

## Paper #20

**Can We Save the Implant: Rib-based Implant Removal Rates and Risk Factors Following Irrigation and Debridement (I&D) Surgery?**

Carina Lott, Catherine Qiu, Nirupa Galagedera, Lia McNeely, Robert Campbell, Patrick Cahill, Jason Anari



**Summary:** Infection is a common complication of growing rod treatment that often, but not always, leads to implant removal. We aimed to determine the incidence of and risk factors for implant removal in patients treated for early onset scoliosis (EOS). Results showed early intervention, lower number of wound complications, and lack of gastrostomy tube trended towards a protective effect.

**Hypothesis:** Clinical indicators or patient-specific factors can predict the need for implant removal in the face of an infection.

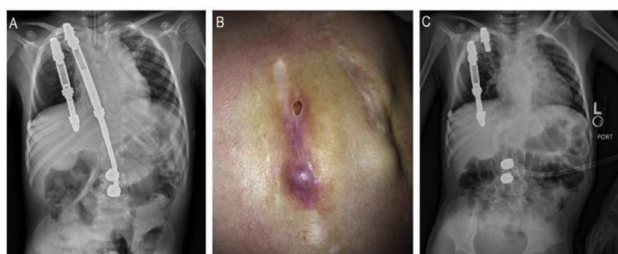
**Introduction:** In the event of a surgical site infection, attempts are made to control the infection with debridement procedures, yet the implant often still requires removal. While studies have described the incidence of complications, current literature does not have sufficient evidence to provide clear recommendations regarding retention vs. removal of implants. This study aims to identify factors associated with the need for implant removal to decrease unnecessary attempts at implant retention and also to identify modifiable risk factors.

**Methods:** Retrospective review of EOS patients at a single center treated with rib-based implants with minimum of a 2 yr f/u who developed surgical infection requiring I&Ds. Regression analyses were conducted to determine the odds of implant removal.

**Results:** 59 patients with wound problems were identified who underwent the initial implant procedure at a mean age of  $4.6 \pm 3.8$  years. 29 patients ultimately underwent implant removal. Significant risk factors for removal included total # of wound problems, total # of I&Ds, days from identification of wound to I&D procedure, days on antibiotics, presence of gastrostomy tube, and non-ambulatory status ( $p < 0.0001$ ,  $p = 0.001$ ,  $p = 0.095$ ,  $p = 0.093$ ,  $p = 0.054$ ,  $p = 0.026$  respectively). Multiple logistic regression results indicated total # of wound problems (OR: 6.00,  $p = 0.001$ ), days from identification of wound to I&D (OR: 1.03,  $p = 0.039$ ), and presence of a gastrostomy tube (OR: 5.7,  $p = 0.07$ ) as independent predictors for implant removal.

**Conclusion:** Patients who required implant removal often had prodromal signs of wound problems in advance of their debridement surgeries and the time from the onset of these signs until debridement surgery inversely correlates with the ability to retain the implants.

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**Figure 1.** A patient a) treated with rib-based fixation who b) developed wound problems and underwent two debridement surgeries, was closed, discharged c) yet still required implant removal to eradicate the infection 63 days post first debridement surgery.

## Paper #21

**Comparison of Single Posterior Spinal Fusion (PSF) vs Growth-Friendly (GF) Surgery in Older Neuromuscular EOS Patients**

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**Summary:** PSF may be more effective than GF surgery at controlling neuromuscular scoliosis in 8-11 year old children. PSF patients had less complications, and better Financial Impact and Family Burden scores. However, GF patients gained a greater percentage of spine length and achieved similar spine length at last f/u.

**Hypothesis:** PSF provides good curve control in older neuromuscular EOS patients, and has a lower complication rate and higher quality of life (QoL) compared to GF surgery.

**Introduction:** A previous study showed that PSF and GF devices were effective at controlling scoliosis in older ambulatory EOS patients. PSF patients had less complications and unplanned returns to the operating room (UPROR), and better QoL. Our purpose was to compare radiographic outcomes, complications, and QoL in older neuromuscular EOS patients treated with PSF and GF surgery.

**Methods:** Multicenter retrospective review of children with neuromuscular EOS, age 8-11 years at index surgery with PSF or GF devices (TGR, MCGR, rib-based growing constructs), with minimum 2 year f/u. Patients with prior surgery and missing radiographic data were excluded. QoL was measured using EOSQ-24.

**Results:** 16 PSF and 125 GF patients were analyzed. Demographics were similar except PSF patients were older at index surgery (Table). PSF patients had greater percentage of major curve correction and smaller major curve at last f/u. 4 PSF patients (25%) experienced 10 complications, resulting in 5 UPRORs. 86 GF patients (69%) experienced 195 complications, resulting in 78 UPRORs. Poisson regression (sig is 0.10) adjusted for age, BMI, and preop major curve showed that the GF group was more likely to have a complication ( $p = 0.092$ ). Both groups demonstrated spinal growth but the GF patients had a larger increase in spine length. T1-T12 and T1-S1 lengths at last f/u were similar. PSF patients had better postop Financial Impact and Family Burden scores.

**Conclusion:** PSF may be more effective than GF surgery at controlling scoliosis in older neuromuscular EOS patients. PSF patients had better Financial Impact and Family Burden scores. GF patients achieved more spinal growth at the expense of more complications.

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