CONCLUSION: Our venous occlusion model provides a viable method to quantify the early venous occlusion process. A negative slope of 1.38%/min is highly significant for a venous outflow obstruction. This quantitative endpoint may elucidate when to plan for flap exploration. Further study is warranted to delineate differences that comorbidities and demographics impart.

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QS13

Bridging The Gap: Extending Free Flap Pedicle Length With Interposition Vein Grafts And Arteriovenous Loops

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PURPOSE: The purpose of this study is to assess clinical outcomes for utilization of vein grafts and arteriovenous loops in the context of free flap reconstruction. Free tissue transfer in complex oncological and traumatic defects may require extension of the vascular pedicle to reach recipient vessels and complete microvascular anastomosis. This can be accomplished by using vein grafts as a bridging medium. When interposition vein grafts (IVG) are needed for extension of both the arterial and venous conduit, a temporary arteriovenous fistula (AV loop) can be constructed as an intermediary step. These techniques have traditionally been regarded with increased risk of thrombosis and flap failure, but the body of clinically relevant published data lags behind.

METHODS: Following approval by our Institutional Review Board, we retrospectively analyzed patients requiring free flap reconstruction between March 2007 and June 2017. All patients utilizing any vein graft in this context were identified. Data collection included demographic, medical, surgical, and outcome variables.

RESULTS: A total of 90 IVG were used in 56 patients, receiving a total of 54 free flaps. Reconstructive sites included: head/neck (29; 51.8%), breast (13; 23.2%), upper extremity/trunk (9; 16.1%), and lower extremity (5; 8.9%). Twenty out of 26 AV loops created received flaps (11 immediate; 9 staged). Five AV loops thrombosed in staging and were discarded; one patient died in staging due to medical comorbidity. The duration of staging ranged from 1 to 59 days (median=4). Forty-two procedures utilized IVG (n=22; 3 arterial conduit only, 13 venous conduit only and 6 both) or AV loops (n=19) in the index flap surgery, of which 10 (24.4%) were taken back for emergent flap salvage (2 AV loops, 8 IVG group). Seven of these cases (eight flaps) were successfully salvaged. In 13 cases (14 flaps) IVG was utilized for free flap salvage (3 arterial conduit IVG, 10 venous conduit IVG), with a 78.6% successful flap salvage rate (n=11). Out of 54 flaps overall, 11 flap failures occurred (20.4%; 95% CI 10.6–33.5%). All flap failures occurred in the patients that used any IVG (with or without AV loop) for immediate reconstruction (two in AV loop group, 1 in IVG for both conduits, 5 in IVG for single conduit) or failed salvage utilizing IVG (3 in IVG for single conduit). Of the nine staged AV loops that received flaps, flap survival was 100%.

CONCLUSIONS: Interposition vein grafts and AV loops offer practical solutions for pedicle lengthening in order to successfully perform microvascular anastomosis, but increase risk of take-back and flap failure when utilized in the index flap surgery. Our data demonstrate that staged AV loops may be superior to immediate AV loops, owing to a de facto pre-identification of patients who may otherwise develop a flap complication after immediate reconstruction. Additionally, IVG appears to be an especially effective tool in cases of free flap salvage.

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QS14

Restoration of Flap Sensation Using Neurotized Anterolateral Thigh Flaps for Lower Extremity Reconstruction

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**PURPOSE:** In recent years, the anterolateral thigh (ALT) flap has become a workhorse flap with widespread indications. Lower extremity salvage rates have dramatically increased as a result. However, use of the ALT as a neurotized or re-innervated flap capable of restoring sensation in lower extremity reconstruction has been widely underreported in the literature.

**METHODS:** We performed a retrospective review of all lower extremity (LE) reconstructions between 2013 and 2015 performed by the senior author. Anterolateral thigh flap reconstructions that employed neurorrhaphy of the lateral femoral cutaneous nerve (LFCN) to a recipient site peripheral nerve were identified and selected for inclusion. Sensory testing was performed on the flaps at follow up visits.

**RESULTS:** A total of 15 lower extremity free ALT flaps were identified, 10 of which were neurotized free ALT flaps and eligible for inclusion. The mean age at time of reconstruction was 41.6 (range 7.1 - 56.7) years, with a male predominance of 80%. The mean operative time was 740 (range 113 - 1110) minutes, and mean length of hospital stay was 14.3 (range 7 - 31) days. Of the 10 procedures, the mean flap size was 186.6 (range 23 - 324) cm². Trauma (n=6), infection (n=3) and tumor extirpation (n=1) were the most common indications for salvage. Average follow-up was 174.25 days (range 72–555 days). There was a 100% limb salvage rate, and there were no cases of total or partial flap loss. There was one (n=1) tumor recurrence at a site distant from the primary resection. Return of protective sensation was evaluated via Semmes-Weinstein Monofilament, two-point discrimination, and light touch testing. Protective sensation (two point discrimination < 15 mm) was regained in 3 of 7 patients (43%). Light touch returned partially or fully in 6 of 7 patients (86%). Those with segmental or no return of sensation were of shorter duration of follow-up.

**CONCLUSION:** Neurotization of the ALT flap with the LFCN can restore protective sensation in complex lower extremity reconstructions, which will potentially reduce the complications related to insensate flaps in the foot and leg. Minimal donor site morbidity, a long vascular pedicle, the option to include muscle or fascia, and the ability to provide sensory re-innervation to the lower extremity make the neurotized ALT free tissue transfer an ideal flap for use in lower extremity reconstruction.

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**QS15**

**Evaluating the Best Use of 3D CT Angiograms in Free Abdominal Breast Reconstruction: Do fewer perforators correlate larger vessels?**

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**PURPOSE:** Autologous Microvascular Breast Reconstruction at the present time revolves around abdominal based Free Tissue Transfer. A 3D CTA is a commonly used in preoperative planning to identify the perforators and intact pedicle supplying the proposed flap. Based on flow mechanics one would hypothesize that as the number of perforators increase that the average size of each of the given perforators would decrease.

**METHODS:** One hundred charts of patients who underwent free abdominal breast reconstruction were reviewed, specifically examining CT angiograms with 3D reconstruction. The following data was collected: quantity, locations, and diameters of perforators, patient BMI, and pre-operative blood pressure. A sub group of Perforators within 3 cm superior and 5 cm inferior to umbilicus were of special interest, as this anatomical region is most commonly used for DIEP flaps. A Pearson correlation coefficient and Students Two sided Test were used to evaluate the data.

**RESULTS:** Contrary to our original hypothesis, we found that as perforator number increased as did the average perforator size (Pearson correlation coefficient of 0.31 on the left and 0.17 on the right, CI 99.9% and 95%). This led us to investigate the relationship of pre-operative BMI and mean arterial pressure with average vessel diameter. A larger BMI resulted in a larger average vessel diameter (Pearson correlation coefficient of 0.293 for the left and 0.286 on the right with CI of 99.5% for both). Blood pressure showed no statistical correlation with vessel size or number. One of