**University of Michigan, Ann Arbor, MI, USA**

**PURPOSE:** Severe musculoskeletal trauma as observed in crush injuries and prolonged ischemia as seen in flap reconstruction and composite tissue allotransplantation is associated with ischemia-reperfusion (IR) injury leading to an aberrant inflammatory response. While smaller muscle injuries heal by complete muscle regeneration, complex injuries result in aberrant healing with muscle fibrosis. However, the inflammatory cascade that is governing this process remains incompletely understood. Recently, neutrophil extracellular traps (NETs), extracellular DNA structures released by neutrophils, have been implicated in the initial phases of ischemic inflammation. In this study, we develop a mouse extremity polytrauma model of combined muscle trauma and IR injury to assess the initial inflammatory response.

**METHODS:** Male C57BL/6 mice were randomized into three treatment groups: 1. Fibrosis model: Cardiotoxin (CTX) injection into the tibialis anterior (known fibrosis model); 2. IR model: hindlimb ischemia by occluding the femoral artery using a microvascular clamp for 3.5 hours followed by reperfusion for up to 5 days 3. Polytrauma model: IR plus CTX injection (n=4 mice/group). Bioluminescent imaging for myeloperoxidase as a readout of inflammation was analyzed as well as neutrophil elastase. Additionally, lower extremity muscle was harvested for flow cytometry to assess inflammatory cell subpopulations and histology.

**RESULTS:** Macroscopic evaluation of muscle specimens revealed an evident area of necrosis and apparent muscle changes while the CTX alone and IR alone muscles appeared normal. In-vivo imaging revealed significantly increased inflammation as measured by myeloperoxidase and neutrophil elastase activity in mice undergoing IR+CTX than either of the other groups. This was further corroborated by flow cytometry where we found differences in inflammatory cell subpopulations with more inflammatory monocytes/macrophages and neutrophils recruited to the muscle injury site in the IR+CTX group (p(Monocytes: IR+CTX vs. CTX only)=.000002 and p(Neutrophils: IR+CTX vs. CTX only)=.037).

**CONCLUSIONS:** Our findings demonstrate that combined IR+muscle injury (CTX) results in significantly increased muscle injury than either ischemia or muscle injury alone. This was characterized by an elevated inflammatory response with amplified recruitment of pro-inflammatory macrophages and neutrophils. This model can be utilized to examine the effects of musculoskeletal polytrauma on muscle regeneration and fibrosis. A better understanding and description of the inflammatory cascade after extremity IR injury will enable early intervention and prevention of post-traumatic muscle fibrosis.

**QS53**

**Violence Against Women: Facial Fractures Secondary to Assault in the Urban Female Population**

Nicholas C. Oleck, BA, Farrah C. Liu, BS, Jordan N. Halsey, MD, Edward S. Lee, MD, Mark S. Granick, MD

Rutgers New Jersey Medical School, Newark, NJ, USA

**PURPOSE:** Assault has been frequently indicated as a major cause of facial trauma in the United States and around the world. Facial fractures secondary to assault have been shown to occur at a much higher rate in the male population as opposed to females. While these injuries may occur less frequently in females, they remain a significant medical problem within this demographic as facial trauma is one of the most frequently reported injuries resulting from domestic violence against women. Numerous studies have examined facial fractures in the general population, but few have assessed these injuries in females specifically. The objective of this study is to assess facial fractures secondary to assault in the female population. We intend to examine the prevalence and specific mechanism of action of these injuries in order to develop effective management strategies and decrease the likelihood of future injury.

