



# Department of Otolaryngology

*Thirty-Third Annual*

**RESIDENTS' RESEARCH DAY**

*Friday, May 4, 2007*

*at*

**The London Hunt and Country Club**

# RESIDENTS' RESEARCH DAY PROGRAM 2007

9:00 – 9:15

**WELCOME**

Drs. Lampe/Yoo

## CHAIRMAN – DR. HOWARD LAMPE

- 9:15 – 9:25 **Mr. Luke Harris** Metastatic Cutaneous Squamous Cell Carcinoma to the Parotid Gland: The LHSC Experience
- 9:25 – 9:30 **Interactive Discussion**
- 9:30 – 9:40 **Ms. Naomi Nicholson** Superficial Siderosis: Implications in the Diagnosis and Treatment of Profound Hearing Loss
- 9:40 – 9:45 **Interactive Discussion**
- 9:45 – 9:55 **Dr. Michael Brandt** Assessing Scar Measurement: Are We Measuring Correctly?
- 9:55 – 10:00 **Interactive Discussion**
- 10:00 – 10:10 **Dr. Mohamed Mohamed** Cervical Anomalies in 22Q Microdeletion Syndrome
- 10:10 – 10:15 **Interactive Discussion**
- 10:15 – 10:45 **COFFEE BREAK**
- 10:45 – 10:55 **Dr. Irene Zhang** Swallowing Quality of Life (QOL) in Advanced Larynx and Hypopharynx Cancer Treated with Organ Preservation Vs. Surgery
- 10:55 – 11:00 **Interactive Discussion**
- 11:00 – 11:10 **Dr. Damien Micomonaco** Development of a New Visual Analogue Scale for the Assessment of Area Scars
- 11:10 – 11:15 **Interactive Discussion**
- 11:15 – 11:25 **Dr. Scott Hamilton** Cisplatin Otoprotection Using Transtympanic L-N-Acetylcysteine
- 11:25 – 11:30 **Interactive Discussion**
- 11:30 – 11:55 **Dr. Raj Sindwani** Management of Advanced Frontal Sinus Disease: Shifting Paradigms
- 11:55 – 12:00 **Interactive Discussion**
- 12:00 – 1:30 **LUNCH**

## CHAIRMAN – DR. COREY MOORE

- 1:30 – 1:45 **Presentation of Awards**
- 1:45 – 1:55 **Dr. Shamir Chandarana** The Effect of Autologous Platelet Adhesives on Dermal Fat Graft Resorption Following Reconstruction of a Superficial Parotidectomy Defect: A Double-Blinded Prospective Trial
- 1:55 – 2:00 **Interactive Discussion**
- 2:00 – 2:10 **Dr. Kathryn Roth** Endoscopic Anatomy of the Orbital Floor: Discovery of an Orbitomaxillary Strut
- 2:10 – 2:15 **Interactive Discussion**
- 2:15 – 2:25 **Dr. Matthew Bromwich** The Dizzyfix – Three Trials of a Dynamic Visual Device for the Self Treatment of Benign Paroxysmal Positional Vertigo
- 2:25 – 2:30 **Interactive Discussion**
- 2:30 – 2:40 **Dr. Maya Sardesai** ALA Photodiagnosis: Histological Correlation
- 2:40 – 2:45 **Interactive Discussion**
- 2:45 – 3:10 **Dr. Neal Futran** Advances in Midface Reconstruction
- 3:10 – 3:15 **Interactive Discussion**
- 3:15 – 3:30 Evaluation Form Completion

## **METASTATIC CUTANEOUS SQUAMOUS CELL CARCINOMA TO THE PAROTID GLAND: THE LHSC EXPERIENCE**

**Mr. Luke Harris**

**Background:** This study evaluated our experience with metastatic cutaneous SCC (MCSCC) to the parotid gland.

**Methods:** We performed a retrospective review of all parotidectomies conducted at a single institution (London Health Sciences Centre) by two of the study authors (JY and KF) from 1997 to 2004. Patients with a diagnosis of MCSCC having a minimum follow up of one year were selected for further analysis.

**Results:** Two hundred and thirty two patients underwent parotidectomy during the time interval. MCSCC was the most common malignant diagnosis (40.7% of malignancies). In this cohort, the median age was 74 years (range, 51-91) and the male to female ratio was 37:7. The positive predictive value (PPV) of the preoperative CT scan was 62.5%. Thirty-six patients were treated by parotidectomy, neck dissection, and postoperative radiotherapy. Overall five year survival and disease-specific five year survival were 50.8% and 62.8%, respectively. Five year locoregional recurrence was 22.9%.

