises is so that the muscles have enough strength and endurance to maintain this corrected posture. The client is further trained to hold this corrected posture in his or her daily activities and hopefully during sports as well. The idea here is to retrain the neuromuscular system to maintain or improve the curvature.

Although there is no literature comparing the effectiveness of the rigid brace to the SpineCor brace, and that the rehabilitative approach certainly does not correct the scoliotic spine completely, it however certainly does attempt to improve upon the current rehabilitation treatment approach by adding an active and dynamic component to the treatment which is direction specific, scoliosis type specific and muscle specific.

References

1. Coillard C, Vachon V, Circo A, Beausejour M and Rivard C. Effectiveness of the Spine Cor brace based on the new standardized criteria proposed by the scoliosis research society for adolescent idiopathic scoliosis. *J.Pediatr Orthop* 2007; (27);4;pp375-379.
2. Richards S, Bernstein R, D'Amato C and Thompson G. Standardization of criteria for adolescent idiopathic scoliosis brace studies. *Spine* 2005; (30);18;pp 2068-2075.

This newsletter is produced by Core Concepts - Musculoskeletal Health.

*We can be reached at
T: 6226 3632 or
E: enquiry@coreconcepts.com.sg
W: www.coreconcepts.com.sg*