Western

Schulich
MEDICINE & DENTISTRY

Department of Otolaryngology

Thirty-Fourth Annual

RESIDENTS' RESEARCH DAY

Friday, April 25, 2008
The London Hunt and Country Club

PLANNING COMMITTEE MEMBERS

Disclosure Form

I have/have not had in the past 2 years, a financial interest, arrangement or affiliation with one or more organizations that could be perceived as a direct/indirect conflict of interest in the content of the subject of this or any other program.

1. Howard Lampe: None
2. Gordon LeBoldus: None
3. Corey Moore: Grant – “Stryker Leibinger”.

RESIDENTS' RESEARCH DAY PROGRAM
2008

9:00 – 9:15	**WELCOME**	Drs. Lampe/Yoo

CHAIRMAN – DR. GORDON LEBOLDUS

8:30 – 9:15	**COFFEE IN THE EXHIBITORS' AREA**	
9:15 – 9:25	**WELCOME**	
9:25 – 9:30	**Dr. Shahin Nabi**	Two Heads are Better than One: The Experiences of a Combined Pediatric and Head and Neck Otolaryngology Service
9:35 – 9:40	**Interactive Discussion**	
9:40 – 9:50	**Dr. Amanda Hu**	Three Dimensional Educational Computer Model of the Larynx: Voicing a New Direction
9:50 – 9:55	**Interactive Discussion**	
9:55 – 10:05	**Dr. Leigh Sowerby**	Discrepancy between Ultrasonographic and Final Pathology Measurements in Thyroid Nodules
10:05 – 10:10	**Interactive Discussion**	
10:10 – 10:55	**COFFEE IN THE EXHIBITORS' AREA**	
10:55 – 11:05	**Dr. Michael Brandt**	Atrophy Amongst Mucosa-Only versus Muscular-Mucosa Superiorly Based Pharyngeal Flaps: A Pilot Animal Study
11:05 – 11:10	**Interactive Discussion**	
11:10 – 11:20	**Dr. Irene Zhang**	Neurofibromatosis and Velopharyngeal Insufficiency: Is There an Association
11:20 – 11:25	**Interactive Discussion**	
11:25 – 11:30	**INTRODUCTION OF DR. SUMIT AGRAWAL**	**Dr. John Yoo**
11:30 – 12:00	**Dr. Sumit Agrawal**	Metrics in Surgical Simulation
12:00 – 12:05	**Interactive Discussion**	
12:05 – 1:30	**LUNCH**	

CHAIRMAN – DR. COREY MOORE

1:30 – 1:45	**Presentation of Awards**	
1:45 – 1:55	**Dr. Damian Micomonaco**	Development of a New Visual Analogue Scale for the Assessment of Area Scars: The Western Scar Index
1:55 – 2:00	**Interactive Discussion**	
2:00 – 2:10	**Dr. Scott Hamilton**	Microvascular Changes in Radiation-Induced Oral Mucositis
2:10 – 2:15	**Interactive Discussion**	
2:15 – 2:25	**Dr. Shamir Chandarana**	Radiation Induced Fibrosis in Head And Neck Cancer Patients: The Development of a Comprehensive Prospective Database
2:25 – 2:30	**Interactive Discussion**	
2:30 – 2:40	**Dr. Kathryn Roth**	Biomechanical Properties of Facial Retaining Ligaments in the Cadaveric Model: Novel Platysmal-Hyoid Ligament Characterized
2:40 – 2:45	**Interactive Discussion**	
2:45 – 2:55	**INTRODUCTION OF DR. PATRICK GULLANE**	**Dr. John Yoo**
2:55 – 3:25	**Dr. Patrick Gullane**	Head and Neck Surgery: Looking Back and Moving Forward
3:25 – 3:30	**Interactive Discussion**	
3:30 – 3:45	**Evaluation Form Completion**	

TWO HEADS ARE BETTER THAN ONE: THE EXPERIENCES OF A COMBINED PEDIATRIC AND HEAD AND NECK OTOLARYNGOLOGY SERVICE

Dr. Shahin Nabi

OBJECTIVES: Pediatric thyroidectomies and parotidectomies are less common than their adult counterparts. MEN 2 prophylaxis, thyroid malignancies, and parotid neoplasms are common indications. The primary objective of this study is to review the pediatric thyroidectomy and parotidectomy experience at a combined pediatric and head and neck otolaryngology service and assess surgical outcomes and patient satisfaction; the secondary objective is to assess the experiences of other Canadian otolaryngologists performing parotidectomies and thyroidectomies and their comfort level with patients of all age groups.

