and length of perforators, and distance from midline were measured. Statistical analysis was performed with SPSS 16.0, one-way ANOVA, and post-hoc Tukey’s tests.

Results: All patients had a history of ≥2 previous failed reconstructions. Defects were secondary to gunshot injury, bone flap infection after cranioplasty performed for CVA and aneurism clipping, post-ablation irradiation, and post-frontal intracranial hemorrhage cranioplasty. Four defects were reconstructed using 2 ribs, whereas the remaining 4 patients received 1 rib. A prolene mesh was used to fill in the donor site defects in 6 patients. Average follow-up was 26 months (1-56 months). All patients had stable reconstructions. Headache resolved in 2 patients after reconstruction, and neurologic status improved in 3 patients. All patients showed some donor site morbidity with an increase in the Pain Disability Index. An average of 13.75 perforators could be localized in each cadaveric latissimus dorsi muscle. No perforator was found for the 7th rib. Not all cadaver sides contained perforating vessels for the 8th and 12th ribs. The distance from the midline to the first perforator was not different between the ribs (p = 0.499). Perforator diameter and pedicle length tended to decrease at more inferior rib levels. The 10th rib (4.65 ± 2.01) followed by 9th rib (3.7 ± 1.63) had the highest number of perforators. The 8th and 12th ribs contained the least perforators. The 8th rib had the longest perforators (4.26 ± 1.52 cm). The 8th and 9th had larger perforators than the 10th-11th-12th ribs (p = 0.021).

Conclusions: The LDRF can successfully address large composite cranial defects, provide support, and enhanced contour with acceptable donor-site morbidity. The 10th followed by the 9th rib has the best vascular supply for this flap. If 2 ribs are considered for the flap, the 9th and 11th are recommended. If only 1 rib is necessary for reconstruction, the 10th is ideal.

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A “Free Flap Timeout” Improves Maintenance Of Blood Pressure Goals In Cases Of Free Tissue Transfer

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Purpose: Free tissue transfer has been established as an invaluable technique within the field of reconstructive surgery. While there is no consensus regarding the optimal intraoperative blood pressure during cases of free tissue transfer, it has been demonstrated that intraoperative hypotension confers an increased risk of complication and flap failure. Blood pressure preferences vary from surgeon to surgeon. Maintenance of goal blood pressure is carried out by the anesthesia team but is heavily dependent on “across-curtain” communication. We chose to study the effect of a formal “free flap timeout” on maintenance of intraoperative blood pressure during cases of free tissue transfer at the University of Wisconsin.

Methods: A formal free flap timeout card was created containing a script, which was performed following the standard surgical timeout. The script included: 1) A statement that blood pressure is a major factor in the case, 2) A goal systolic blood pressure of 110mmHg (determined by a staff survey), 3) A prompt to share preferred interventions for maintenance of blood pressure, and 4) The specific request that anesthesia notify the surgical team when such measures are being employed. The anesthesia team was provided a “hand-off card” to keep at their station, which was used to record the blood pressure goals and preferred interventions during the timeout. Chart review was used to assess blood pressure during free flap cases prior to and following the installment of our “free flap timeout.” We recorded the number of instances systolic blood pressure dropped below the set goal during each case, how long each episode of sub-goal blood pressure lasted, the trough blood pressure of each episode, and the total amount of time the blood pressure spent below goal for the entire case. Data from pre- and post-intervention groups were compared using unpaired t-tests.

Results: A total of 68 pre-intervention and 55 post-intervention cases were assessed. Following our intervention, the duration of blood pressure episodes below goal significantly improved from a mean of 25.8 minutes to 15.8 minutes (p<0.0001). We also saw a significant improvement in the number of blood pressure dips per hour, decreasing from a mean of 4.4 dips to 1.7 dips (p<0.0001). The percentage of the case spent below the goal pressure significantly decreased from 48.1% to 36.9% (p=0.0045). The average trough blood pressure of each episode showed improvement from 97.8 mmHg to 99.0 mmHg, though was not significant (p=0.15).

