flaps, introduced in 1972 by Scolnick and McCall, was an improvement on existing techniques in that they varied the type of flap according to the patients lateral pharyngeal wall motion. The purpose of this study was to describe a central defect-control pharyngeal flap, as we call it, with varying width determined by preoperative nasoendoscopic findings, and assess surgical outcomes by perceptual speech evaluation and nasometric analysis.

MATERIALS AND METHODS: The authors reviewed medical records of all children who underwent a central defect-control pharyngeal flap performed by the senior author (Rong-Min Baek) from May 2008 to January 2014. 74 patients were included. Preoperative nasopharyngeal endoscopy had been performed to make a complete observation of sphincteric movement and central velopharyngeal port during speech. The unique cobblestone pattern on the posterior pharyngeal wall for each patient was used as landmarks to determine the width of flap. During surgery, watertight closure was performed at all sites to prevent scar contracture of raw surfaces. Preoperative and postoperative velopharyngeal function was assessed through perceptual speech evaluation and nasometric analysis. The correlation factors of long-term surgical outcome were analyzed.

RESULTS: 96.3 % of the patients showed velopharyngeal competency after surgery. No obstructive sleep apnea was seen. Significant improvement was observed in perceptual speech evaluation and nasometric analysis at both short term (6 months) and long term(2 years) follow-up (p<0.001). The preoperative size of velopharyngeal gap, the closure pattern of velopharyngeal sphincter, symmetry of lateral pharyngeal wall, the degree of hypernasality, the degree of nasal emission, the age at surgery, and the etiology of VPI did not correlate to long-term postoperative velopharyngeal function.

CONCLUSION: The central defect-control pharyngeal flap with emphasis on filling the central velopharyngeal port defect with inidividually-sized flaps, is highly successful in treating velopharyngeal insufficiency without major complications. Preoperative nasopharyngoscopy is a valuable tool in determining the size of flap. Individualized design of flap dimension, together with elimination of all raw surfaces during surgery, seems to produce adequate velopharyngeal closure that lasts over time, as demonstrated in the patients’ speech evaluation and nasometric analyses.

DISCLOSURE/FINANCIAL SUPPORT: None of the authors has a financial interest in any of the products, devices, or drugs mentioned in this manuscript.

Challenges in Abdominoplasty, Management of Difficult Cases: Review and Surgical Classification

Walter Marrou, MD; Martin Robles, MD; Alberto M. L. Caldeira, MD, PhD

INTRODUCTION: Big abdominal deformities or abdominal surgical sequelae constitutes a surgical challenge constantly defying a surgeon’s expertise and techniques. The difficulties approaching these patients are caused principally by poor skin tissue in the abdominal region, where multiple scars, adherences, retractions, traumatic and iatrogenic injuries can be found. This work will show different approaches to successfully classify and manage some of these difficult cases maintaining an aesthetic component to it.

MATERIALS AND METHODS: The authors revise complex abdominal wall deformities, propose a classification for them and present three cases considered for surgical reconstruction, which will be addressed not only throughout the anterior abdominal wall, but by modeling of the whole body contour.

RESULTS: In spite of established treatments, abdominal aesthetic surgery needs a global approach relative to body contouring. Treating the whole thoraco-abdominal area in order to reconstruct anterior wall deformities will result in an improved harmony of the patient’s body contour.

CONCLUSION: The cases here presented require the surgeon to part from established surgical approaches, modifying and incorporating unusual techniques so that the final outcome exhibits refined and aesthetic results.

DISCLOSURE/FINANCIAL SUPPORT: None of the authors has a financial interest in any of the products, devices, or drugs mentioned in this manuscript.

Clinical Outcome of Porcine Intestinal Sub-Mucosa Usage, a Case Series

Abdelfatah S. Abou Issa, MD, MS; Richard Simman, MD

INTRODUCTION: Porcine intestinal sub-mucosa matrix is an extra cellular collagen rich matrix derived from sub-mucosa of porcine intestine. It is composed of collagen type I, glycosaminoglycan and proteoglycans. Our case
series study has shown the promising effect of porcine sub-
mucosa matrix in healing of different kind of wounds.

**OBJECTIVE:** To test the clinical outcome of porcine sub-
mucosa matrix when we use it in variety of wounds with different etiologies.

**MATERIALS AND METHODS:** This was an observational case series with prospective review of five different patients with different types of wounds who received this collagen rich matrix (sub-mucosa of porcine) during their treatment.