METHODS: A retrospective chart review of eight consecutive thyroidectomies since August 2006 to April 2008 and three consecutive parotidectomies since November 2005 to April 2008 in children fifteen years of age and younger was performed. One fellowship trained pediatric otolaryngologist and one fellowship trained head and neck otolaryngologist performed the surgeries jointly. Patient demographics, surgical indications, procedures, histopathology, complications, and outcomes were examined. Guardian and patient satisfaction was assessed via a follow-up visual analogue scale questionnaire. The thyroidectomy and parotidectomy experiences of Canadian otolaryngologists were examined via an online survey.

RESULTS: In regards to the primary outcome, in the thyroidectomy group, mean age at time of surgery was 9.8 years (range 5.2-14.9 years), involving two multinodular goitres, four cases of MEN 2A prophylaxis, one Graves' disease, and one hyperplastic solitary thyroid nodule. In the parotidectomy group, mean age at time of surgery was 11.6 years (range 9.8-13.9 years), involving a benign salivary duct cyst, benign lymphoepithelial cyst, and Hodgkin's lymphoma. No serious postoperative complications were reported, however, the child with Graves' disease developed ventilation difficulties during the total thyroidectomy. Tracheomalacia was discovered using a flexible pediatric bronchoscope and the problem was resolved intraoperatively upon advancement of the endotracheal tube with no further sequelae. Patient satisfaction and guardian satisfaction of their child's surgical experience was high. In regards to the secondary outcome, comfort level decreases with younger patients. Fellowship trained pediatric otolaryngologists attempt small numbers of thyroidectomies and parotidectomies per year. Conversely, fellowship trained head and neck otolaryngologists attempt large numbers of cases and are relatively more comfortable in most age groups except in the 0-5 age range where fellowship trained pediatric otolaryngologists are more comfortable.

CONCLUSIONS: The results indicate high guardian and patient satisfaction and low complication rates using a collaborative approach. The national survey indicates decreasing comfort level performing thyroidectomies and parotidectomies with decreasing patient age, fellowship trained head and neck otolaryngologists perform far more thyroidectomies and parotidectomies than fellowship trained pediatric otolaryngologists and are relatively more comfortable in most age groups except the youngest where the opposite is correct. A combined pediatric and head and neck otolaryngology service is highly effective. It combines the knowledge and comfort in the intricacies of pediatric care plus a high volume of experience with thyroid and parotid surgery.

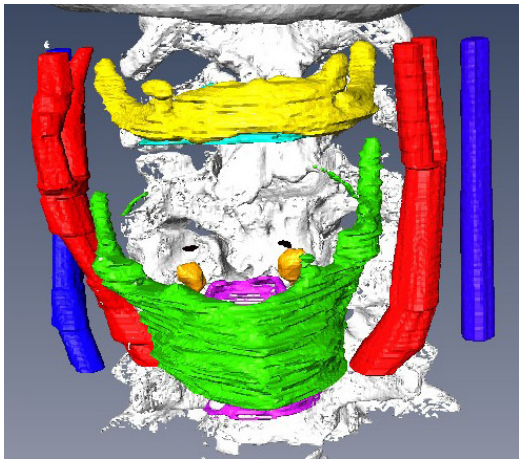
THREE DIMENSIONAL EDUCATIONAL COMPUTER MODEL OF THE LARYNX: VOICING A NEW DIRECTION

Dr. Amanda Hu

OBJECTIVE: Knowledge and understanding of laryngeal anatomy is important for medical students and residents in ENT. Medical educators have been using novel methods to teach human anatomy, like three-dimensional educational computer tools. The need for these three-dimensional computer tools is growing for several reasons. Firstly, the traditional teaching method of cadaver dissection may be ineffective for some organs, like the larynx, where the structures are too small and delicate. Dissecting these structures requires advanced dissection skills which most students lack. Secondly, there has been a decrease use of cadavers in anatomy curricula due to the increasing cost and decreasing availability of materials and curricula time. Thirdly, computer educational tools are portable to any personal computer, making distance education, web based learning, and satellite campuses more feasible. Our objective was to build a three-dimensional educational computer model of the larynx to teach medical students and residents laryngeal anatomy.

