challenges for the surgeon. There are multiple approaches to salvage dynamic function in patients with failed Free Functional Muscle Transfers (FFMT), however, there is a paucity of literature to help guide the surgeon in choosing a specific salvage modality. The objective of this study is to demonstrate the feasibility, describe the surgical technique, and assess the results of one such approach that had previously not been described – the reuse of the masseter nerve to re-innervate a new FFMT.

METHODS: Patients who presented between 2007 and 2017 to a single center after previously failed dynamic smile reanimation using the masseteric nerve who underwent a salvage dynamic procedure involving re-use of the masseteric nerve were analyzed. Additionally, patient demographics, history of radiation or chemotherapy, surgical techniques, and objective measurements using the MEEI Facegram software were evaluated.

RESULTS: The average duration of palsy was 6.2 years, and the average pre-operative HB score was 6. Etiologies of palsy included one patient with Bell’s palsy, two with parotid malignancies, and one with a CN7 schwannoma, with two patients requiring radiation preoperatively. Three patients failed to achieve any motion after one-stage reanimation with a FFMT to the masseteric nerve. The fourth patient initially achieved excursion, however, due to cancer recurrence and resection of FFMT, motion was subsequently lost. In one case, neurolysis of the masseteric nerve at the area of previous coaptation led to motion 8 days after surgery, while the others achieved motion an average of 4 months after re-dissection of the masseteric nerve and coaptation to a new FFMT. Overall this series achieved 11.32 mm of smile excursion on the paralyzed side with a 1.3 mm philtral deviation correction in repose.

CONCLUSION: Dynamic smile restoration with FFMT in previously failed reanimation patients is feasible. Careful patient evaluation and clear understanding of previous procedures is key to success. Use of a new donor nerve, a previously used donor nerve, and rarely, neurolysis of a previous FFMT nerve coaptation, may all provide successful reanimation.

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Evaluation of 3D Printed Cleft Lip and Palate Models in Plastic Surgery Education

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BACKGROUND: Modern plastic surgical education is challenged with increasing work hours restrictions, attainment of milestones for graduated responsibility, and a general decrease in operative independence. These challenges require residency programs to define new methods for delivery of education efficiently and preoperatively to augment the intraoperative surgical experience. We evaluated an approach using a three-dimensional printed cleft lip and palate silicone model for haptic simulation surgery in a laboratory setting.

METHODS: Three-dimensional modeling and printing of a unilateral complete cleft lip and palate model was performed and tested at two accredited plastic and reconstructive surgery residency programs. A standardized modified Millard cleft lip repair course was developed for model surgery and proctored by a craniofacial surgery faculty
RESULTS: 27 trainees from two institutions completed the cleft lip model surgery session. Improvement of pre-test to post-test self-assessed understanding of the surgery steps (mean 5.6 ± 1.6 to 6.3 ± 1.7) and confidence in performing the surgery (mean 4.9 ± 2.1 to 5.8 ± 2.6) were statistically significant (p=0.02, p<0.001, respectively). Additionally, the improvement of objective knowledge from pre-test to post-test (mean 13.7 ± 3.4 to 16.2 ± 1.7) was also statistically significant (p<0.001).

To differentiate between the improvement between different levels of training, trainees were separated into three levels based on post-graduate years (PGY) with low corresponding to <2 years, medium 3–4 years, and high >5 years. For both subjective measures of self-assessed understanding and confidence, post-test scores were elevated in higher level trainees while objective knowledge scores were not significantly different. When grouped by the number of primary cleft lip surgeries performed, again, self-assessed understanding and confidence post-test scores were higher in trainees who had previously performed more cleft lip repairs. Objective knowledge pre-test scores were also higher in trainees who had performed a larger number of cleft lip repairs (p=0.005), while no difference in knowledge scores were found post-test.

CONCLUSION: Transforming the classic “one-to-one” to a “one-to-many” apprenticeship model using simulation laboratories maximizes and efficiently delivers technical surgical education. A three-dimensional printed, standardized unilateral complete cleft lip and palate model for haptic surgical simulation demonstrated an improvement in subjective understanding and confidence in trainees for performing surgery. Furthermore, a curriculum incorporating haptic surgical simulation for cleft lip surgery demonstrated equalization of objective knowledge between trainees who have performed fewer repairs when compared to those who have performed greater number of repairs.

Biological Simulator for Training in Cleft Lip Surgery. Validation of the Instrument for the Evaluation of Surgical Competencies in Cleft Lip Surgery with Tennison Randall Queiloplasty

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PURPOSE: The evaluation of surgical skill acquisition in plastic surgery has traditionally relied on subjective opinions of senior faculty. Currently, is shifting toward early competency-based training using validated models. No objective assessment of dexterity, movement skills, and ability exist on the evaluation of surgical techniques for cleft lip cheiloplasty with biological simulators.

OBJECTIVE: To develop and validate the Instrument for the Evaluation of Surgical Competencies in Cleft Lip Surgery with Tennison Randall type Cheiloplasty. This instrument consists on a three-module scale that assess 13 basic surgical parameters during the procedure.

METHODS: In order to validate this assessment instrument, 20 clinical cases of cheiloplasty in rabbits using Tennison Randall technique were performed by second and third year plastic surgery residents, guided by an expert consultant plastic surgery faculty. The procedures were recorded on videos using a video camera. The videos were unedited and evaluated by 3 blinded expert plastic surgeons in cheiloplasty technique, using the Instrument for the Evaluation of Surgical Competencies in Cleft Lip surgery with Tennison Randall type Cheiloplasty. All residents performed the same surgical technique to standardize the assessment as much as possible.

RESULTS: A total summary score was calculated from the sum of the three modules from the Instrument. Mean scores were compared among the three evaluators using analysis of variance. Significant differences were found among the rating scores for the 10 residents but not among the 3 evaluators. Inter-rater reliability was determined using Cronbach’s alpha coefficient (0.89) and task module-specific (0.93) scores suggested high internal consistency for each module.

CONCLUSION: The Instrument for the Evaluation of Surgical Competencies in Cleft Lip Surgery with Tennison Randall type Cheiloplasty is the first validated instrument