near-normal range of motion (30–70 degrees) of the distal interphalangeal joint and good aesthetic results. All of the replanted digits developed protective sensation. The average length of hospital admission was five days. All patients were satisfied with the results and were able to return to their previous work.

CONCLUSION: The use of the reverse digital arterial arch is a novel and reliable technique in distal digital replantation when an increase in vessel length is required, allowing for a tension-free vessel repair without the need for vein grafts.

Rapid Detection of Acute Vascular Occlusion Using Oxygen Monitoring in a Rat Myocutaneous Flap Model

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PURPOSE: Free tissue transfer requires close postoperative monitoring for vascular occlusion. Vascular compromise commonly occurs in the immediate postoperative period in association with failure of the micro-vascular anastomosis. The resiliency of tissue to hypoxia and ischemia is crucial to the success of the surgery. It is estimated that 6 percent to 25 percent of skin flaps require a secondary surgical re-exploration and approximately 10 percent of flaps fail. Currently, all monitoring methods have limitations because they require an experienced operator, suffer calibration difficulties and are expensive. Furthermore, many of these methods impose a significant delay between the time of vessel occlusion and its detection. In this study we introduce implantable oxygen sensors as a new method to detect acute vascular occlusion.

METHODS: Experimental sensors were made by incorporating benzo-porphyrin dye into a matrix of biocompatible hydrogel. These sensors were approximately 3mm-long, 1.5mm-wide, and 0.5mm-thick. Male Sprague-Dawley rats were used throughout the study. Sensors were implanted intradermally in the impending flap site. Inspired oxygen was modulated between 100% and 12% to qualitatively confirm sensor sensitivity. Superficial inferior epigastric artery (SIEA) myocutaneous flaps were surgically elevated. The SIEA flap was first outlined on the shaved skin of the right ventral abdomen by placing a 3 × 5cm square template based on the location of the superficial inferior epigastric vessels. These vessels were carefully dissected to create a 3 × 5cm island flap containing skin, subcutaneous fat, and panniculus carnosus muscle. Tissue oxygen tension (TOT) readings were obtained from implanted sensors both at baseline and during vascular clamping of the feeding blood vessels.

RESULTS: Tissue Oxygen Tension (TOT) measurements from the sensors were observed to modulate as expected by a magnitude that correlated with the changes in the inspired oxygen levels. Clinical observation of the flaps did not show any significant change in color and temperature of the flaps during or immediately after clamping of the feeding blood vessels. Real-time analysis of the sensors implanted in the myocutaneous flaps has demonstrated that acute vascular clamping of the feeding blood vessels in the pedicle were immediately detected within 70 seconds. (*p<0.05)

CONCLUSION: Oxygen monitoring in tissues is highly sensitive and can be specific for the detection of acute vascular occlusion. This approach is superior to clinical observation, faster than current standard of care methods and offers a cost-effective, and accurate means of monitoring free tissue transfers.
SATURDAY, MAY 6, 2017  
SESSION 8 GROUP A  
10:30 AM – 12:00 AM

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Non-response Bias in Patient Reported Outcomes Research for Breast Reconstruction: Lessons from a Multi-institutional Prospective Cohort Study

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PURPOSE: Survey-based research has emerged as a primary method of evaluating the impact and outcomes of breast reconstruction in an era of patient centered care. Despite increased utilization of patient reported outcomes measures, such as the BREAST-Q surveys, there are few studies assessing non-response among study participants. Differential non-response to surveys threatens the generalizability and validity of studies evaluating patient reported outcomes. The objectives of this study were to identify independent variables associated with non-response to surveys following breast reconstruction to aid in the design and improvement of future patient-reported outcomes research.

METHODS: The Mastectomy Reconstruction Outcomes Consortium is a multi-institutional prospective cohort study involving 11 leading medical centers from the United States and Canada. Data were collected through a combination of self-reported patient surveys and medical record review. Patient reported outcomes including satisfaction with breast and with care (BREAST-Q), depression (PHQ-9), and anxiety (GAD-7) were collected preoperatively and at several intervals postoperatively. Non-response rates to BREAST-Q, PHQ-9, and GAD surveys were measured at one week, three months, one year, and two years following breast reconstruction. Complication rates between questionnaire responders and non-responders were compared at one year. Multivariable logistic regression models were designed with non-response as the dependent variable.

RESULTS: Among 3,083 women included in the analytic cohort, 2,060 (66.8%) underwent implant-based, 857 (27.8%) underwent autologous, and 166 (5.4%) underwent mixed breast reconstruction. Non-response rates to BREAST-Q surveys at one week, three months, one year, and two years postoperatively were 14.5%, 21.8%, 27.8%, and 34.4% respectively. At one year following reconstruction, the rate of non-response ranged from 8.0% to 41.4% among participating centers. Patient race and ethnicity, annual household income, and education were all associated with non-response to the postoperative surveys. Patients undergoing implant-based breast reconstruction were approximately half as likely to respond to BREAST-Q surveys at one year when compared with women who underwent autologous reconstruction. Neither satisfaction with care nor incidence of clinical complications was predictive of non-response to the surveys.

CONCLUSION: Although patient reported outcomes are increasingly utilized to assess and compare the impact of breast reconstruction procedures, there are few studies evaluating differential non-response rates to survey instruments among study participants. In a multi-institutional, prospective cohort study, racial and ethnic minorities, and women from lower income and education groups were less likely to respond to follow-up surveys. Additionally, women who underwent implant-based breast reconstruction were approximately half as likely to respond to BREAST-Q surveys at one year when compared with women who underwent autologous reconstruction. Researchers studying patient-reported outcomes in breast reconstruction should assess and adjust for non-response bias. Future studies are needed to design and implement effective approaches to improving response rates for patients at high risk of loss to follow-up.

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The Total Acute Phase Response Predicts Complications in Children with Musculoskeletal Infection

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PURPOSE: Pediatric musculoskeletal infection leads to intense activation of the acute phase response (APR) that