**Conclusions:** MCSCC was the most common malignancy in our series. Almost half of the patients had cervical nodal disease. There was a significant rate of occult nodal disease. The ability to detect nodal metastases by CT scanning is limited.



## **SUPERFICIAL SIDEROSIS: IMPLICATIONS IN THE DIAGNOSIS AND TREATMENT OF PROFOUND HEARING LOSS**

**Ms. Naomi Nicholson**

Superficial siderosis is an under-reported cause of profound sensorineural hearing loss that is now easier to diagnose thanks to its characteristic MRI findings. It results from chronic subarachnoid hemorrhage leading to hemosiderin deposition in the intrathecal space, commonly along the 8<sup>th</sup> cranial nerve. In this paper we review two patients with sensorineural hearing loss who were referred to our tertiary care centre for a cochlear implant. The diagnosis of superficial siderosis was only made post-cochlear implantation, after complications led to a thorough neurologic assessment.

We review the pathogenesis, clinical and imaging findings of superficial siderosis as well as the literature regarding cochlear implantation and superficial siderosis. Unfortunately, due to the paucity of clinical cases, no conclusions regarding outcome predictors can be made though our own patients' outcomes were less than desirable. Presently, superficial siderosis and its resulting sensorineural hearing loss is not a contraindication for cochlear implantation, but as clinicians become more aware of this illness, more research can be conducted.

**Keywords:** deafness, ataxia, hearing loss, superficial siderosis, cochlear implant

## ASSESSING SCAR MEASUREMENT: ARE WE MEASURING CORRECTLY?

Dr. Michael Brandt

**Background & Objectives:** Every surgical incision results in some form of post-operative scarring. This is of greatest significance to the individual undergoing a cervicofacial procedure as they must wear their scar on their face for the rest of their life. Based on the substantial psychosocial impact of scarring, a significant industry has been built around its aesthetic improvement with little objective research to justify commercial promises. At present, there is no gold-standard assessment instrument for the evaluation of skin scarring. The assessment tools most widely accepted and utilized attempt to objectively measure scar features using equal appearing interval (EAI) scales. Despite the reported reliability, and internal consistency of these measurement tools, the use of a quantitative EAI scale for the measurement of a qualitative perceptual judgment raises the question of the appropriateness and validity of such scales. Should the qualitative features of a scar not allow for standard linear measurement, the present assessment tools may not be the best means by which to objectively evaluate a scar. Furthermore, the experimental literature addressing the use of scales for perceptual judgments suggests that one needs to empirically evaluate whether a particular dimension of interest is of a linear or curvilinear dimension. Thus, this study determined if the results obtained using current measurement tools fit a linear or curvilinear function, and by doing so, assessed whether these scales provide a valid basis for the assessment of surgical scarring.

**Methods:** Twenty-four young adults assessed a set of 30 scar photos in random sequence using dimensions and definitions from the Patient and Observer Scar Assessment Scale (POSAS), the Vancouver Scar Scale (VSS). This rating procedure was conducted using EAI methods and a rating method termed direct magnitude estimation (DME). For the DME method, a single photo was selected to serve as a comparative “modulus”. The modulus is used as a point of reference from which all other measures are generated.

Data from both EAI and DME methods for the scar dimensions of vascularity, pigmentation, thickness, pliability, and surface area were obtained. Each observer performed both EAI and DME measures of all scars in a counterbalance manner for two randomly selected features. These data were then assessed for inter-rater consistency and to determine whether particular scar features fit a linear or curvilinear mathematical model.

**Results:** Both the VSS and POSAS demonstrated excellent inter-rater reliability (>80%). Using the DME technique, it was determined that scar features and their severity do not fit a linear mathematical model. Fitting the generated data to a mathematical function further demonstrated the curvilinear nature of scar assessment.

**Conclusion and Significance:** The results of this study objectively demonstrate that scar assessment does not follow a linear model. Thus, present assessment instruments using linear EAI measurement scales do not accurately evaluate and represent observer perceptions for features that characterize scars. This study provides an empirical foundation for the generation of an accurate scar assessment instrument which will allow for the valid evaluation of scarring and the techniques employed for scar improvement.

## **CERVICAL ANOMALIES IN 22Q MICRODELETION SYNDROME**

**Dr. Mohamed Mohamed**

**Objectives:** To evaluate the incidence of cervical spine anatomic and functional anomalies in Velocardiofacial syndrome.

**Design:** Prospective enrolment for imaging of the C-spine in patients that are screened positive for the 22Q microdeletion in a tertiary care velopharyngeal insufficiency clinic(VPI).