METHODS: A male and female adult cadaveric neck was scanned with a micro CT and MRI scanner. Key structures were identified on each slice of the CT and/or MRI and segmented with Amira 4.1. These images of the larynx were exported from Amira 4.1 and imported into Microsoft Powerpoint. Visual text and audio commentary was added to explain the images. Real patient cases of a child's larynx, a tracheostomy, a cricothyrodomy, epiglottitis and a patient with laryngeal carcinoma were also included as clinical vingettes. The final model was converted by Articulate into a Microsoft Flash document.

RESULTS: Below is an example diagram of the laryngeal model.



CONCLUSION: A three-dimensional educational computer model of the larynx has been created. For future directions, we plan on conducting a randomized controlled trial on students to evaluate the efficacy of this three-dimensional educational computer model in teaching laryngeal anatomy.

DISCREPANCY BETWEEN ULTRASONOGRAPHIC AND FINAL PATHOLOGY MESASUREMENTS IN THYROID NODULES

Dr. Leigh Sowerby

BACKGROUND: Staging of differentiated thyroid cancer (DTC) continues to challenge the thyroidologist. Most staging systems use pathological nodule size as a component of staging and this could represent a source of error in classifying disease.

OBJECTIVE: Evaluation of the discrepancy between ultrasonographic and final pathology measurements in thyroid nodules.

METHODS: A retrospective chart review of all thyroidectomies between 1998 and 2007 by four different surgeons at one centre was completed, identifying 676 nodules in 481 thyroids and 598 thyroid lobes. A comparison of discrepancy and concordance of the largest dimension of the nodule by ultrasonographic and pathologic measurement was made
.

RESULTS: A median underestimation by pathology of 0.3cm was present, averaging 20% of the nodule size by pathology. This trend was consistent with subgroup analysis for size, pathology and nodularity and was in a normal distribution. Of primary clinical concern, an underestimation by pathology of 0.4cm was present for papillary carcinoma under 1cm. Grouping nodules by size, a concordance of 80% was present for nodules under 1cm. Statistical testing revealed weak correlation and a kappa of approximately 0.3 for agreement.

CONCLUSION: The recent advances in ultrasound and the constraints of pathology preparation allow an argument to be made for investigation of using ultrasonographic measurements in making treatment decisions.

ATROPHY AMONGST MUCOSA-ONLY VERSUS MUSCULAR-MUCOSA SUPERIORLY BASED PHARYNGEAL FLAPS: A PILOT ANIMAL STUDY

Dr. Michael Brandt

OBJECTIVE: Surgical treatment of velopharyngeal insufficiency employs the use of a superiorly based pharyngeal flap. This flap recreates the naso-oropharyngeal barrier normally formed by the action of the soft-palate against the posterior pharynx. Conventional pharyngeal flaps consist of both muscle and mucosa, with the muscle included to potentially increase survival and overall bulk. Over time, the muscular portion of the flap atrophies but the benefits of the pharyngeal flap persists. The goal of this study was to determine whether a flap comprising of only mucosa atrophies to the same degree as a traditional pharyngeal flap.

DESIGN: Pilot animal study. Blinded randomized control trial.

Participants: 10 animals acted as direct patient surrogates.

INTERVENTIONS: Animals were randomized to undergo a superiorly based pharyngeal flap procedure whereby the flap comprised of either muscle and mucosa or mucosa-only. Blinded volumetric analysis took place via MRI immediately post-operatively, and at 4, 8, and 12 weeks.

MAIN OUTCOME MEASURE(S): Final flap volume, and reduction in flap volume over time were compared.

RESULTS: The two groups demonstrated statistically similar final flap volumes. The atrophy of the flaps over time were statistically similar with the muscular-mucosa group demonstrating a slightly greater reduction.