Conclusion: We have demonstrated that a formal “free flap timeout” improves maintenance of intraoperative blood pressure during cases of free tissue transfer at the University of Wisconsin. Opportunities for explicit discussion of goals
and preferences may ultimately lead to improved outcomes following free flap reconstruction.

**Beyond The Abdomen: Extending The Enhanced Recovery After Surgery (eras) Pathway To Thigh-based Microsurgical Breast Reconstruction**

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**Purpose:** There is mounting evidence to support universal adoption of enhanced recovery after surgery (ERAS) pathways in patients undergoing microsurgical breast reconstruction. Champions of ERAS cite its ability to safely decrease length of hospital stay and opioid requirements. However, this data is entirely based upon patients treated with abdominal-based free flaps and fails to considering the growing popularity of alternative donor sites. The authors sought to examine the outcomes of patients undergoing both thigh and abdominal-based breast reconstruction before and after implementation of ERAS protocols.

**Methods:** A retrospective review of all patients that underwent microsurgical breast reconstruction over a two-year period at a single institution was conducted. Patient demographics and perioperative data were compared between those managed utilizing ERAS recommendations or pre-ERAS standards of care. Univariate analyses were performed for group comparisons.

**Results:** Eighty-two consecutive patients were identified, forty-one in each group. The mean age was 52.0±8.9 years. There were significantly more thigh-based flaps in the ERAS group than in the pre-ERAS group (22.0% vs. 2.4%, p=0.007). Average length of stay (LOS) was similar between the ERAS and pre-ERAS groups (3.5 vs. 3.6 days, p=0.486). During the immediate 24-hour post-operative period, patients in the ERAS group required significantly less opioids for pain management (24.2 vs. 31.9 mg of oral morphine equivalents, p=0.002), however there was no significant difference in opioid utilization throughout the remainder of the hospital stay (9.7 vs. 13.6 mg/day of oral morphine equivalents, p=0.318). Additionally, patients in the ERAS group had significantly increased post-operative intravenous fluid demands during the length of their hospital stay (40 vs. 31 mL/kg/day, p=0.023). A subgroup analysis comparing patients that underwent thigh-based flaps and abdominally based flaps within the ERAS group revealed no significant difference in LOS (3.3 vs. 3.5 days, p=0.507) or post-operative opioid utilization (9.6 vs. 12.5 mg/day of oral morphine equivalents, p=0.537).

**Conclusion:** Patients undergoing thigh and abdominal-based microsurgical breast reconstruction appear to benefit equally from adoption of ERAS protocols with regards to reducing overall opioid requirements. Our series did not show a difference in length of stay between ERAS and pre-ERAS cohorts, but did identify peri-operative fluid management and multi-modal pain control regimen beyond the first 24 hours as areas in which current ERAS protocols may be further improved.

**Advantages Of The Delayed-Immediate Microsurgical Breast Reconstruction: Extending The Choice**

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**Purpose:** Deep inferior epigastric perforator (DIEP) reconstruction can be performed in an immediate, delayed-immediate (immediate tissue expander followed by staged DIEP), or delayed timing following mastectomy. Several advantages of delayed-immediate reconstruction have been previously described which include avoiding radiation of the flap. The interval between the tissue expander placement and DIEP flap may grant patients additional time to choose between autologous and implant reconstruction. The purpose of this study is to evaluate patients undergoing immediate or delayed-immediate DIEP reconstruction.

**Methods:** Consecutive patients undergoing breast reconstruction from 2017-2019 by a single surgeon were divided into three groups: immediate DIEP after mastectomy (Group I); delayed-immediate DIEP (Group II); and patients who initially chose delayed-immediate DIEP but later decided on implants for the second stage of reconstruction (Group III). Exclusion criteria were patients that had delayed DIEP (no immediate reconstruction) or had implant reconstruction (direct to implant or two-stage reconstruction with