Results

Axonal viability: after 8 weeks, axons had regenerated into the distal grafts in all lengths: mean myelinated axon counts (±SD): 7043 (±790), 6066 (±1838), 6491 (±983) in 2cm,3cm,4cm grafts, with no differences between graft lengths (p=0.48). One week after elevation and unfurling, the number of myelinated axons was significantly decreased in all groups (p<0.006): 3821 (±567), 2953 (±1107), 2894 (±1761) in 2cm,3cm,4cm grafts, with no differences between lengths (p=0.91). Ischemic injury: immediately after elevating a PING, blood flow within the distal half of the graft fell to baseline levels (i.e. no blood flow). 3 days after elevation, blood flow throughout the graft was significantly above baseline (p≤0.04) and matched/exceeded flow measured immediately prior to elevation. Functional impact: preliminary results suggest PINGs can deliver rapid functional recovery.

Conclusions: Axons remain present in clinically relevant numbers at the distal ends of PINGs after elevation and unfurling. A decrease in axon counts after elevation may relate to ischemia in the distal PING immediately after elevation. Preliminary functional results show PINGs are capable of delivering early functional recovery.

QS2

Outcomes Of Pediatric Dynamic Facial Reanimation After Two Decades

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Purpose: Pediatric facial paralysis has substantial functional consequences in a growing child including impaired quality of life. Microneurovascular facial reanimation is the gold standard for smile reconstruction; however, quantitative data are lacking regarding long-term outcomes, particularly beyond 10 years. The primary objective of this study was to evaluate the long-term surgical and patient-reported outcomes after dynamic reconstruction of unilateral facial paralysis in childhood.

Methods: A cross-sectional study was performed of patients in our institutional facial paralysis database (1978-2008) who underwent dynamic reconstruction of unilateral facial paralysis 20 or more years ago. All patients were treated as children with a staged cross face nerve graft and free functioning muscle transfer. Frontal facial photographs in repose and maximal smile prior to surgery, within 2 years post-surgery, and at long term follow-up were analyzed using the MEEI Face-Gram software for commissure excursion. Patient-reported outcomes were obtained using the FaCE Scale for subjective facial impairment and disability, as well as the FACE-Q Satisfaction with Outcome and FACE-Q Social Function scales. Results are reported as median [IQR] and non-parametric statistical analysis was performed with alpha of 0.05.

Results: Eleven patients were included with long term follow-up of 23.7 [5.6] years (6 females, 5 males; 5 congenital, 6 acquired; age at surgery 7.3 [6.3] years). For surgical quantitative measures, commissure excursion significantly improved from prior to surgery (-1.3 [7.4] mm) compared to follow up within 2 years post-surgery (7.0 [1.7] mm) (p<0.05) and from prior to surgery compared to long term follow-up (8.3 [4.9] mm) (p<0.001). There was no statistically significant difference in commissure excursion within 2 years post-surgery and at long term follow-up (p>0.05). For patient-reported outcomes, median FaCE Scale scores showed good function for social function (81/100), oral function (88/100), facial comfort (92/100), and overall score (75/100). On the FACE-Q Satisfaction with Outcome scale, 10/11 respondents somewhat agreed or definitely agreed with the statement, “I am pleased with the result.” On the FACE-Q Social Function scale, 10/11 respondents somewhat agreed or definitely agreed with the statements, “I make a good first impression” and “I feel confident when I participate in group situations.”

Conclusion: Dynamic reconstruction of unilateral facial paralysis in young children improves commissure excursion that is maintained at long-term follow up. As adults, these patients report a high level of satisfaction and social functioning with their smile reconstruction.

QS3

The Ideal Match: Optimizing Partial Face Transplants In Terms Of Skin Tone Discrepancies

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**Background:** Partial face composite allotransplantation poses a unique aesthetic challenge. Namely, partial face transplants need to resemble the patient’s native skin. The degree of resemblance considered acceptable is a prominent variable and may depend on the gender and underlying skin tone of the recipient. The primary aim of this study was to investigate the degree of skin tone matching deemed aesthetically tolerable, recipient gender, and recipient skin tone. Two populations were queried: (1) the general public and (2) plastic surgeons. Few studies have investigated this topic from either of these standpoints. A secondary aim was to determine whether participant characteristics such as demographics, skin color, and history of having had facial surgery impacted their perceptions.

**Methods:** This was a cross-sectional investigation of perceptions on skin tone matching. Participants from the general public were recruited through Amazon Mechanical Turk and surgeons were recruited through the American Council of Academic Plastic Surgeons. Participants were queried for aesthetic preferences using frontal face photos from age-standardized models. Skin tones of transplanted segments were varied using the Munsell color scale via Adobe Photoshop (Adobe Inc., San Jose, CA).

**Results:** In total, 550 lay participants from Amazon Mechanical Turk and 21 plastic surgeons provided complete survey responses. On average, plastic surgeons tolerated a lesser degree of skin tone discordance than the lay public: 87% of lay participants and 33% of plastic surgeons believed a change of 4 hues was acceptable ($p=0.02$). Additionally, all survey respondents tolerated less of a degree of skin tone discrepancy on female faces when compared to male faces (mean difference tolerated: 2 hues for females, 4 hues for males). Participants tended to tolerate less skin tone discrepancy in subjects with similar skin tones as their own (mean difference tolerated: 2 hues for own versus 4 hues for different skin tones, $p=0.04$).

**Conclusion:** This study highlighted the intensely subjective nature of aesthetic preferences surrounding skin tone matching on the face, which varied by demographics and between surgeons versus the lay public. Surgeons should ensure that they truly elicit their patients’ preferences, especially given that our results demonstrated a greater tolerance for discrepancies among the lay public compared to plastic surgeons. Procuring a graft for facial allotransplantation is challenging; understanding what level of skin tone discrepancy is tolerable to the recipient can help surgeons improve patient satisfaction and may also lessen time-to-transplant by enlarging the potential donor pool for this type of transplant.

**QS4**

**Optimizing The Decellularization Of The Rodent Epigastric Free Flap: A Comparison Of Automated SDS-based Protocols**

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**Purpose:** Raising flaps to cover complex wounds with exposed critical structures are lengthy operations that result in donor site morbidity. Tissue engineering research is developing with great promise to build replacement tissues without morbidity. Decellularization removes whole cells and cell debris, and is the initial step to create a scaffold with an intact vascular network. Benchmark measurement of the overall cellular level is quantification of the DNA content, where 50 ng/mg is classically considered as a threshold. Although perfusion decellularization and recellularization approaches have shown exceptional promise in whole organ engineering, there is minimal crossover into the microsurgical field. Sodium dodecyl sulfate (SDS)-based protocols are known to have deleterious effects on the ultrastructure and capillary network of the scaffolds, but remain the predominant choice for decellularization protocols. This study aims to optimize the SDS exposure protocol for automated decellularization by comparing different SDS perfusion times to gain better understanding of the balance between decellularization and scaffold preservation.

**Methods:** A 3D-printed closed-system bioreactor capable of continuously perfusing fluid throughout the vasculature was used for decellularization of free flaps. 2x2 cm fasciocutaneous free flaps from the epigastric region of the rat were harvested, and the vascular pedicle was isolated as a single