**Methods:** All patients are screened by FISH testing for 22Q microdeletion upon entrance to the VPI clinic at Thames Valley Children's Centre, London, Ontario. Patients are then imaged with C-spine flexion and extension Xrays looking for instability. In addition, CT of the C-spine is carried out to look for anatomic abnormalities.

**Results and Discussion:** Specific anatomic anomalies were identified in this pilot study. The significance of these results are discussed as they apply to surgery on this population and for future research.

**SWALLOWING QUALITY OF LIFE (QOL) IN ADVANCED LARYNX  
AND HYPOPHARYNX CANCER TREATED WITH  
ORGAN PRESERVATION VS. SURGERY**

**Dr. Irene Zhang**

**Background:** Advanced laryngeal cancer (CA) is managed with total laryngectomy (TL) and post-operative radiation (RT) or concurrent chemoradiation.

**Purpose/Objective:** To comprehensively evaluate swallowing in patients following treatment for advanced larynx and hypopharynx CA.

**Materials/Methods:** All consecutive patients with stage III/IV larynx or hypopharynx CA from a single institution between 1999-2005 were enrolled. All patients were greater than 1-year post curative treatment with surgery +/- adjuvant RT/CRT, RT, or CRT. Using objective swallowing measures and validated questionnaires, swallowing QOL was assessed.

**Results:** Surgery with adjuvant treatment tended to have more strictures, 31.8% than RT alone, 12.9%, (P=0.098). MDADI did not show differences between treatment groups.

**Conclusions:** Organ preservation with CRT is associated with more frequent and prolonged use of nutritional support in the short term, but long term QOL appears to be similar to patients treated with radical surgery.

## DEVELOPMENT OF A NEW VISUAL ANALOGUE SCALE FOR THE ASSESSMENT OF AREA SCARS

**Dr. Damien Micomonaco**

**Background:** The field of clinical scar assessment lacks a standardized methodology and general consensus on the most appropriate tools for evaluation. As such, current clinical practice utilizes a wide array of both subjective and objective scar assessment tools, but with a focus on linear defects. Due to the lack of standardized methodology many of these tools are used to assess a wide range of scar types for which they were not intended. These include burn, linear and area scars. This deficit is most apparent relative to the evaluation of area scars such as those that occur secondary to free flap reconstruction. Currently, no measures exist specific to large area scars. The application of such tools to assess scars for which it was not intended reduces sensitivity, consistency and reliability. The purpose of this study was to evaluate whether lay observers can validly assess area scars, and to evaluate the utility of a new visual analogue scale for the assessment of area scars.

**Methods:** A series of 10 area scars secondary to radial forearm free flap reconstruction were empirically evaluated by naïve young adults observers using a paired comparison (PC) paradigm. Observers evaluated 108 scar pairs for two, randomly selected dimensions (vascularity, pigmentation, observer comfort, and acceptability). All observers were then asked to assess each scar using a newly developed visual analogue (VA) scale that assessed severity. This new VA evaluation scale was evaluated as a scar assessment tool for use in a clinical trial investigating the effects of autologous plasma adhesives on wound healing in radial forearm free tissue transfer and skin graft reconstruction. The VA evaluation tool will be used to evaluate digital photographs of area scars taken using a newly developed standardized photographic system.

**Results:** Based on data obtained in the PC phase of the study, observers were able to assess the series of scars with a high degree of reliability for all dimensions assessed. As a result, a very consistent hierarchy of parametrically based assessments emerged for all four dimensions evaluated using the PC paradigm. Regardless of dimension assessed, observers were found to demonstrate consistency levels for judgment >80%. In regard to use of the new VA scale for measurement of scar severity, statistical analysis indicated high correlations between PC ratings of pigmentation, acceptability, and observer comfort ( $r>0.9$ ). Vascularity did not appear to be a strong predictor of severity.

**Conclusions:** Use of the PC paradigm demonstrated strong and consistent capacity of observers to sort and classify area scars. This suggests that while specific dimensions (vascularity and pigmentation) can be evaluated, more global measures of scar characteristics may be more advantageous clinically. Comprehensive assessment of severity may carry great value to patients who must live with large area scars following treatment of head and neck cancers. Data obtained using the VA scale suggest that it is not only time efficient, but highly successful in mirroring results from the more elaborate PC method. Therefore, the present data provides a rich foundation from which a method for quantifying area scars can be developed.



