emotional outcome in facial palsy, a single-stage procedure with a muscle that has a nerve able to reach from the paralysed side to the active donor nerve is preferred.

**QS25**

**Limb-preserving Autologous Reconstruction In Patients With Soft-tissue Malignant Neoplasms: An Analysis Of 468 Cases From 2005 - 2017 ACS-NSQIP National Database**

Samyd S. Bustos, MD¹, Maria Yan, MD¹, Doga Kuruoglu, MD¹, Gabriel F. Martinez Galvez¹, Antonio J. Forte, MD, PhD, MS², Brian T. Carlsen, MD¹, Steven L. Moran, MD¹, Oscar J. Manrique, MD, FACS¹

¹Mayo Clinic, Rochester, MN, USA, ²Mayo Clinic, Jacksonville, FL, USA.

**Purpose:** Limb-sparing procedures are replacing amputations in patients with limb soft-tissue malignancies. Autologous reconstruction restores limb function while improving quality of life. However, nationwide studies comparing types of flap are lacking. Herein, we conduct a nationwide short-term outcomes analysis of limb-preserving autologous reconstruction in patients undergoing resection of soft-tissue malignant neoplasm.

**Methods:** Patients who underwent limb-preserving autologous reconstruction after soft-tissue malignant neoplasm resection between 2005-2017 were identified using Current Procedural Terminology Codes for the excision/resection and their concurrent reconstruction in the ACS-NSQIP database. Demographics, operative characteristics, and surgical outcomes were assessed. Comparisons between type of flap and extremity were performed.

**Results:** 468 cases were identified: 392 pedicled (121 upper and 271 lower extremities) and 76 free flaps (28 upper and 48 lower extremities). Overall mean age and BMI were 60.1 years and 29.4 kg/m², respectively. Patient demographics were not statistically different between free and pedicled flap groups. The free flap group had a higher risk of unplanned reoperations (adjusted OR 3.6, 95% CI 1.6-8.3). The lower extremity group showed a higher risk of surgical-site infections (SSI) (adjusted OR 3.5, 95% CI 1.5-8.5). Overall, patients with an operative time above the median (3.4 hours) were associated with a higher risk of SSI, bleeding requiring transfusion, and unplanned reoperation (p<0.004).

**Conclusion:** Autologous reconstruction is a powerful option for limb preservation after soft-tissue malignant neoplasm resection. Based on ACS-NSQIP data, free flap reconstruction and lengthier operative time were associated with higher risk of complications. The therapeutic approach should be considered on an individual basis contemplating the risks and benefits of each type of flap.

**QS26**

**Differential Secretomes Of Processed Adipose Grafts, The Stromal Vascular Fraction And Adipose-derived Stem Cells**

Summer E. Hanson, MD PhD¹, Malke Assad¹, Yewen Wu, MS¹, Qixu Zhang, MD PhD¹, Cynthia Branch-Brooks¹, Charles Butler, MD¹, Peiman Hematti, MD²

¹The University of Texas MD Anderson Cancer Center, Houston, TX, USA, ²The University of Wisconsin, Madison, WI, USA.

**Purpose:** Autologous fat grafting (AFG) is a widely accepted technique for soft tissue replacement or augmentation; however, graft take or retention remains unpredictable. To address this, there have been numerous variations in the processing technique, including the addition of progenitor cells known as adipose derived stem cells (ASCs) or other cells from the stromal vascular fraction (SVF). The objective of this study was to compare cytokine, chemokine and other protein expression in adipose grafts, the heterogenous SVF and a pure population of ASCs.

**Methods:** Adipose grafts were harvested from healthy female donors and processed via three commonly used techniques: centrifugation (C), an active filtration device (AF, Revolve) or a passive filtration system (PF, Puregraft). Each resulting graft was further processed to isolate the SVF and protein for analysis. A pure population of ASCs expanded from each donor to passage 4 were used for comparison.

