

non-idiopathic scores rose from in-cast in all but 1 domain, while idiopathic scores again remained unchanged.

Conclusions: Idiopathic EOS patients' HRQoL begins within a normal range but declines while in cast, and remains lower after the treatment. While non-idiopathic patients begin with lower HRQoL, their decline in-cast is relatively small, and recovers post-casting. An explanation is that before casting, idiopathic patients have a comparatively higher HRQoL and are thus more negatively impacted by the restrictive casting intervention.

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Paper #29

Results of Magnetically Controlled Devices Parallel to the Spine (MAGEC/VEPTR) in Children with Scoliosis due to Spinal Muscular Atrophy (SMA)



Anna K. Hell, Heiko Lorenz, Batoul Badwin

Summary: Ellipse MAGEC rod implantation in combination with a bilateral VEPTR fixation from rib to pelvis is a sufficient method in treating flexible scoliosis in children with SMA without instrumentation of the spine.

Hypothesis: Spinal deformities in children with SMA are sufficiently treated by a combination of the MAGEC/VEPTR devices.

Design: Prospective study design with retrospective analysis.

Introduction: Progressive scoliosis and thoracic insufficiency syndrome in children have been mainly treated with expandable methods such as growing rod systems or vertical expandable prosthetic titanium rib implants (VEPTR). However, with the number of repetitive surgeries for lengthening the complication rate rises (e.g. infection). Additionally, for children with spinal muscular atrophy (SMA) severe pulmonary problems are common after surgical procedures and may lead to long-term hospitalization.

Methods: 21 children (11 m, 10 f) with neuromuscular scoliosis due to SMA were treated with the Ellipse MAGEC rod in combination with a bilateral VEPTR fixation. All children were externally lengthened 5 mm every 3 months. Clinical and radiological parameters of all children were assessed and statistically analyzed.

Results: The average follow-up was 2.1 years. At the initial MAGEC surgery the Cobb angle of the scoliosis could be corrected from an average of 62.1 to 27.4 ($p < 0.0001$). At the time of the lengthening appointments every three months the Cobb angle had progressed, but could be reliably reduced. At the third lengthening the average Cobb angle could be changed from 36.8 to 33.7 ($p = 0.612$). At the sixth lengthening the change was from 35.5 to 33.9 ($p = 0.839$) and at the ninth lengthening from 35.0 to 30.5 ($p = 0.673$). Kyphosis was positively influenced by the implant as well.

Conclusions: Ellipse MAGEC rod implantation in combination with a bilateral VEPTR fixation from rib to pelvis is a sufficient method in treating flexible scoliosis in children without instrumentation of the spine. The lack of repeated surgeries is especially beneficial in children with impaired pulmonary function such as SMA patients. Long-term results may show the beneficial effect of this method in avoiding spinal ossification and autofusion.

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Paper #30

Comparison of Newly Implanted versus Converted Magnetically Controlled Growing Rods (MCGR) from the Post-United States Release



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Summary: Magnetically controlled growing rods (MCGR) first appeared in the U.S in 2014. While MCGR may minimize surgeries needed for lengthenings compared to traditional growth-friendly instrumentation, research studies are still lacking. In this study, newly implanted MCGR resulted in significant spine deformity correction while conversions did not. Conversions to MCGR also had higher complications at 1 year.

Hypothesis: We hypothesize greater curve corrections in new MCGR implants but higher complications in conversions.

Design: Retrospective cohort study.

Introduction: MCGR has the potential to spare early onset scoliosis (EOS) patients from repeat surgeries but there are limited studies. We compared spinal deformity correction and complications between new MCGR implants and conversions from other growth-friendly techniques.

Methods: MCGR patients were queried from a multi-center early onset scoliosis (EOS) registry between 2014 and 2016. Major Cobb and kyphosis angles at immediate and 1-year post-operative visits, and 1-year complications were compared between new implants and conversions.

Results: In total, 49 patients (mean age 7.8y; 28 female) were identified. Of these, 31 patients had new MCGR insertion and 18 were converted to MCGR at a mean of 3.5 years after original implantation. Scoliosis etiology included 7 congenital, 18 idiopathic, 15 neuromuscular, and 9 syndromic. Average lengthenings per year were 3.6 (new) and 3.8 (conversions). For new implants, the mean Cobb/kyphosis angles changed from 71.4°/56.7° pre-operatively to 40.9°/43.2° immediately after surgery, and 45.4°/46° at 1-year. The change for conversions was 63.1°/52.5° to 61.3°/57.4°, and then 56.1°/58.5°. There were significant decreases in Cobb/kyphosis angles for new implants immediately after surgery ($p < 0.05$), but not for conversions. There were 16 unique patients with complications and 24 total reported incidences. Complications occurred for 26% and 44% of the new implants and conversions respectively and the difference trended towards significance ($p = 0.18$). There was a clinically significant difference in complications between the groups, but not in severity as per the Smith Classification.

Conclusions: New MCGR implants had significant Cobb and kyphosis angles correction while conversions did not, due to their previous implants' correction. The higher complication risk for the conversions is likely influenced by the prior spine surgeries. Despite this, the conversion goals were achieved by minimizing the need for repeat lengthening surgeries and by maintaining curve correction.

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Paper #31

Development of a Risk Severity Score Predicting Surgical Site Infection in Early Onset Scoliosis



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