



# Abstract: Long-Term Outcomes Following Flap Reconstruction in Pediatric Pressure Ulcers

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## Plastic Multilayered Closure in Nonidiopathic Scoliosis Significantly Reduces the Risk of Wound Complications in a Pediatric Population

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**INTRODUCTION:** The purpose of this study was to compare the surgical site infection (SSI) and wound complication risk between standard closure and plastic multilayered closure (PMC) in patients with nonidiopathic scoliosis undergoing primary or revision growth-friendly instrumentation or fusion.

**METHODS:** Patients with a diagnosis of nonidiopathic scoliosis undergoing primary or revision growth friendly instrumentation or fusion during 2014 to 2016 were included. Clinical charts and operative reports were reviewed. The SSI and wound complication risk of patients undergoing PMC was compared to standard closure. Additionally, the mean Risk Severity Score (RSS) for SSI, which utilizes patient characteristics to calculate the probability of SSI, was calculated to compare the observed (actual risk) and expected risk (RSS).

**NUMBER OF CASES AND FOLLOW-UP:** 110 patients, 90 days of follow-up (Centers for Disease Control [CDC] definition of SSI)

**RESULTS:** A total of 56 patients with standard closure and 54 patients with PMC were identified (mean age of 10.2; 55% female; mean preoperative coronal curve=58.5°). There was no statistically significant difference in age, preoperative major coronal curve, BMI, preoperative hemoglobin, estimated blood loss, mean RSS score, sex, race, etiology, and procedure type between the standard closure and PMC group ( $p>0.05$ ). Following PMC implementation, the SSI rate decreased from 8.9% to 1.9%. The overall change in the observed (actual risk) vs. expected SSI risk (based on mean RSS score) indicated an overall

decrease in SSI risk by 7.1%. The overall rate of wound complications decreased by 15.9% (3.7% vs 19.6% in standard closure),  $p=0.008$ . The mean increase in operative time due to PMC was 29 minutes.

**CONCLUSION:** Utilizing PMC in patients undergoing spinal surgery for nonidiopathic scoliosis significantly decreases the risk of wound complications and risk of SSI. Given the minimal increase in operative time required for this technique, surgeons should consider using PMC in high risk patients.

## Long-Term Outcomes Following Flap Reconstruction in Pediatric Pressure Ulcers

**Presenter:** Joseph M. Firriolo, MD

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**INTRODUCTION:** To clarify the role of flap reconstruction in the management of pediatric pressure ulcers.

**METHODS.** We reviewed the records of patients with pressure ulcer(s) who underwent flap reconstruction from January 1995 to July 2013.

**RESULTS:** Twenty-eight patients with 34 pressure ulcers, requiring 57 flaps were included. Nineteen patients were male, and the mean age was  $16.1\pm 5.90$  years. Ulcers were followed up for a median of 4.8 years.

Nineteen patients had myelomeningocele, four were paraplegic secondary to various etiologies, three had spastic quadriplegic cerebral palsy, and two had lipomeningocele. Twenty-seven patients were wheelchair dependent, and 24 had sensory impairment at their ulcer site(s).

In 12 patients, ulcer development was complicated by an inability to obtain adequate wheelchair

cushioning and bedding, secondary to insurance coverage. Eleven patients had a preoperative history of non-compliance with conservative management, nine of which experienced ulcer recurrence.

All ulcers were stage III-IV; most involved the ischia (18/34) or sacrum (9/34). Twenty-one ulcers had underlying osteomyelitis, associated with increased admissions ( $p=0.027$ ) and length of stay ( $p=0.043$ ).

Overall, there was a 40-percent recurrence rate in ulceration following flap reconstruction. Recurrence did not correlate with age, sex, nutritional status, or osteomyelitis. However, preoperative non-compliance with conservative therapy was associated with recurrence ( $p=0.007$ ).

**CONCLUSION:** Flap reconstruction remains essential in the management of pediatric pressure ulcers. However, surgery is only part of the treatment required for these complex patients. Unlike prior studies, our work shows similar recurrence in children compared to adults. We conclude that flap reconstruction should only be performed in patients and families compliant with non-operative elements of care. Additionally, surgeons should be aware of the nature and importance of the various biopsychosocial factors that perpetuate ulcers and inhibit wound healing, and optimize these factors pre- and post-operatively.

### **Pediatric Open Tibial Fractures in the United States: Analysis of Incidence, Operative Strategies and Resource Utilization over 15 Years**

**Presenter: Alexandra Bucknor, MBBS, MRCS, MSc**

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**INTRODUCTION:** Open tibial fractures are complex injuries to manage, often requiring combined plastic and orthopedic care. Centralization of services may improve patient outcomes and cost-efficiency.<sup>1</sup> This study aims to characterize the epidemiology, operative trends and resource-utilization of pediatric open tibial fractures in the United States.

**METHODS:** Retrospective analysis of the Healthcare Cost and Utilization Project Kids' Inpatient Database for all available years (1997, 2000, 2003, 2006, 2009 and 2012) was undertaken. Data were retrieved for children  $\leq 18$  admitted with open tibial fractures. The Cochran-Armitage test was used to evaluate trends in patient and hospital characteristics, post-operative complications and operative modality over time.

**RESULTS:** Over the years sampled, 9,339 children were admitted with open tibial fractures. Mean age was 12.35 years.

The incidence of open tibial fractures has decreased, from 1,924 (27.7 per million) in 1997 to 1,005 (13.9 per million) in 2012. From 1997 to 2012 there were significant changes in management over time.

There was an increase in proportion of cases admitted to large (51.9% to 69.8%,  $p<0.001$ ) urban, teaching (49.8% to 75.8%,  $p<0.001$ ) hospitals. Primary internal fixation increased (35.1% to 59.2%,  $p<0.001$ ), while flap reconstruction decreased (38.6% to 26.7%,  $p<0.001$ ). Complication rates were stable (3.1% to 3.3%,  $p=0.475$ ), while charges increased over time (\$20,067 to \$65,736,  $p<0.001$ ).

**CONCLUSION:** There is a clear trend toward centralization of care; however, there has been no improvement in complication rates, with a decrease in flap reconstruction. The role of plastic surgeons in the management of these injuries should be further investigated.

#### **Reference Citations:**

1. Aquina CT, Probst CP, Becerra AZ, Iannuzzi JC, Kelly KN, Hensley BJ, et al. High volume improves outcomes: The argument for centralization of rectal cancer surgery. *Surgery*. 2016;159:736-48.

### **Evaluation of Bilateral Cleft Lip Patients Using Anthropometry in a Multicultural Setting: Defining Predictive Measurements of Severity Pre and Post Operatively**