CONCLUSIONS: This study demonstrates equivalent final superiorly based pharyngeal flap tissue-bulk amongst flaps comprising of only mucosa when compared to conventional flaps. Thus, the mucosa-only pharyngeal flap may yield similar patient outcomes while reducing post-operative discomfort, and providing for an earlier return to normal pharyngeal function.
The results of this investigation provide the empiric basis for the pursuit of research amongst children with VPI.

NEUROFIBROMATOSIS AND VELOPHARYNGEAL INSUFFICIENCY: IS THERE AN ASSOCIATION?

Dr. Irene Zhang

OBJECTIVES: Velopharyngeal Insufficiency (VPI) is a disorder of palatal and nasopharyngeal closure that results in hypernasal speech. It is often under-recognized. The clinical association of VPI and neurofibromatosis remains unclear in the literature. The purpose of this study is to evaluate the clinical association of VPI in Neurofibromatosis (NF) patients.

METHOD: A retrospective study. The NF database from the Medical Genetic unit at University of Western Ontario was utilized over the year of 1998 to 2007. All patients were sent a letter offering participation in the study to screen for VPI. All respondents were evaluated by a VPI trained Speech Language Pathologist who performed perceptual testing using the American Cleft Palate-Craniofacial Association (ACPA) clinical data base form and standard nasometry testing. Chart review was performed on all respondents.

RESULTS: 149 neurofibromatosis patients were identified from the Medical Genetic unit NF database. 18 patients with speech abnormalities were enrolled into the study. A previous three patients had been seen in the VPI clinic from the original 149 patients and as such were included. 11 out of 21 patients were diagnosed to have VPI from ACPA score and SNAP score testing.

CONCLUSIONS: There appears to be a clinical association between VPI and Neurofibromatosis patients. Further studies are ongoing in a prospective manner.

DEVELOPMENT OF A NEW VISUAL ANALOGUE SCALE FOR THE ASSESSMENT OF AREA SCARS: THE WESTERN SCAR INDEX

Dr. Damian Micomonaco

OBJECTIVE: Clinical scar assessment lacks standardized methodology and consensus on the most appropriate evaluation instrument. This study empirically evaluated whether area scars could be validly assessed by naïve observers with the objective to develop and validate a novel multidimensional visual analogue scale (VAS) for the assessment of area scars.

METHODS: Standardized digital photographs of radial forearm free flap (RFFF) donor sites were obtained. Naïve observers evaluated the images in three sequential psychophysical experiments, which led to the development of the new scar scale. These experiments involved initial evaluation of four dimensions (pigmentation, vascularity, observer comfort, acceptability) using a paired comparison (PC) paradigm and correlation with ratings of overall severity using a VAS, and initial VAS test phase followed by formal debriefing, and subsequently, evaluation of a VAS for the 4 dimensions in addition to contour. Validation involved determination of intra- and inter-rater reliability and correlational analysis.

RESULTS: Across all three experiments, 56 observers evaluated 101 images, generating 12,720 observations for analysis. PC data demonstrated observers could assess scars with high reliability and internal consistency for all dimensions (>95%). Overall (VAS) severity correlated highly with all dimensions, including contour. The new VAS yielded high levels of correlation ($r=0.72$ to 0.98, $p<0.01$).

CONCLUSION: Comprehensive VAS analysis demonstrates high reliability in mirroring PC results for multiple dimensions of area scars. These data support our novel multidimensional VAS method as a valid, reliable, simple, and time-efficient instrument for clinical and research use. We introduce the Western Scar Index as a new measurement tool with many potential applications.

MICROVASCULAR CHANGES IN RADIATION-INDUCED ORAL MUCOSITIS

Dr. Scott Hamilton

BACKGROUND: Mucositis is one of the most debilitating side effects of head and neck cancer therapy, and is currently believed to arise from an inflammatory cascade leading to cellular damage. However, no effective treatment has been identified despite extensive attempts with anti-inflammatory medications.

OBJECTIVE: To compare real-time microvascular inflammatory changes with oral mucositis levels in patients undergoing radiotherapy or chemoradiotherapy for head and neck tumours.

DESIGN: Prospective, longitudinal cohort observational study

SETTING: Regional Cancer Program

METHODS: Twenty patients with head and neck tumours were assessed on a weekly basis throughout the course of radiotherapy. Levels of mucositis were graded objectively using the Oral Mucositis Assessment Scale, and subjectively using a patient symptom questionnaire. Video imaging of the sublingual microcirculation was obtained using Orthogonal Polarized Spectral imaging, which was used to quantify inflammatory markers such as microcirculatory velocity, white blood cell margination and extravasation.

