Results: Approximately 26 centers had performed 98 transplants in 62 individual patients at the time of the survey. All centers were emailed a survey and surveys were re-sent 3 times. Centers who did not respond were personally approached at the ISVCA Conference in 2017. Responses were received regarding 42 (67%) patients. Survey responses were scored between 1 and 5 suggesting that patients with a wide range of psychosocial variables have been transplanted. On preliminary review, there are increased episodes of rejection in transplanted patients with difficult interpersonal functioning with dependent personality traits, anxiety, and/or depression.

Conclusion: Psychosocial factors are important in the success of upper extremity transplantations. In this study, we have examined factors assessed by clinicians and compared these with known outcomes in the IRHCTT. Ongoing work is examining qualitative data, interviewing patients, families, and clinicians; and finally attempting to quantify the significance of these factors with model scenarios.

Recognizing emotional expression as an outcome of face transplantation

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Background: Face transplantation outcome assessments focus on recovery of motor, sensory, and vital functions of the allograft. Although those measures are important, face transplantation recipients seek to reintegrate into society where facial emotional expression is integral to life-enhancing moments. Despite high relevance, limited data are available about this topic in face transplantation. This study aims to fill the gap by establishing an objective method to assess emotional expression as an outcome in face transplantation.

Methods: We used FaceReader (Noldus, Leesburg, VA) to perform software-based video analysis on 46 video recordings of 7 face transplantation recipients. Recordings were taken at 6-month intervals over a post-transplantation follow-up period of 8 years (range: 6 months–8 years, mean: 4.3 years). Video analysis relies on the Facial Action Coding System and Active Appearance Method to evaluate a series of facial movements performed by face transplantation recipients in each recording. Facial expressions are given an intensity score value between 0 (absent) and 1 (fully present) for the presence of six basic expressions of happiness, sadness, anger, fear, surprise, and disgust. According to the manufacturer, intensity scores above 0.5 are considered to be detectable by a human observer, with improvement or deterioration of emotional expression between time points determined by changes greater than or equal to 0.1.

Results: Preliminary data from one full- and one partial face transplantation recipient at three time points (6 months, 2 years, and 4 years post-op) show maximum intensity score values for happiness, sadness, anger, fear, surprise, and disgust as follows: 0.39, 0.50, 0.05, 0.76, 0.78, and 0.03 for Patient 1; 0.46, 0.60, 0.28, 0.34, 0.53, and 0.09 for Patient 2. Results suggest that happiness, sadness, fear, and disgust are facial emotional expressions that can be objectively recognized in face transplantation recipients. Happiness, surprise, and fear improved over 4 years by 0.11, 0.46, and 0.12 for Patient 1, and 0.41, 0.28, and 0.19 for Patient 2. The most improvement was seen between 6 months and 2 years post-op. This is an ongoing study.

Conclusion: This study is proof of concept that objective measurement of facial emotional expression is possible for face transplantation recipients via software-based video analysis.

Decellularized vascularized nerve scaffolds for the repair of peripheral nerves

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Background: Peripheral nerve injuries are devastating, life-altering injuries. Decellularized scaffolds, which act as guide-conduits for the regenerating nerves, represent a promising approach to increase availability of nerve grafts and effective nerve reconstruction when used as vascularized grafts. Here, we report the development of a vascularized nerve scaffold in which the preserved vascular tree can be used for perfusion and recellularization in order to improve cell engraftment, supply of nutrient and, thus, regeneration and functional recovery.

Methods: Seven vascularized porcine sciatic nerve scaffolds were retrieved and perfusion-decellularization was applied using a SDS/Triton X detergent protocol. Decellularized vascularized porcine sciatic nerve scaffolds were characterized analyzing cell and DNA content and preservation of extracellular matrix, vascular tree and cytokine content. Reendothelialization of decellularized scaffolds was conducted with porcine-aorta endothelial cells in a perfusion-bioreactor.

Results: Scaffold vascularization was confirmed by angiography before and after decellularization. Morphologic examination of decellularized vascularized porcine sciatic nerve scaffolds and analysis of the DNA content demonstrated cell and antigen clearance. Extracellular matrix content and structures of the nerve fascicles were preserved. The vascularized

porcine sciatic nerve scaffolds' vasculature was characterized in three dimensions using micro-computed tomography (microCT) imaging and showed optimal vasculature preservation down to the capillary level. Cytokine quantification demonstrated a strong preservation of growth factors and reduced preservation of pro-inflammatory cytokines. Reendothelialization experiments showed porcine-aorta endothelial cell viability and engraftment with repopulation of the scaffold'svessels.

Conclusion: This study shows that perfusion-decellularization can be used to generate vascularized nerve scaffolds with preserved extracellular matrix structure and a functional vascular tree, which can be reendothelialized in vitro. As compared to non-vascularized conduits, vascularized engineered nerve scaffolds may represent an ideal approach for promoting better nerve regeneration in larger nerve defect reconstructions.

Psychosocial factors affecting recipients of vascularized composite allografts

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Background: While vascularized composite allotransplantation is an increasingly successful therapy, medication non-adherence appears to be an important cause of graft loss. Psychosocial factors predict medication adherence in solid organ transplant recipients, and early experiences suggest psychosocial factors may also play an important role in the success of vascularized composite allotransplantation.

Methods: We surveyed vascularized composite allotransplantation recipients to assess psychosocial factors associated with medication non-adherence in solid organ transplant recipients: anxiety, depression, personality, posttraumatic stress disorder, and perceived social support using validated tools (Generalized Anxiety Disorder 7-item Scale, Patient Health Questionnaire—9, 10-item Personality Inventory, Primary Care PTSD Screen for *DSM-5*, and Multidimensional Scale of Perceived Social Support).

Results: Three of four vascularized composite allotransplantation recipients at our transplant hospital participated (75% response rate; Table 1). Screening revealed that no participants had posttraumatic stress disorder, and that all participants had high levels of social support. All participants demonstrated high levels of emotional stability and two demonstrated high levels of extraversion; however, agreeableness, conscientiousness and openness to new experiences were each demonstrated by only one participant. One participant demonstrated minor depression, and two participants demonstrated mild anxiety (Table 2).

Conclusion: In this study, vascularized composite allotransplantation recipients appeared to have sufficient social support, which has previously been associated with better medication adherence in solid organ transplant recipients. However, vascularized composite allotransplantation recipients may be affected by other psychosocial factors such as depression and anxiety, which have been associated with worse medication adherence in prior studies of solid organ transplant recipients.

Table 1. Participant characteristics (n).

Education	
High school or GED	1
Associate's degree	1
Graduate degree	1
Income	
US$20,000–39,000	1
>US$120,000	2
All or part of income from disability	2
Marital status	
Single	1
Married	1
Divorced	1

Table 2. Prevalence of depression, anxiety, and personality traits among VCA recipients.

Depression	**N**	
No symptoms	1	
Minimal symptoms	1	
Minor depression/major depression, mild	1	
Major depression, moderately severe	0	
Major depression, severe	0	
Anxiety	**N**	
No symptoms	1	
Mild anxiety	2	
Moderate anxiety		
Severe anxiety		
Personality traits	**High levels (N)**	**Low levels (N)**
Emotional stability	3	0
Extraversion	2	1
Agreeableness	1	1
Conscientiousness	1	0
Openness to experiences	1	0

Lymphangiogenesis and immune regulation in vascularized composite allograft containing donor lymph nodes

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