Scoliosis

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Latero-posterior directed migration of trunk to the concave side of the curve: a biomechanical principle in treating the three dimensional deformity of idiopathic scoliosis with a custom molded high profile TLSO

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Background

The biomechanical principles that guide orthotic treatment for Idiopathic Scoliosis (IS) are not fully defined, except for the 'three point correction' principle.

Aim

This study aims to discover the underlying biomechanical principles, used by experienced orthotists, in treating the three dimensional deformity of IS, with a custom molded TLSO.

Methods

Semi-structured individual interview, and focus group methodology , were the primary methods of data collection. Detailed descriptions of orthotic treatment, for a specified case example, were obtained from seven experienced spinal orthotists; participants held an average of 16.7 years experience in IS treatment. Sessions were audiotaped, transcribed and data was analyzed using a systematic approach to identify themes. Triangulation of data was completed.

Results

Achieving a "balanced and aligned spine and trunk in all 3 planes" emerged as the primary biomechanical goal for all 7 participants (100%). The orthotists identified specific techniques of the treatment process such as:

- drawing an iliac-clavicle box on the PA x-ray
- determining the location and the degree of forces and finding flexibility of the curve with a hand technique
- reducing lumbar lordosis during casting• de-rotating the trunk
- centering the upper torso at the axillas over the pelvis
- creating space on the lateral posterior area of the concave side of curve and the mid-posterior area of the spine
- •carving the model to achieve desired forces
- applying abdominal pressure
- building a sternal extension and a trochanteric extension.

Conclusion

To achieve the biomechanical goal, and re-align the 3-dimentional deformity of IS, orthotists apply de-rotational, anterior, and lateral translational forces on the lateral side of the convex curve, and create space on the side opposite the applied force. These factors result in a biomechanical principle called latero-posterior directed migration of the trunk to the concave side of the curve.

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Reference

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