RESULTS: Despite very high levels of objective and subjective mucositis, inflammatory changes were not present in the microcirculation.

CONCLUSIONS: Typical microvascular inflammatory changes are not demonstrated in radiation-induced mucositis. These findings contradict the currently proposed mechanism of mucosal damage, and may therefore have important implications in the development of novel therapeutic interventions.

RADIATION INDUCED FIBROSIS IN HEAD AND NECK CANCER PATIENTS: THE DEVELOPMENT OF A COMPREHENSIVE PROSPECTIVE DATABASE

Dr. Shamir Chandarana

An increasing number of mucosal carcinomas of head and neck subsites are being treated with primary radiotherapy/chemoradiotherapy. Neck skin and subcutaneous tissue fibrosis is a debilitating side effect of radiation therapy; however, the degree of fibrosis is patient specific. This fibrosis affects range of motion, swallowing ability and appearance of the neck.

No instrument in the literature has been validated to specifically measure radiation fibrosis in the head and neck cancer population. The objective of the first phase of this study is to demonstrate construct validity for the Cutometer®, an instrument that has been validated to quantify visco-elastic properties of skin. The objective of the second phase of the study is to prospectively develop a data base of head and neck cancer patients that accurately reflects their objective and subjective experience after radiation therapy.

Patients undergoing various modalities of treatment provided by a multidisciplinary head and neck oncology team will be recruited to participate in this study. The primary outcome measure will be the degree of neck fibrosis, as quantified by the cutometer. Secondary outcome measures include the collection of patient demographic data (age, gender, primary site of tumor, stage of tumour, specifics of treatment). Further, the University of Washington Quality of Life Questionnaire, a validated tool specifically designed for patients with head and neck cancer, will be completed by patients through their treatment course.

Preliminary results of data collected thus far will be discussed. The initial data provides construct validity to the cutometer in its use for the measurement of radiation fibrosis, by comparing matched patients who have not received radiation therapy (controls) to those that have (intervention).

The formulation of such a database is a long term endeavor with several possible implications. Identifying patient specific factors that may predict treatment response affords the ability to individualize treatment and council patients more accurately.

BIOMECHANICAL PROPERTIES OF FACIAL RETAINING LIGAMENTS IN THE CADAVERIC MODEL: NOVEL PLATYSMAL-HYOID LIGAMENT CHARACTERIZED

Dr. Kathy Roth

OBJECTIVE: A number of retaining ligaments in the face have been described and hypothesized to play a role in the characteristic changes seen in the aging face. This study aims to further elucidate the biophysical properties of these ligaments. A previously undescribed ligament is proposed as originating from the hyoid and passing through the platysma to support the tissues of the neck at the cervico-mental angle.

METHODS: Microdissection of 10 fresh frozen cadaveric hemi-faces & necks were performed. The orbital, zygomatic, bucco-maxillary and mandibular osteocutaneous ligaments, and the novel platysmal-hyoid ligament were tested to obtain force-displacement curves. Force to initial and to terminal failure as well as a stiffness coefficient were obtained. The platysmal-hyoid ligament was histologically examined using H&E and Masson's trichrome stains.

RESULTS: While the results were consistent with ligament viscoelastic properties, variability in the initial and ultimate load value exists both within and between groups. The zygomatic retaining ligaments were found to be strongest, resisting up to 66N of force prior to failure while the other ligaments ranged from 4 to 15 N. The platysmal-hyoid structure revealed a force-displacement curve consistent with that of the other ligaments. Histology confirms the origin & insertion of the platysmal-hyoid structure.

CONCLUSIONS: The biomechanical properties of the osteo-cutaneous facial ligaments have been quantified. There is variation in ligament strength which is associated with subject age. The viscoelastic and histologic properties of the platysmal-hyoid structure are consistent with that of the other ligaments. Thus, we propose the platysmal-hyoid ligament as another soft-tissue retaining structure that may contribute to the definition of the cervico-mental angle.

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Presented for the most innovative research.

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