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“Analysis and trends in radiographic changes of head and neck free flaps over time.”

Surgeons currently overestimate flap volume intraoperatively, typically by 30-40% to account for postoperative atrophy. This approach is imprecise and there is limited existing data or standardized model to predict the magnitude and timing of volume loss after reconstruction. A better understanding of free flap volume changes over time, factoring in patient specific risk factors, is essential to improve surgical planning, long-term outcomes and accurate interpretation of post-operative imaging.

Approximately ten patients who underwent head and neck reconstruction with microvascular free flaps will be included in the retrospective chart review. The study period will span from August 1, 2015 to August 1, 2025. Data including Medical Record Number (MRN), Date of Birth (DOB), race, gender, type of flap, recipient site, donor site, height, weight, relevant risk factors such as chemotherapy, radiation, smoking, diabetes, and immunosuppression will be collected from the electronic medical record for each patient.

For each patient, preoperative, immediate postoperative, and long-term postoperative CT scans will be analyzed for evidence of tissue atrophy using Picture Archiving and Communication System (PACS). Flaps will be segmented manually in PACS. For each scan, the following data will be recorded: date of flap surgery (converted to time between surgery and imaging), postoperative imaging type, date of image collection (converted to time between surgery and imaging) series number, image number, slice thickness, minimum attenuation, average attenuation, maximum attenuation, and cross-sectional area. These values will then be used to compare volume and density changes across three time points to assess postoperative tissue loss.