# CISPLATIN OTOPROTECTION USING TRANSTYMPANIC L-N-ACETYLCYSTEINE

**Dr. Scott Hamilton**

**Background:** Cisplatin is currently one of the most effective types of chemotherapy for a broad spectrum of tumours. Its dosing is primarily limited by a high incidence of ototoxicity, with bilateral high frequency hearing loss commonly reported. There is growing evidence that the mechanism of cisplatin ototoxicity lies in an accumulation of reactive oxygen species (ROS). Though systemic antioxidants have demonstrated a drastic reduction in cisplatin-associated hearing loss, a reduction in cisplatin's oncologic effect has prevented their clinical use. A much smaller dose, delivered directly to the inner ear, has been shown in animals to have a similar protective effect on hearing without influencing the anti-tumour effect of chemotherapy.

**Objective/ Hypothesis:** The objective of this study is to determine the ability of transtympanic L-N-Acetylcysteine to decrease the ototoxicity of cisplatin treatment. It is hypothesized that daily treatment with a transtympanic microwick system will decrease loss in sensorineural hearing and speech discrimination, as well as result in decreased tinnitus.

**Protocol Overview:** All patients scheduled to initiate high dose cisplatin therapy will be approached for study enrolment. Patients will undergo a pre-treatment audiologic assessment. A tympanostomy tube and Silverstein microwick will then be inserted into one ear. Ear drops containing L-NAC will be administered daily on the side with the wick over the course of chemotherapy. Following treatment completion, the tympanostomy tube will be removed and patients will have their audiologic evaluation repeated.

**Potential Study Significance:** Hearing protection with L-NAC would allow more patients to have a therapeutic dose of cisplatin and reduce the number of patients requiring hearing amplification following chemotherapy.



**THE EFFECT OF AUTOLOGOUS PLATELET ADHESIVES  
ON DERMAL FAT GRAFT RESORPTION FOLLOWING  
RECONSTRUCTION OF A SUPERFICIAL PAROTIDECTOMY  
DEFECT: A DOUBLE-BLINDED PROSPECTIVE TRIAL**

**Dr. Shamir Chandarana**

**Background:** Following parotidectomy, dermal fat grafts (DFG) are used to reconstruct facial contour defects. Post-operatively, variable DFG resorption has been observed. Application of autologous platelet adhesive (APA) to the surgical bed, obtained from patient's blood intra-operatively, has been shown to augment wound healing.

**Objectives:** The primary objective of this study is to compare DFG resorption between patients receiving APA versus controls.

**Study Design:** Double blinded prospective cohort.

**Setting:** Tertiary Care Centre.

**Main Outcome Measure:** Volumetric Analyses of DFG extrapolated from Magnetic Resonance Imaging (MRI) scans.

**Methods:** Patients undergoing a parotidectomy with DFG reconstruction were divided into two cohorts: those receiving APA and controls. All patients underwent one and six-month MRI scans. DFG resorption was quantified by a radiologist blinded to the intervention using volumetric analysis software. In addition, patients were prospectively followed for complications. At the six month follow – up, evidence of Frey's Syndrome was elicited with the starch-iodine test, and questionnaires were used to measure patient satisfaction.

**Results:** Sixteen sequential patients were analyzed, eight of which received APA. A statistically significant difference was seen in percentage graft take between the control group (31% take) and the APA group (57%)( $p = .01$ ). Three patients in the control group had fat liquefaction compared to none in the APA group. Significant differences were also found in patient satisfaction.

**Conclusion:** This study demonstrates that the application of APA to a DFG is associated with improved graft viability at 6 months.

**Key Words:** Parotidectomy, Dermal Fat Graft, Autologous Plasma Adhesive, Platelet Rich Protein

## ENDOSCOPIC ANATOMY OF THE ORBITAL FLOOR: DISCOVERY OF AN ORBITOMAXILLARY STRUT

**Dr. Kathy Roth**

**Objective:** The primary objective was to determine accurate measurements of orbital floor endoscopic landmarks, which may be useful in repair of orbital fractures. A second aim was to characterize the newly described orbitomaxillary strut, and to determine its role in orbital blow-out fracture patterns.

**Methods:** Three-dimensional CT reconstructions of the orbit and maxillary sinus of 12 cadaveric specimens were obtained. The orbital floor topography was measured for thickness and density. Scans were correlated with endoscopic anatomy of the orbital floor and gross dissections. Pressure, tension, and stress measurements were obtained in a pilot study simulating the hydraulic theory of orbital floor fracture.