**Results:** When comparing cytokine expression between the graft, SVF cells and pure ASCs, we found variations
both across the three processing techniques and among the sample components (i.e., ASCs, SVF or fat). There were similar concentrations of adipogenic markers among all three grafts with minimal concentrations in the ASCs or SVF. Angiogenin, CD31 and vascular endothelial growth factor (VEGF) were used as markers of vasculogenesis. CD31 expression was similar among all samples. VEGF and angiogenin values were higher in the graft samples processed with the AF system compared to PF or centrifugation. Markers of inflammation had the greatest variability. For example, C-reactive protein (CRP) was not expressed in the pure ASC samples but similarly found in the SVF and grafts across all three techniques. Conversely, IL-8 was minimal in the grafts, and comparable in the SVF and ASC samples. CD14 concentration was negligible in the pure ASC populations, and comparable in the SVF and grafts processed by active or passive filtration; however, there was nearly two-fold higher concentration in the graft processed by centrifugation and minimal expression in the SVF. Markers important in tissue regeneration, hepatocyte growth factor (HGF), fibroblast growth factor (FGF) and matrix metalloproteinase 9 (MMP9), were similarly variable. FGF was comparable among all samples and all techniques. HGF was similar in the SVF and grafts resulting from filtration devices (AF and PF) but negligible in the SVF and grafts from centrifugation. MMP9 was highest in the SVF from all processing techniques compared to ASCs and fat.

Conclusions: This study compares secretomes of the adipose tissue grafts, SVF and ASCs resulting from three different processing techniques. While there were many similarities, there are differences in cytokine expression both in the graft and the associated SVF, particularly in inflammation and wound healing. These secretomes may impact graft retention and fat necrosis in the clinical setting or have implications in cell-assisted lipotransfer. Outcomes studies are underway to correlate these findings.

QS27

Vitamin D3 (calcitriol) Improves Autologous Fat Graft Retention In A Murine Model

Marisa DeSanto, BS1, Sheri Wang, BS2, Lei Chen,3,4, Alexander G Stavros, BS2, Jeffrey A Gusenoff, MD3,5; J. Peter Rubin, MD3,5, Lauren E Kokai, PhD3,5

1Ohio University Heritage College of Osteopathic Medicine, Athens, OH, USA, 2University of Pittsburgh School of Medicine, Pittsburgh, PA, USA, 3Department of Plastic Surgery, University of Pittsburgh; First Affiliated Hospital of Fujian Medical University: Fuzhou, Pittsburgh; Fujian, China, PA, USA, 4Department of Plastic Surgery, University of Pittsburgh; McGowan Institute of Regenerative Medicine, University of Pittsburgh, Pittsburgh, PA, USA, 5McGowan Institute of Regenerative Medicine, University of Pittsburgh, Pittsburgh, PA.

Introduction: Autologous fat grafting is an important technique in plastic surgery that is currently limited by unpredictable or unsatisfactory outcomes. After injection, adipose grafts experience hypoxia-induced necrosis, inflammation, macrophage-resorption and finally, repopulation by circulating cells. We hypothesize that reducing phagocytic clearance of the residual graft scaffold will increase overall retention following revascularization. Calcitriol, the active form of Vitamin D3, decreases inflammation and promotes adipogenesis, therefore we compared fat grafting with local and systemic calcitriol to control fat grafting outcomes in an animal model.

Methods: Coleman processed lipoaspirate from 3 unique donors was implanted bilaterally on the mouse dorsum and graft retention and viability were assessed at 1, 4, and 12 weeks. Calcitriol was either delivered systemically by thrice weekly calcitriol IP injections or locally by introducing calcitriol into the lipoaspirate container for 1 hour. To determine mechanism of action, in vitro experiments were performed with adipose particles suspended in media with calcitriol in 1% hypoxic culture and tissue viability and gene expression were measured.

Results: At 1 and 4 weeks, both local and systemic administration of calcitriol increased graft retention (p<0.05). At 12 weeks, systemic calcitriol increased retention from 54.6% to 79.8% (p<0.05) while local delivery was not significantly different from the control. At every study time point, there was no significant difference in the H&E based injury score between groups, however perilipin IHC showed adipocyte viability was increased at 12 weeks from 48.7% to 63.3% (local p<0.05) and from 48.3 to 70.7% (systemic, p<0.05). In vitro, calcitriol decreased the expression of inflammatory