E-Poster

EP-198

Novel Air-Sac Spinal Orthosis for Adolescent Idiopathic Scoliosis: A Case Series Report

Topic: Prosthetics and Orthotics

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BACKGROUND

Adolescent idiopathic scoliosis (AIS) management traditionally relies on rigid bracing, which often presents compliance challenges due to discomfort and lifestyle interference. We present a novel air-sac spinal orthosis designed to address these limitations through innovative pressure distribution and adjustment mechanisms. The device features pneumatic compression systems, customizable pressure points, and modifiable hardness settings, potentially offering improved patient comfort and treatment adherence.

CASE DESCRIPTION

We report two cases of female adolescents with idiopathic scoliosis treated with our novel orthosis combined with Physiotherapeutic Scoliosis Specific Exercises (PSSE). The first patient, a 16-year-old female, presented with thoracolumbar curves measuring 49° and 53°. Her treatment protocol consisted of PSSE performed 30 minutes daily for eight months, supplemented with the air-sac orthosis from the third month of follow up. The orthosis was worn for 12-14 hours during daytime and 6-8 hours at night. At the eight-month follow-up, her curves had improved to 35° and 33°. The second patient, a 13-year-old female, initially presented with a thoracic curve of 36°. She underwent the same PSSE regimen for eight months, with orthosis implementation beginning at month 3. Her brace-wearing protocol consisted of 18-20 hours of daytime wear. At the eight-month follow-up, her curve had significantly improved to 9°.

DISCUSSION

These cases demonstrate the potential effectiveness of our novel air-sac spinal orthosis in AIS treatment. The device's pneumatic surface contact design enhances comfort by reducing pressure points and minimizing skin complications. The adjustable pressure distribution system allows for dynamic modification as treatment progresses and anatomical changes occur. Both patients showed substantial curve improvement and maintained high compliance with the prescribed wearing schedule, suggesting that the enhanced comfort features of the orthosis may contribute to better treatment adherence. The integration of PSSE with this novel bracing approach appears to provide synergistic benefits for curve correction. While these initial results are promising, longer-term follow-up studies with larger patient cohorts are needed to establish the sustained effectiveness of this treatment approach.

CONCLUSION

This novel air-sac spinal orthosis demonstrates promising short-term outcomes in AIS treatment through enhanced comfort and adjustability. Combined with PSSE, significant curve improvements were achieved in both cases. The innovative design appears to address traditional bracing compliance challenges while maintaining therapeutic effectiveness.

Statement of Disclosures

None

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Doi: 10.5606/archisprm.2026.EP-198