relatively low and acceptable complication rates while achieving more functional outcomes. This series demonstrates the utility and success of VBFs for a variety of clinical situations.

**Extended Medial Gastrocnemius Rotational Flap for Treatment of Mid Tibia Chronic Osteomyelitis**

**Presenter: Vidas Dumasius, MD**

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**BACKGROUND:** The mid-tibia region is a challenging reconstructive region given the paucity of soft tissue options and local muscle flaps available for reconstruction. A free-tissue transfer may not be an option in all cases due to patient comorbid conditions, personal preferences or operative resources availability. An extended medial gastrocnemius rotational flap may provide a safe, versatile and effective treatment option in the mid tibia region.

**METHODS:** In this case series 5 patients with chronic osteomyelitis of the middle tibia region were treated with extended medial gastrocnemius rotational flap. In 2 cases original injury was a gunshot wound and in 3 cases it was an open fracture that never healed. Delay in treatment ranged from 10 to 30 years. Patients on average have undergone over 10 surgical procedures to treat their chronically infected, draining and non-healing mid tibia wounds. In addition to surgical procedures patients have been treated by systemic multi antimicrobial regimens on average 7 times in a hospital setting and an outpatient setting.

**RESULTS:** All patients underwent staged-procedures with wide debridement of infected field along with collection of cultures and pathological specimens to rule out malignance. Orthopedic surgery service provided evaluation and stabilization of the tibia with external fixation. The initial treatment included an irrigating WoundVac therapy with 0.125% Dakin’s solution for 5 days and systemic broad spectrum antimicrobial therapy. Infection disease consult was initiated to assist with antimicrobial therapy.

During the second stage medial gastrocnemius rotational flap was disinserted from Achilles tendon and rotated to the established defect. Given the location and size of the defect the facial layers of the muscle on both sides were scored using the cautery every 1–1.5 cm in longitudinal and horizontal direction of the muscle fibers. Scoring increased the size of the muscle coverage by 50% allowing further distal tibia defect coverage. The muscle flap was covered with split thickness skin grafts and WoundVac as a bolster dressing.

At the 1 year follow up all patients remained infection free, have not required further hospitalizations or antimicrobial therapies. Given a significant bone loss during the debridement procedure 2 of the patients underwent bone grafting under the flap without complications.

**CONCLUSION:** In summary, this case series demonstrates that extended gastrocnemius flap in selected group of patients can be used to treat middle portion of the tibia defect. A systematic multidisciplinary team approach provides the ideal treatment option for these complex chronic lower extremity wounds.
PSTM 2018 Abstract Supplement

SATURDAY, SEPTEMBER 29, 2018

CRANIOMAXILLOFACIAL/HEAD & NECK SESSION 1

Direct Brain Recordings in Craniosynostosis Can Predict Future Language Development

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PURPOSE: Non-syndromic craniosynostosis is associated with a multitude of language deficits. Early detection and prevention is essential for language remediation in these cohorts. The current standard assessment, the Bayley Scales of Infant Development (BSID), provides little predictive value for long-term development. Auditory event-related potentials (ERPs), in particular the mismatch negativity (MMN), measure passive neurological responses to speech sounds and suggest a promising avenue for analyzing infant speech development, particularly in craniosynostosis. We now provide long-term follow up neurocognitive assessment of patients with midline synostosis (sagittal and metopic) in comparison to BSID and ERP testing in infancy.

METHODS: Non-syndromic craniosynostosis infants who received surgical correction for craniosynostosis were recruited one month post-operatively from the institutional Craniofacial Clinic. Participants were given the BSID by a licensed child psychologist. Immediately following, participants were presented with a non-native phoneme discrimination paradigm involving the Hindi retroflex phoneme /da/ and the dental phoneme /da/ in random order. Auditory stimuli were set at 80 dB, and EEG was recorded at 250 Hz with a 128-channel HydroCel Geodesic Sensor Net. Analysis focused on four electrode clusters: left and right frontal electrodes and left and right central electrodes. The MMN component was calculated as the largest negative amplitude in the difference wave between 80-300ms after stimulus presentation. Once patients reached ≥6 years of age, they completed a battery of neurodevelopmental tests (Wechsler Abbreviated Scale of Intelligence and Wechsler Fundamentals) with 6 sub-assessments that measure language-related functional domains. Statistical comparisons were performed with univariate regressions.

RESULTS: Of twenty non-syndromic sagittal and metopic craniosynostosis patients who received BSID/ERP testing post-operatively and are currently eligible for long-term neurocognitive follow-up, data is currently available for nine (average age 8.1 years; 22% female; 55% sagittal, 33% metopic, 11% metopic and sagittal; all patients received whole vault cranioplasties). Univariate regression analyses showed that left frontal cluster MMN positively predicted word reading scores ($\beta$ 3.00, $R^2$ 0.48), reading comprehension scores ($\beta$ 3.57, $R^2$ 0.54), and reading composite scores ($\beta$ 3.33, $R^2$ 0.57). Right frontal and bilateral central clusters did not significantly predict scores. In comparison, BSID receptive language scores negatively predicted word reading ($\beta$ -27.48, $R^2$ 0.67) and reading comprehension ($\beta$ -17.41, $R^2$ 0.86), while BSID cognitive, expressive language, and language composite scores had no predictive value for future neurocognitive language scores.

CONCLUSION: Our prospective longitudinal assessment shows that ERP assessment in patients with sagittal and metopic synostosis has significantly better predictive value for future neurocognitive assessment than the current gold standard BSID test. Left frontal measurements approximate the location of language associated brain centers. This suggests that high fidelity ERP testing should be performed following surgical correction of craniosynostosis. This may help tailor treatment for possible language deficits in future development.