(p=0.001) emerged as a significant protective factor for overall complications after adjustment for other factors. Wise pattern incisions (p=0.051) increased the odds of complications, although not quite significantly (p=0.051). Age (p=0.007) and body-mass index (p<0.001) continued to significantly increase risk of complications in this model.

CONCLUSION: NSM may be safely performed using various mastectomy incisions, each with unique advantages and limitations. Overall, inframammary fold incisions appear to be associated with lowest complications while Wise pattern incisions may increase risk.

CRANIOMAXILLOFACIAL/HEAD & NECK SESSION 4

Full Facial Allotransplantation Including the Temporomandibular Joints: An Anatomical Study and Surgical Protocol

Presenter: Teresa Nunez-Villaveiran, MD

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INTRODUCTION: Face allotransplantation cardinally shifted the reconstruction paradigm of unmanageable facial defects. Incorporation of temporomandibular joint (TMJ) in total face allotransplant can further improve functional outcome in these patients. The purpose of our study was to evaluate the vascular supply of TMJ and develop a surgical protocol of a total face allotransplantation including TMJ.

METHODS: 100 skulls and mandibles from the Hamann-Todd collection (Cleveland Museum of Natural History) and 100 facial CT scans were examined to evaluate the variability of TMJ dimensions. Intercondylar distance, width, length and height of condyles, mandibular ramus and body dimensions, condylar fossa breadth and anteroposterior dimension, and gonial (GA), intercondylar (ICA) and condyle-symphysis (CSA) angles were measured on dry skulls.

Bilateral frontal ramal inclination (FRI) and lateral ramal inclination (LRI) were measured in 3D reconstructed CT scans. Injection of the common carotid arteries with red-colored latex was performed in eight fresh cadaver heads. They were then dissected for visualization of the vascular branches entering the TMJ. Four fresh cadavers were then used to perform a TMJ-included total face transplantation. Donor allografts were harvested using an extracranial Le Fort III approach combined with a temporal craniotomy to include the total TMJ. Internal carotid and middle meningeal arteries were well preserved. Bilateral sagittal split osteotomy was performed to address any anticipated discrepancy between donor and recipient intercondylar distance. The allograft was transferred to the recipient face and secured with miniplates at the orbital rims and nasal bridge. TMJs were secured on the zygomatic processes of temporal bones by long miniscrews.

RESULTS: Statistically significant difference between genders were observed in all parameters measured on dry skulls except for ICA and CSA. There was a statistically significant difference of FRI between genders in CT measurements. The mean values, standard deviation and the range of all measurement are provided bellow in male vs female format.

Intercondylar distance: 118.1mm±5 (range 104.6-128mm) vs 112.2mm±6.5 (range 98–123.3mm) p<0.05

Gonion-gonion distance: 99.0mm±6.3 (range 86.6–115.3mm) vs 91.2mm±4.9 (range 82.7–104.5mm) p<0.05

Lateral fossa-lateral fossa points: 120.1mm±4.6 (range 109.5–129.1mm) vs 113.3mm±4.9 (range 101.7–123.2mm) p<0.05

ICA: 141.1° ±10.2 (range 118.9–162.5°) vs 139.7°±10.0 (range 119.3–160.3°), p>0.05

CSA: 64.8°±5.6 (range 53.4–74.6°) vs 64.1°±5.6 (range 54–77.1°), p>0.05

GA: 122.4°±7.8 (range 104.2–147.9°) vs 126.4°±6.2 (range 114.2–144.6°), p<0.05

FRI: 79.3°±4.1 (range 69.7–90.2°) vs 77.1°±3.6 (range 71.3–96.9°), p<0.05

LRI: 82.1°±5.4 (range 69.2–96.8°) vs 82.3°±5.8 (range 114.2–144.6°), p>0.05
The TMJ received 1 – 3 direct branches (maximal diameter 0.7–0.8 mm) from the maxillary and middle meningeal arteries medially, and the superficial temporal artery laterally. Fixation of TMJ on zygomatic processes minimally increased the intercondylar distance on recipient face. However, transplanted joints were located more inferior and anterior compared to their normal anatomical position. Class 1 original donor occlusion was achieved with normal ramal inclination and mandibular range of motion.

CONCLUSION: We demonstrated that TMJ-included total face allograft procurement and transplantation is technically and functionally feasible and reasonable occlusion, range of motion and lateral excursions is achievable.

One-Stage Reconstruction Using Dual Innervated Double Muscle Flap Transplantation for Re-Animation of Established Facial Paralysis

**Presenter:** Hajime Matsumine, MD, PhD

**Co-Author:** Hiroyuki Sakurai, MD, PhD

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**BACKGROUND:** A natural smile involves several facial expression muscles. Conventional dynamic reconstruction with a single muscle flap only restores unidirectional movement. Early flap reinnervation prevents atrophy. We describe our one-stage double-muscle reconstruction technique comprising latissimus dorsi (LD) and serratus anterior (SA) flaps, dually reinnervated by the contralateral facial nerve (FN) and ipsilateral masseter nerve (MN) with successful outcomes for reanimation of facial paralysis.

**METHODS:** We used this technique in two facial paralysis patients. A double-muscle flap comprising a left LD and a fifth left SA flap was harvested with the thoracodorsal artery and vein; a 15-cm thoracodorsal nerve (TN) section attached to the LD flap; and 5-cm and 1-cm long thoracic nerve (LTN) sections at the proximal and the distal sides of the SA flap. The buccal branch of the contralateral FN was exposed and the ipsilateral masseter was incised exposing the masseteric nerve. The LD and SA flaps were sutured along the directions of motion of the zygomaticus major and risorius, respectively, in a pocket from the corner of the mouth to the anterior portion of the auricula; the thoracodorsal artery and vein were anastomosed with the facial artery and vein. The contralateral FN and ipsilateral MN were interconnected by triple nerve suturing for dual innervation of two flaps: medial branch of TN to the distal end of the LTN; the proximal end of the LTN to the ipsilateral MN, and the buccal branch of the contralateral FN to the main trunk of the TN. The recipient site was closed conventionally.

**RESULTS:** Good contraction of the transferred flaps resulted in good smile reconstruction. No donor site complication, such as difficulty in abduction was observed.

**CONCLUSION:** Fast axonal outgrowth from the ipsilateral MN achieved swift reinnervation of the SA flap via the long thoracic nerve, and the LD flap via the medial branch of the TN, preventing atrophy of both flaps. Axonal outgrowth from the buccal branch of the contralateral FN dually reinnervated both flaps, enabling reanimation of a natural symmetrical smile.

Swallowing Outcomes of Hypopharyngeal Reconstruction with Free Jejunal Flap - Retrospective Statistical Analysis of 83 Consecutive Cases in Japanese Single Institution -

**Presenter:** Keisuke Takanari, MD, PhD

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**INTRODUCTION:** Total pharyngo-laryngo-esophagectomy (TPLE) and free jejunal flap (FJ) reconstruction has been a widely used procedure for extensive hypopharyngeal or laryngeal cancer. There are several reports that assess swallowing outcomes of hypopharyngeal reconstruction with FJ flap. Pre/postoperative irradiation, chemotherapy and resection of lateral retropharyngeal (Rouviere) lymph nodes are known factors to influence postoperative...