**METHODS:** All facial fractures between the years 2001 and 2011 were retrospectively reviewed based on International Classification of Disease (ICD-9) codes. The facial fractures included in this study were the result of assault in the female population in an urban, level 1 trauma center (University Hospital, Newark, NJ). Results were categorized by patient demographics, location of fractures, concomitant injuries, length of hospital stay, critical complications, and surgical management strategies.
RESULTS: From 2001 to 2011, 139 female patients were identified as having sustained fracture(s) of the facial skeleton due to assault. Mean age was 34.61 (range 1–73) years. A total of 202 fractures were recorded and treated. Most common fracture sites were those of the mandible (35.15%), orbit (22.28%), zygoma (15.84%), nasal bone (14.35%), and zygomaticomaxillary complex (7.92%). A Glasgow Coma Scale score was documented for 33 patients, averaging 13.7 (range 7–15). 16 patients were intubated on, or prior to, arrival to the ED. 100 patients required a surgical airway. Intubation in the ED was significantly associated with increased length of stay (P<0.0001). The most common concomitant injuries were facial/scalp lacerations (22.3%), maxillary sinus fracture (8.63%) and skull fracture (8.63%). 106 patients required surgical intervention. Of these, 32 required open reduction and internal fixation, 12 required closed reduction, and 22 underwent both open and closed reductions. 37 patients required soft tissue management and laceration closure. Average hospital length of stay was 5.8 days (range 1–58). 9.23% of the patients were admitted to an intensive care setting, while 90.77% were admitted to this hospital. One patient expired.

CONCLUSION: Traumatic facial injuries secondary to assault remain a significant medical problem in the urban female population. The authors hope that this study can provide some insight and further investigation into this topic as there is a dearth of literature regarding the management of facial fractures due to assault of the female population. Beyond the surgical treatment of facial fractures, it is necessary to examine the patterns of injury and presentation in order to improve prevention techniques, screening tools, and psychological support for victims of assault.

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What is the Difference Between Sagittal with Metopic and Isolated Sagittal Craniosynotosis? A Whole Brain Intrinsic Connectivity and Diffusion Tensor Imaging Study

Rayssa Cabrejo, BA1, Cheryl Lacadie, B.S.1, Carolyn Chuang, MD, MHS1, Jenny Yang, MD, MHS1, Alexander Sun, BS1, Eric Brooks, MD, MHS1, Joel Beckett, MD, MHS1, Kyle Gabrnick, MD1, Derek Steinbacher, DMD, MD1, Michael Alperovich, MD, MSc1, Kevin Pelprey, PhD2, Todd Constable, PhD1, John Persing, MD1

1Yale School of Medicine, New Haven, CT, USA, 2George Washington University, Washington, DC, USA

PURPOSE: The purpose of this study is to understand the neurological differences between patients born with combined sagittal and metopic craniosynostosis (SMc) and isolated sagittal craniosynostosis (ISc).

METHODS: The authors collected diffusion tensor imaging (DTI) and resting-state functional connectivity MRI (fMRI) data in eight infant patients: four in the SMc group (5.1 ± 1 months of age) and four in the ISc group (4.6 ± 0.9 months of age). Resting state fMRI and DTI data were acquired using a 3-T Siemens Trio MRI system (Erlangen, Germany) while the infant patients slept without sedation. fMRI data was corrected for movement using SPM (University College London, UK), underwent cerebrospinal fluid and white matter signal regression and further analyzed with BioImageSuite (Yale University, USA). For the DTI data, three diffusions run were averaged, processed utilizing FMRIB Software Library (Oxford University, UK), and analyzed statistically using BioImageSuite (Yale University, USA).

RESULTS: fMR and DTI data for SMc demonstrated that there was statistically significant increased connectivity in the right Broadmann Area (BA) 9 corresponding to the dorsolateral prefrontal cortex (DLPFC). Decreased connectivity in the right BA 31 and BA 23 corresponding to the posterior cingulate cortex (PCC) (p<0.001) was also noted. Analysis of the DTI revealed increased fractional anisotropy in the SMc group in the cingulate compared to the ISc group (p<0.05).

CONCLUSION: “Functional brain connectivity” or the association of timing of similar activation of areas of the brain, is studied utilizing fMRI, as it measures differences in blood oxygenation throughout the brain. Lower connectivity, where there is less simultaneous oxygen utilization of the region, and higher connectivity where there is increased oxygenation. The SMc had decreased connectivity in the DLPFC, an area important in executive function such as