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 differing 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

Presenter: Anel Gabriela Briceno Abraham, MD

Co-Authors: Raymundo B. Priego Blancas, MD, PhD; Anabel Villanueva Martinez, MD PhD

Affiliation: Hospital General de Mexico, Mexico City

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 perform by second and third year plastic surgery residents, guided by an expert consultant plastic surgeon 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
for assessing surgical competencies in cleft lip surgery. Proficiency in cleft lip surgery can be achieved over a relatively limited number of practice sessions. Standardized evaluation and systematic learning of conventional surgical techniques is necessary, and is the foundation of competency-based training, which itself is the future of surgical education.

Craniofacial Skills: Validating an Assessment to Aid Plastic Surgery Resident Milestone Achievement in Technical Skills and Instrument Knowledge

Presenter: Katherine Alan Grunzweig, MD
Co-Authors: Ji Son, MD; Anand R. Kumar, MD
Affiliation: University Hospitals Cleveland Medical Center, Cleveland, OH

BACKGROUND: Plastic surgery evaluates residents on milestones. Previously, we defined a model of education including pre and post-test assessments and a single day of lab training intended for evaluating residents in the unique technical skills for craniofacial surgery. This study aims to validate this task-based assessment using solely Saw Bones (TM) and brief instructor education on common technical pitfalls of craniofacial surgery.

METHODS: Three tasks were evaluated: instrument identification (channel retractor, lamina spreader, double guarded nasal osteotome, Obegesser in tow retractor, J inferior border mandible stripper), accuracy of burr hole placement, and accuracy of square craniotomy on craniofacial models. Tasks were evaluated before and after a short teaching simulation by the craniofacial faculty on standard osteotomies, instrument names, and pitfalls of craniofacial surgery. The study population consisted of junior, midlevel, and senior residents with different levels of experience on the University craniofacial service.

RESULTS: Participant performance was analyzed for each post-graduate year, and was grouped by level of training: junior, midlevel and senior resident. Resident accuracy improved for all tasks (instrument naming p=0.00002, burr holes p=0.0031, craniotomy p=0.08). There was no difference in rate of improvement between resident cohorts. Data and feedback was provided to all residents after the post-assessment to guide future improvement.

CONCLUSION: The task-based assessment with resident education on basic craniofacial surgery skills, standard osteotomies, and instrument names directed resident learning and assessed resident knowledge. The craniofacial skills task-assessment successfully evaluated milestone attainment.

HAND AND UPPER EXTREMITY SESSION 3

Free Vascularized Fibula Grafting in the Operative Treatment of Malignant Bone Tumors of the Upper Extremity: A Systematic Review of Outcomes and Complications

Presenter: Daniel J. Gould, MD, PhD
Co-Authors: Mark J. Landau, PhD; Ido Badash, BA; Christine Yin, MD; Ram K. Alluri, MD; Ketan M. Patel, MD
Affiliation: University of Southern California, Los Angeles, CA

BACKGROUND AND OBJECTIVES: Vascularized bone grafting after tumor resection can be an important component in the treatment of bony neoplasms of the upper extremity. The radiographic, clinical, and patient-centered outcomes following VBG of the upper extremity have been reported in several studies; however, no large-scale analysis of outcomes has been performed and no standardization of reporting exists. The purpose of this study was to determine the outcomes of free vascularized fibula grafting (FVFG) in the treatment of upper extremity sarcomas and analyze the reporting of specific clinical and patient-centered parameters during follow-up.

METHODS: A systematic review of the literature of FVFG used in the treatment of upper extremity sarcomas was performed. We excluded case reports and studies in which data was aggregated from multiple different procedures for various diagnoses. The outcomes assessed were patient demographics, classification and location of the tumor, the use of preoperative and/or postoperative radiation and/or chemotherapy, bony union, and patient-centered outcomes.