compared to the control hand. Comparing the test hand to the control hand allowed for the depiction of the “delta” that was sensitive enough to detect changes on a video without any additional augmentation.

RESULTS: The average rate of change in red pixels between video frames was noticeably different compared to control for both arterial occlusion (1.06x greater) and venous occlusion (1.07x greater). A graphical representation depicted a clear relationship while an individual was undergoing occlusion. There was a consistent pattern amongst patients returning from arterial occlusion to no occlusion as well that consisted of an increase in rate of average pixel change oscillations and greater range (The lowest bound corresponding to each individuals no occlusion chart, and the highest bound corresponding to that for venous occlusion).

CONCLUSION: Our smartphone video capture and analysis facilitates visualization of skin perfusion and can distinguish between states of no occlusion, arterial occlusion, and venous occlusion. The pattern shown after recovering from occlusion suggests that a similar pattern might be observed in tissue about to undergo occlusion, and implicates future studies could isolate diagnostic biomarkers before occlusion. This study shows promise for the use of inexpensive smartphone monitoring in a clinical setting for accurate free flap monitoring.

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Systematic Review and Guidelines for Perioperative Management of Pediatric Free Tissue Transfer Patients

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PURPOSE: Microsurgical free tissue transfer has gained popularity for various reconstructive applications in children, with successes reported despite the technical challenge of small caliber vessels. Although several recent publications describe strategies for perioperative care of adult free tissue transfer patients, no guidelines exist for children. The goal of this study was to identify the best available evidence on perioperative management of pediatric patients undergoing free tissue transfer, and to develop evidence-based recommendations to optimize outcomes.

METHODS: A systematic review of the literature was conducted in Pubmed, Embase, Scopus, and Cochrane Library databases from inception until June 2017. Two reviewers screened the search results to identify strategies to guide perioperative care of pediatric free tissue transfer patients. Due to the scant, low-level evidence found upon preliminary search of the pediatric microsurgical literature, both pediatric anesthesia guidelines for healthy children undergoing major surgeries as well as specific studies of pediatric free tissue transfer patients were included.

RESULTS: 170 articles were selected, their full text was reviewed, and 47 articles met criteria. Reasons for exclusion included vague / absent descriptions of perioperative care parameters, case reports, and studies of syndromic or chronically ill children. Management approaches specific to the pediatric population were identified, classified according to level of evidence (LOE), and used to formulate recommendations in six categories: patient temperature, anesthesia, fluid administration/blood transfusion, anticoagulation, and vasodilator use.

CONCLUSION: High quality (LOE 1) data was found for all but patient temperature (LOE 3) and vasodilator use (LOE 4) in the pediatric anesthesia literature, while the microsurgical literature provided LOE 3 data for anesthesia and analgesia, and LOE 4 data for all other categories. Key recommendations include administration of sevoflurane to induce general anesthesia, with supplemental regional blocks placed under ultrasound guidance (LOE 1). Regional sympathetic blockade improves outcomes in upper extremity microsurgery, and should be continued for postoperative pain control (LOE 3). A multimodal analgesia strategy should be implemented including NSAIDs (LOE 1). Preoperative fasting should be limited to 2–6 hours (LOE 1). Isotonic crystalloid should be used perioperatively (LOE 2), and transfusions restricted until hemoglobin <7 g/dl (LOE 1). Venous thromboembolism prophylaxis administration should be based on risk assessment, with chemical prophylaxis reserved for high risk patients, ideally with low molecular weight heparin (LOE 1). These guidelines serve as an important first step toward standardization of perioperative care in pediatric free tissue transfer to improve outcomes and minimize complications.