**Results:** Predictable endoscopic orbital and maxillary sinus landmarks were identified with measurements from standardized locations. A linear bony thickening of the orbital floor extending down both the medial and lateral maxillary sinus walls was consistently observed. This strut was found at a mean distance of 12 mm medial to the orbital rim and correlated with computed tomography measures. It was found to withstand a uniformly distributed pressure of 730 mmHg without fracture.

**Conclusions:** A newly observed orbitomaxillary strut is identified and further characterized with regard to density and strength. This buttress may be responsible for fracture patterns seen in orbital injuries. Significant pleomorphism within the craniofacial structure exists; thus, these consistent, measurable orbital floor anatomic landmarks may guide surgeons in endoscopic repair of orbital floor fractures.

# THE DIZZYFIX – THREE TRIALS OF A DYNAMIC VISUAL DEVICE FOR THE SELF TREATMENT OF BENIGN PAROXYSMAL POSITIONAL VERTIGO

**Dr. Matthew Bromwich**

**Objective:** To test the safety, reliability and efficacy of a completely new device for the home treatment of BPPV.

**Design:** Prospective.

**Setting:** Tertiary care hospital

**Methods:** Three separate trials were conducted to test the DizzyFIX device. Trial one examined the ability of the device to assist in the performance of the particle repositioning maneuver (PRM) (n=50). Trial two examined the positive and negative predictive outcomes of the device when used by residents blinded to the device (n=25). Trial three examined patients with active BPPV who used the device as their primary treatment modality (n=12) and compared them with physician guided controls (n=30).

**Main outcome measures:** Data endpoints included the Dizziness Handicap Inventory, the Particle Repositioning Maneuver score, observer score and resolution and recurrence rates.

**Results:** In trial one, volunteers who used the device performed the maneuver significantly better than those who relied on instructions alone ( $p < 0.001$ ). In trial two, a significant association was found between having conducted a correct maneuver and the device reporting a correct maneuver. Finally, in trial three, patients with active BPPV who used the DizzyFIX as their primary treatment reported immediate resolution of symptoms in 92% of cases (n=12). This rate was comparable to that of the standard treatment group (83%, n=30). This difference was not significant ( $p = 0.27$ ).

**Conclusions:** The use of this device enables patients to conduct a safe, reliable and effective PRM without physician intervention. Success rates appear similar to those of an otolaryngologist.

**Keywords:** BPPV, Self treatment, Randomized, Device, Prospective

## ALA PHOTODIAGNOSIS: HISTOLOGICAL CORRELATION

Dr. Maya Sardesai

**Hypothesis and Objectives:** Recently, the topical application of 5-aminolevulinic acid ALA and the resulting photodynamic effect have been used for photodiagnosis (PD) and excision of cutaneous lesions of the head and neck. To date, no histological correlation has been evaluated. This study determines whether the various photodynamic effects resulting from the topical application of ALA to cutaneous lesions can be correlated with specific histological findings.

**Design:** Single centre, single surgeon, randomized single-blinded prospective cohort study.

**Methods:** Topical ALA was applied to consenting patients undergoing local excision of cutaneous lesions. The gross resection margins were marked prior to examining the lesion for photodynamic effect. Three standardised locations along the fluorescent spectrum were then biopsied. Blinded pathologists with expertise in cutaneous lesions examined the randomized specimens and reported findings based on standardised descriptions.

**Results:** Thirteen lesions were examined and biopsied for red, yellow, and fuschia-pink fluorescence. The lesions included a spectrum ranging from normal skin to solar elastosis, actinic keratosis, and squamous and basal cell carcinoma. No consistent association between colour of fluorescence and histological features was found.

**Conclusions:** Contrary to previous assumptions, ALA fluorescence may not be a reliable indicator of pathological abnormality in cutaneous lesions. Further evaluation is required.

**DISTINGUISHED VISITING PROFESSOR**  
**Department of Otolaryngology**

***DR. NEAL FUTRAN***  
***Director of Head and Neck Surgery &***  
***Neurological Surgery***  
***University of Washington***

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**DISTINGUISHED ALUMNUS**  
**Department of Otolaryngology**

***DR. RAJ SINDWANI***  
***Chief of the Division of Rhinology***  
***& Sinus Surgery***  
***Saint Louis University***

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## SPONSORS

**This program has been made possible through an educational grant from:**

The University of Western Ontario, Department of Otolaryngology

St. Joseph's Health Care London

London Health Sciences Centre

Dr. Charles A. Thompson

Dr. Thomas A. Martin

Abbott Laboratories, Ltd.

Alcon Canada Inc.

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Medtronic of Canada Ltd.

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Wishes to thank the above  
Persons and Companies



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*Presented for the most eloquent presentation including evaluation of audio-visual aids.*

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