**RESULTS:** The first case, diabetic patient with complicated transmetatarsal amputation of gangrenous left forefoot with flaps closure. A total of 3 applications over the period of two months were needed to heal his wounds. The second case involved a patient with non-healing right leg ulcer. The pathology revealed Marjolin’s ulcer (squamous cell carcinoma). After clearing the margins, two applications of sub-mucosa porcine matrix were needed over the period of 6 weeks to heal the wound. The third case involved an anticoagulated patient with right hand traumatic hematoma. Surgical debridement was done leaving her with exposed extensor tendons. One application of sub-mucosa porcine matrix was required to achieve complete healing in 4 weeks. The 4th case involved a patient with stage IV sacral coccygeal pressure wound. Three months later and after 11 applications of sub-mucosa porcine matrix, his wound healed. The last case involved a patient with stage IV sacral coccygeal pressure wound. Three months later and after 11 applications of sub-mucosa porcine matrix, his wound healed. The third case involved an anticoagulated patient with right hand traumatic hematoma. Surgical debridement was done leaving her with exposed extensor tendons. One application of sub-mucosa porcine matrix was required to achieve complete healing in 4 weeks. The 4th case involved a patient with stage IV sacral coccygeal pressure wound. Three months later and after 11 applications of sub-mucosa porcine matrix, his wound healed. The last case involved a patient with stage IV sacral coccygeal pressure wound. Three months later and after 11 applications of sub-mucosa porcine matrix, his wound healed.

**CONCLUSION:** Wounds with different etiologies were successfully treated with porcine intestinal sub-mucosa matrix. By replacing the lost extracellular matrix to guide cellular growth and migration, porcine intestinal sub-mucosa matrix did ultimately fasten the healing process.

**DISCLOSURE/FINANCIAL SUPPORT:** None of the authors has a financial interest in any of the products, or drugs mentioned in this manuscript.

**Complications, Length of Stay, and Economic Burden Among Children Undergoing Pectus Excavatum Repair**

_E. Hope Weissler, BA; Paymon Sanat-Mehrizy, BA; Benjamin Massenburg, BA; Hillary Jenny, BS; Peter J. Taub, MD; Peter S. Midulla, MD_

**PURPOSE:** Pectus excavatum is the most common chest wall deformity. Repairs broadly fall into open or minimally invasive types. The authors aimed to explore the prevalence and financial implications of complications of repair.

**METHODS:** The Healthcare Cost and Utilization Project Kids’ Inpatient Database, the largest all-payer pediatric inpatient database, was queried by ICD-9 code for patients from 2000–2012 with a primary diagnosis of pectus excavatum admitted primarily for its repair. Independent t-tests and Mann Whitney U tests (for equal and unequal variances, respectively) as well as regressions with variables found to be significant on univariate analysis (p<0.05) were used to relate hospital charges and complications. Dollar values are in 2015 amounts.

**RESULTS:** Nine thousand thirty-two patients were admitted for repair, of whom 85.0% were white and 16.5% were female. The average age was 14.17 years and the average length of stay was 4.64 days. 733 patients (8.1%) had “thorascopy” co-coded. 1,543 patients (17.1%) had at least one complication, the most common of which was iatrogenic pneumothorax (N=964, 10.7%), followed by post-operative pain (N=436, 4.8%) and pleural effusion (N=239, 2.6%). There were no injuries of the heart or lungs. Using binary logistic regression controlling for race, hospital size, hospital teaching status, age, and household income quartile, complications were more likely in larger hospitals (OR 1.32, 1.15–1.53) and with increasing age (OR 1.06, 1.03–1.08). The average hospital charge was $41,015.58. Using linear regression, hospital charges were associated with western location ($13,070.78, p<0.0001), age ($429.33, p<0.0001), large hospital size ($1,121.92, p=0.18), length of stay ($8,254.58, p<0.0001), and number of procedures ($3,296.04, p<0.0001) and diagnoses ($1,750.76, p<0.0001).

**CONCLUSIONS:** Pectus excavatum repair is a potentially complicated procedure, with nearly one fifth of patients suffering complications. Given isolated reports of cardiac injury associated with pectus excavatum repair, it was reassuring not to find this complication in this large, national sample.\(^1\)\(^2\) The reasons for more common complications in larger hospitals should be explored for potential process changes that could lead to safer procedures; it is possible that these hospitals are managing more complicated cases. Due to insensitive ICD-9 codes for types of pectus excavatum repair, conclusions cannot be drawn about the outcomes of the Nuss versus Ravitch repairs; however, this is the largest study of complications and hospital charges associated with pectus excavatum repair.