

MAINTENANCE OF SPINE FLEXIBILITY WITH THE USE OF SEMI-CONSTRAINED GROWING RODS FOR EARLY ONSET SCOLIOSIS IN CHILDREN

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Introduction

The growing rod (GR) technique is a fusionless surgical approach to reduce and control deformity whilst allowing the young spine to grow in early onset scoliosis. Original GR designs have resulted in a high rate of rod fracture and auto-fusion of the spine. An earlier biomechanical study has shown that semi-constrained GR allow similar axial rotation of the instrumented spine to that of an un-instrumented spine.

Methods

We performed a prospective single centre study of clinical and radiological data of consecutive patients who have been managed with the semi-constrained GR system (Medtronic Pty Ltd). Minimally invasive rod lengthening procedures were performed at approximately six monthly intervals until the definitive fusion surgery was performed.

Results

Between 2007-2015, 24 patients (12 girls, 12 boys) with a mean age of 8 years (1.5-10.9) underwent treatment. Diagnoses were neuromuscular (N=18), congenital (N=4), idiopathic (N=2) and the mean follow-up was 4.7 years (0.1-8.0). The mean pre-operative Cobb angle was 72.2° (45-120°); corrected to mean 41.7° (22-85°) after GR insertion. To date 13 patients (mean age 12.3 (7.2-14.5 years) have had instrumented fusion surgery; mean pre-fusion Cobb angle of 54.4° (23-105) after having mean 6.5 (2-12) rod lengthening procedures. The trunk height increased by a mean 10.3cm (5.5-16.6) between insertion of GR and the final fusion surgery. Mean post-fusion Cobb angle was 36.4° (10°-90°) demonstrating a mean 33% curve correction. Eight of the total 24 patients experienced a complication: 3 infections, 3 GR fractures, 3 foundation failures of the cephalad hooks.

Conclusion

Results indicated that the semi-constrained GR system was effective and allowed regular lengthening procedures. This new concept of GR may provide a greater deformity correction by limiting the chance of auto-fusion. A larger number of patients are required to confirm the superiority of semi-constrained GR and their ability to maintain spine mobility during GR treatment.