

of 37.8mm (1.3-95.4, SD:21.4, $p < 0.001$) between the matched 3DTSLS and SoCVH measurements. On average, the 3DTSLS of the measured spines was 124.2% of the measured SoCVH. This discrepancy increased as either the Cobb or kyphosis angle increased.

Conclusions: The novel 3DTSLS measurement is accurate, repeatable and complements current growth assessments for EOS treatments.

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Paper #15

Total Hemivertebra Resection by Posterior Approach in Congenital Scoliosis and Kyphoscoliosis: Results with 7 Years Mean Follow Up



Marco Crostelli, Osvaldo Mazza, Massimo Mariani, Dario Mascello

Summary: We operated 74 patients with congenital vertebral deformities (56 scoliosis and 18 kyphosis and kyphoscoliosis) by posterior approach with different techniques and instrumented arthrodesis with pedicle screws. Mean follow up was 7 years, mean Kyphosis curve after surgery was reduced to 20° Cobb and mean scoliosis curve was reduced to 11° Cobb. We experienced no major complications. We think that posterior approach procedures obtain excellent deformity correction in both frontal and sagittal plane, optimal stability, low risk of nervous injury.

Hypothesis: We strongly advocate one time posterior emispondilectomy as surgical intervention most suitable for clinical healing of congenital hemivertebra scoliosis.

Design: 74 patients with congenital vertebral deformities (56 scoliosis and 18 kyphosis and kyphoscoliosis) operated by posterior approach with different techniques and instrumented arthrodesis with pedicle screws.

Introduction: Congenital vertebral deformities are caused by formation or segmentation defects in vertebrae. They are generally treated by surgery due to high risk of curve progression and, in case of kyphosis and kyphoscoliosis, high risk of nervous complications. Modern posterior access surgical techniques, including total hemivertebra resection, can completely correct deformity without additional anterior access surgeries.

Methods: From 2006 to 2015 we operated 74 patients with congenital vertebral deformities (56 scoliosis and 18 kyphosis and kyphoscoliosis) by posterior approach with different techniques (hemivertebra resection, subtraction osteotomy) and instrumented arthrodesis with pedicle screws. Mean age at surgery was 8 years, and 22 patients were under 10 years of age. Mean kyphosis curve was 75° Cobb, mean scoliosis curve was 44°. In interventions until 2011 we did not use intra operative neurophysiologic monitoring, that was used after 2011.

Results: Mean follow up was 7 years (9-1years), mean Kyphosis curve after surgery was reduced to 20° Cobb and mean scoliosis curve was reduced to 11° Cobb. We experienced no major complications (post-surgical infection, instrumentation failure, severe neurological impairment, severe blood loss.) After stabilization patients have been braced for a period from 9 to 12 months. Radiographic controls of the spine have been performed 1 months, 3 months, 6 months and 12 months after the procedure, and then every other year.

Conclusions: Posterior approach interventions with pedicle screws instrumentation are less invasive than combined anterior – posterior approach interventions. Pedicle screws obtain important corrections that can be maintained filling the resulting gaps by bone obtained by osteotomy/resection.

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Paper #16

Efficacy of Preoperative Halo Gravity Traction in Children with Severe Early Onset Scoliosis



Paul D. Kiely, Sandra L. Hobson, Kwadwo Poku Yankey, Henry Duah, Henry Tutu, Theresa Yirerong, Harry Akoto, Oheneba Boachie-Adjei

Summary: The management of severe Early Onset Scoliosis (EOS) is challenging, and fraught with complications. Despite preoperative halo-gravity traction (HGT) being safe and well tolerated, there is little information regarding the management of severe EOS with preoperative HGT.

Hypothesis: To assess the efficacy of preoperative HGT in children with severe early onset scoliosis (EOS), and report early clinical and radiographic outcomes.

Design: Retrospective review of a prospectively collected single-center database.

Introduction: Since its introduction in 1968, HGT has revolutionised the management of severe spinal deformity. Despite achieving partial deformity correction, a recent survey of POSNA members found that only 27% of surgeons used HGT in EOS, despite 77% having access to HGT.

Methods: All children with severe EOS who underwent HGT prior to spinal growth modulation deformity surgery at FOCOS Orthopaedic Hospital, Ghana in West Africa from April 2012 to April 2016 were reviewed. HGT was started at 20% body weight and increased by 10% per week until 50% body weight was reached by 4 weeks or thereafter as tolerated. Demographic variables, operative data, and radiographic parameters were collected. A deformity reduction index was calculated at each time point by summing the scoliosis and abnormal kyphosis for each patient and reported as a percentage of the preoperative deformity.

Results: Twenty three patients underwent preoperative HGT for severe EOS. There were 12 boys and 11 girls. The mean age was 8 years old (range, 3-14). The average duration of preoperative HGT was 63 days (range, 35-98), prior to growth modulation surgery, either using growth rod placement ($n=17$) or FOCOS Bidirectional Growth Modulation (FBGM) ($n=6$). The mean pretraction coronal Cobb angle was 115° (range, 91°-142°) and the mean sagittal Cobb angle was 80° (range, 42°-122°). There was a mean coronal Cobb angle correction of 44%, and a mean sagittal Cobb angle correction of 32%. Six (26%) children developed pin tract infections, 5 of whom resolved with antibiotic therapy. Transient intra-operative neuromonitoring changes (IONM) developed in 6 (26%) children. There were no permanent neurological deficits. One (4%) patient died postoperatively secondary to resistant pulmonary hypertension.

Conclusions: Preoperative HGT is a safe and effective method to partially correct severe spinal deformities in children with early onset scoliosis prior to growth modulation surgery.

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Paper #17

Magnetically Controlled Growing Rods: Observed Length Increases are Lower Than Programmed



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Summary: A clinical study of early onset scoliosis (EOS) patients following implantation of magnetically controlled growing rods (MCGRs) demonstrated that increases in rod length were lower than programmed. Tissue depth, but not prior spine instrumentation, affected increases in rod length.

Hypothesis: 1) Increases in rod length equal programmed increases. 2) Patients with prior spine instrumentation lengthen less than patients without prior surgery. 3) Larger tissue depths decrease lengthening success.

Design: Retrospective review of all EOS patients with MCGRs at a single institution (4/2014-12/2015).

Introduction: MCGRs are increasingly being used in the treatment of early onset scoliosis. Few studies have reported whether desired lengthening can reliably be achieved, or if prior spine instrumentation and large tissue depths affect lengthening.

Methods: A retrospective chart review was conducted on EOS patients with single and dual MCGRs. Rod displacement was measured at each